

Ch. 1 Linear Functions, Equations, and Inequalities

1.1 Real Numbers and the Rectangular Coordinate System

1 List Elements in Specified Subset of Real Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

For the set, list all elements that belong to the specified set.

- 1) $\left\{0, \sqrt{7}, -22, \frac{2}{5}, -\frac{5}{2}, 8.1, 3\right\}$; Integers
A) 0, -22, 3 B) 10 C) 10, -22 D) 10, $\sqrt{7}$
- 2) $\left\{20, \sqrt{6}, -5, 0, \frac{2}{3}, -\frac{3}{2}, 3.9\right\}$; Whole numbers
A) 20, 0 B) 20, -5, 0 C) 20, -5 D) 20
- 3) $\left\{\sqrt{6}, -12, 0, \frac{1}{4}, -4, 9.5, 2\right\}$; Natural numbers
A) 2 B) 0, 2 C) 0 D) -12, 0
- 4) $\{9, \sqrt{5}, -11, 0\}$; Real numbers
A) 9, $\sqrt{5}$, -11, 0 B) 9, -11, 0 C) 9, 0 D) 9
- 5) $\{11, \sqrt{7}, -10, 0, 0.86\}$; Rational numbers
A) 11, -10, 0, 0.86 B) 11, 0 C) $\sqrt{7}$ D) $\sqrt{7}$, 0.86
- 6) $\{10, \sqrt{6}, -21, 0, 0.75\}$; Irrational numbers
A) $\sqrt{6}$ B) $\sqrt{6}$, 0.75 C) $\sqrt{6}$, -21 D) $\sqrt{6}$, 0, 0.75

2 State Number Type

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

For the measured quantity, state the set of numbers that is most appropriate to describe it. Choose from the natural numbers, integers, and rational numbers.

- 1) Number of students in various high schools
A) Natural numbers B) Integers C) Rational numbers
- 2) Hat sizes
A) Rational numbers B) Integers C) Natural numbers
- 3) Temperatures given in a weather forecast for Alaska
A) Integers B) Natural numbers C) Rational numbers
- 4) High temperatures during heat waves in California
A) Natural numbers B) Integers C) Rational numbers
- 5) Net annual incomes of local manufacturers, in dollars
A) Integers B) Natural numbers C) Rational numbers
- 6) The lengths of randomly cut pieces of string (measured using a ruler)
A) Rational numbers B) Natural numbers C) Integers

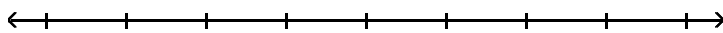
- 7) The populations of armies of termites living in the walls of houses
 A) Natural numbers B) Rational numbers C) Integers
- 8) The lengths of randomly cut pieces of string (measured to the nearest inch)
 A) Natural numbers B) Integers C) Rational numbers
- 9) The average speeds of race cars for one lap at Wilmot Speedway
 A) Rational numbers B) Integers C) Natural numbers
- 10) The number of cars sold in an average month at Bob's Auto Sales
 A) Natural numbers B) Integers C) Rational numbers

3 Graph Set of Numbers on Number Line

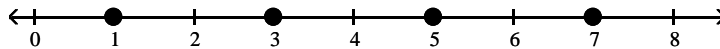
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the set of numbers on a number line.

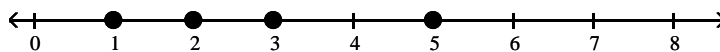
- 1) $\{1, 3, 5, 7\}$



A)



B)



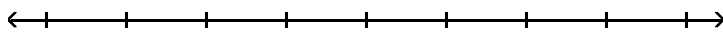
C)



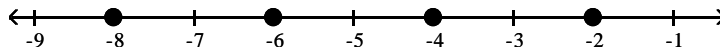
D)



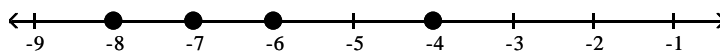
- 2) $\{-8, -6, -4, -2\}$



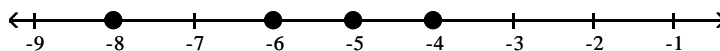
A)



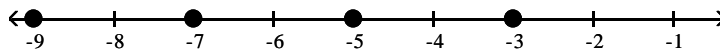
B)



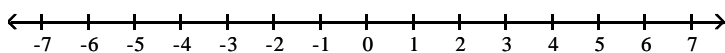
C)



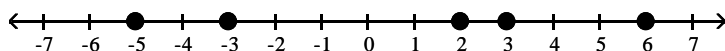
D)



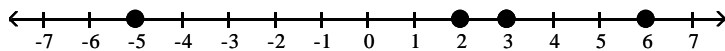
3) $\{-5, -3, 6, 3, 2\}$



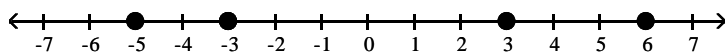
A)



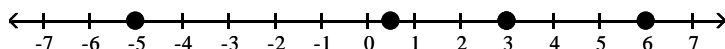
B)



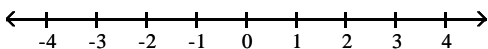
C)



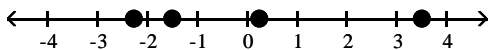
D)



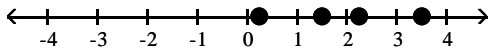
4) $\{-1.5, 0.25, 3.5, -2.25\}$



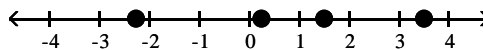
A)



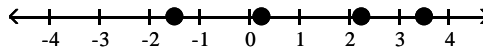
C)



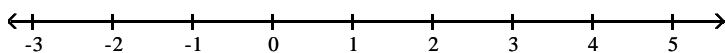
B)



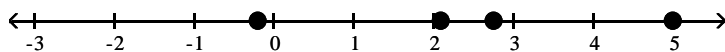
D)



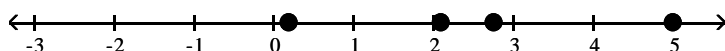
5) $\left\{-0.2, 2.1, \frac{11}{4}, 5\right\}$



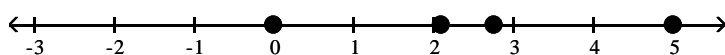
A)



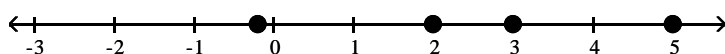
B)



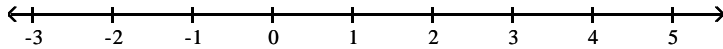
C)



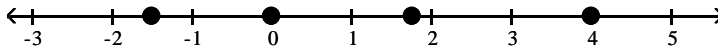
D)



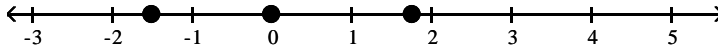
$$6) \left\{ -\frac{3}{2}, 0, \frac{7}{4}, 4 \right\}$$



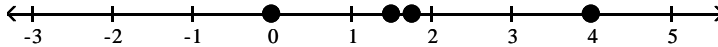
A)



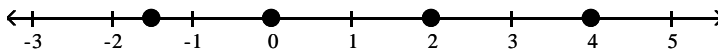
B)



C)



D)



4 Identify Quadrant of Point

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Locate the point on a rectangular coordinate system. Identify the quadrant , if any, in which the point lies.

1) (14, 3)

A) I

B) II

C) III

D) IV

2) (17, -4)

A) IV

B) I

C) II

D) III

3) (-4, 16)

A) II

B) IV

C) III

D) None

4) (-16, -8)

A) III

B) I

C) II

D) IV

5) $\left(-\frac{3}{4}, 0 \right)$

A) III

B) IV

C) II

D) None

6) $\left(-\frac{3}{7}, \frac{2}{7} \right)$

A) II

B) I

C) IV

D) None

7) (0, 0)

A) IV

B) I

C) II

D) None

5 Name Possible Quadrants of Point Given Condition

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Name the possible quadrants in which the point (x, y) can lie if the condition is true.

1) $yx < 0$

A) II or IV

B) II or III

C) I or II

D) III or IV

2) $0 < xy$

A) I or III

B) II or III

C) II or IV

D) III or IV

3) $\frac{y}{x} < 0$

A) II or IV

B) II or III

C) I or II

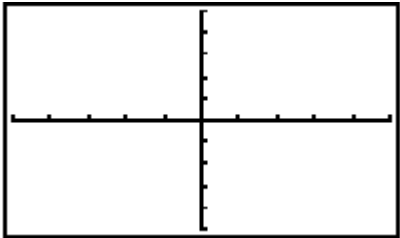
D) III or IV

6 Tech: Find Xmin, Xmax, Ymin, and Ymax From Xscl and Yscl

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Give the values of Xmin, Xmax, Ymin, and Ymax for the screen, given the values for Xscl and Yscl.

1)



Xscl = 1, Yscl = 1

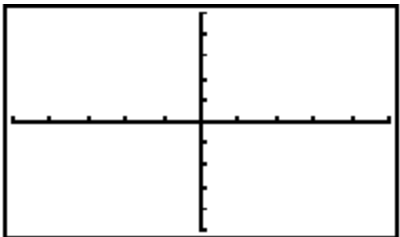
A) $[-5, 5]$ by $[-5, 5]$

B) $[-10, 10]$ by $[-10, 10]$

C) $[5, -5]$ by $[5, -5]$

D) $[10, -10]$ by $[10, -10]$

2)



Xscl = 2, Yscl = 2

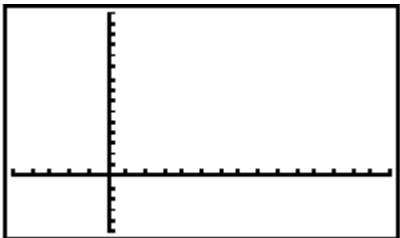
A) $[-10, 10]$ by $[-10, 10]$

B) $[-5, 5]$ by $[-5, 5]$

C) $[10, -10]$ by $[10, -10]$

D) $[5, -5]$ by $[5, -5]$

3)



Xscl = 1, Yscl = 1

A) $[-5, 15]$ by $[-5, 15]$

B) $[15, -5]$ by $[15, -5]$

C) $[-15, 5]$ by $[-15, 5]$

D) $[5, -15]$ by $[5, -15]$

4)

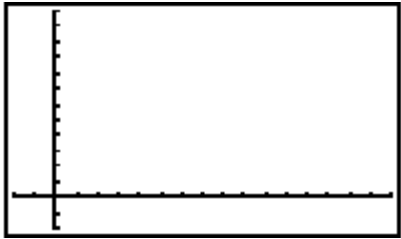


Xscl = 10, Yscl = 10

- A) $[-30, 30]$ by $[-40, 40]$
 C) $[-40, 40]$ by $[-30, 30]$

- B) $[-3, 3]$ by $[-4, 4]$
 D) $[-4, 4]$ by $[-3, 3]$

5)

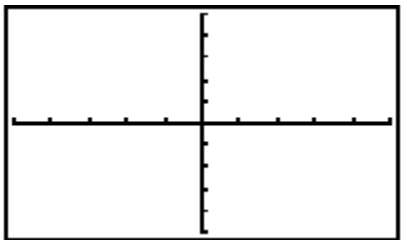


Xscl = 5, Yscl = 5

- A) $[-10, 80]$ by $[-10, 60]$
 C) $[-2, 16]$ by $[-2, 12]$

- B) $[-10, 60]$ by $[-10, 80]$
 D) $[-2, 12]$ by $[-2, 16]$

6)

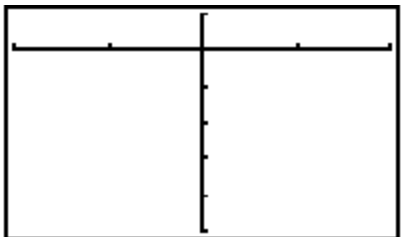


Xscl = 4, Yscl = 2

- A) $[-20, 20]$ by $[-10, 10]$
 C) $[-5, 5]$ by $[-5, 5]$

- B) $[-10, 10]$ by $[-20, 20]$
 D) $[-10, 10]$ by $[-10, 10]$

7)

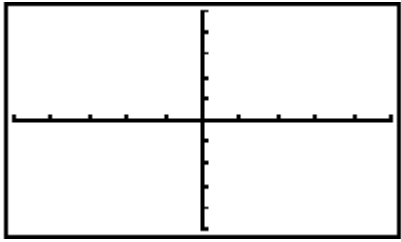


Xscl = 15, Yscl = 10

- A) $[-30, 30]$ by $[-50, 10]$
 C) $[-20, 20]$ by $[-10, 50]$

- B) $[-2, 2]$ by $[-5, 1]$
 D) $[-50, 10]$ by $[-30, 30]$

8)



Xscl = 2, Yscl = .2

- A) $[-10, 10]$ by $[-1, 1]$
 C) $[-10, 10]$ by $[-10, 10]$

- B) $[-5, 5]$ by $[-5, 5]$
 D) $[-1, 1]$ by $[-10, 10]$

9)

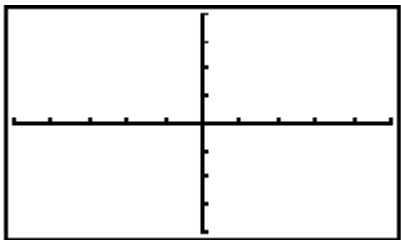


Xscl = 7, Yscl = 8

- A) $[-28, 35]$ by $[-16, 24]$
 C) $[-4, 5]$ by $[-2, 3]$

- B) $[-16, 24]$ by $[-28, 35]$
 D) $[-2, 3]$ by $[-4, 5]$

10)



Xscl = .3, Yscl = .5

- A) $[-1.5, 1.5]$ by $[-2, 2]$
 C) $[-15, 15]$ by $[-20, 20]$

- B) $[-5, 5]$ by $[-4, 4]$
 D) $[-4, 4]$ by $[-5, 5]$

7 Tech: Find Approximation of Root or Power

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find a decimal approximation of the root or power. Round the answer to the nearest thousandth.

1) $\sqrt{5}$

- A) 2.236 B) 2.241 C) 2.233 D) 5.000

2) $\sqrt{31}$

- A) 5.568 B) 5.573 C) 5.565 D) 31.000

3) $\sqrt{274}$

- A) 16.553 B) 16.558 C) 16.550 D) 274.000

- 4) $\sqrt{2254}$
 A) 47.476 B) 47.481 C) 47.473 D) 2254.000
- 5) $\sqrt{163}$
 A) 12.767 B) 12.782 C) 12.754 D) 12.000
- 6) $23^{1/3}$
 A) 2.844 B) -23 C) 529 D) 12,167
- 7) $\sqrt[4]{981}$
 A) 5.597 B) 31.321 C) -5.597 D) -31.321
- 8) $71^{1/2}$
 A) 8.426 B) -142.000 C) 142.000 D) 35.5
- 9) $\sqrt[3]{77}$
 A) 4.254 B) 3.254 C) 6.554 D) 4.954

8 Tech: Approximate Expression

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

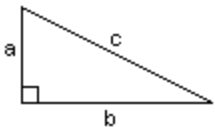
Approximate the expression to the nearest thousandth.

- 1) $\sqrt{157 + \pi^3}$
 A) 13.712 B) 14.736 C) 11.241 D) 14.699
- 2) $|9 - \pi^4|$
 A) 88.409 B) -88.409 C) -90.42 D) 90.421
- 3) $\frac{3.55 - 7.28}{21.8 + 3.7}$
 A) -0.146 B) -0.096 C) -0.102 D) -0.111
- 4) $7.3(2.1^2) - 2(5.3) + 6$
 A) 27.593 B) 33.593 C) -45.407 D) 21.593

9 Find Length of Unknown Side of Right Triangle

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the length of the unknown side of the right triangle. In each case, a and b represent the lengths of the legs and c represents the length of the hypotenuse.



- 1) $a = 3, b = 4$; find c
 A) 5 B) 25 C) 7 D) $\sqrt{7}$
- 2) $a = 16, c = 34$; find b
 A) 30 B) 1156 C) 1412 D) $2\sqrt{353}$

3) $a = \sqrt{11}$, $b = \sqrt{14}$; find c

A) 5

B) 25

C) $\sqrt{317}$

D) 317

4) $b = 6$, $c = 10$; find a

A) 8

B) 10

C) 7

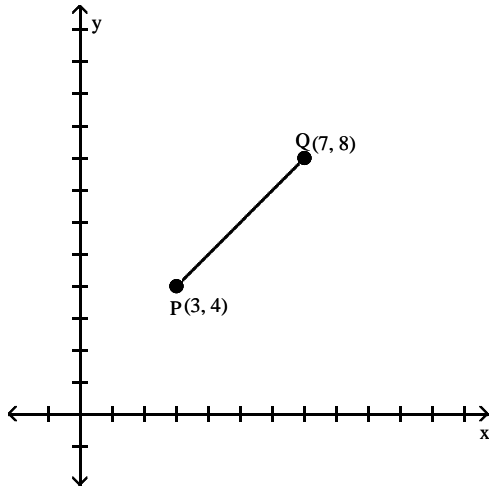
D) 9

10 Find Length and Midpoint of Segment Given Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the distance between P and Q and the coordinates of the midpoint of the segment joining P and Q.

1)



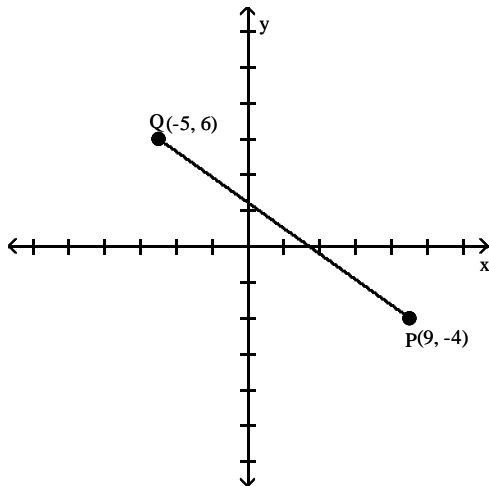
A) $4\sqrt{2}$; (5, 6)

B) 8; (10, 12)

C) 8; (-4, -4)

D) $4\sqrt{2}$; (6, 5)

2)



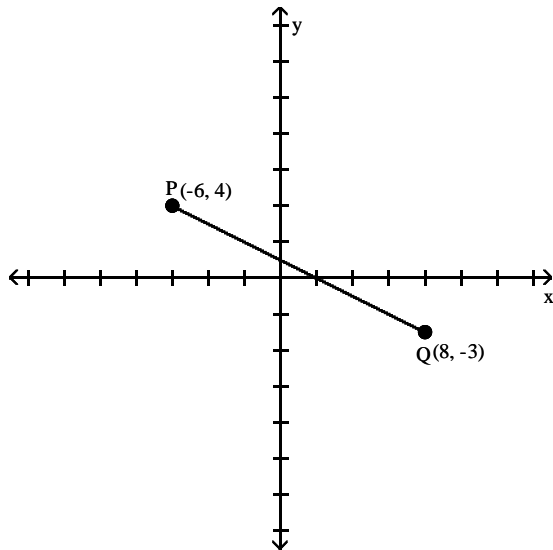
A) $2\sqrt{74}$; (2, 1)

B) 4; (4, 2)

C) 4; (14, -10)

D) $2\sqrt{74}$; (1, 2)

3)



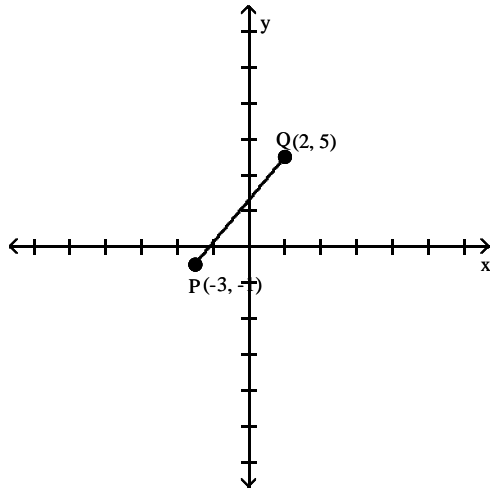
A) $7\sqrt{5}; \left(1, \frac{1}{2}\right)$

B) $7\sqrt{5}; \left(\frac{1}{2}, 1\right)$

C) $7\sqrt{3}; \left(\frac{3}{2}, \frac{1}{2}\right)$

D) $7\sqrt{5}; \left(\frac{1}{2}, \frac{3}{2}\right)$

4)



A) $\sqrt{61}; \left(-\frac{1}{2}, 2\right)$

B) $\sqrt{61}; \left(-\frac{1}{2}, -2\right)$

C) $i\sqrt{11}; \left(-2, \frac{1}{2}\right)$

D) $\sqrt{53}; \left(-2, -\frac{1}{2}\right)$

11 Find Length and Midpoint of Segment Given Points

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the distance between P and Q and the coordinates of the midpoint of the segment joining P and Q.

1) P(5, 2), Q(1, 8)

A) $2\sqrt{13}; (3, 5)$

B) $2; (6, 10)$

C) $2; (4, -6)$

D) $2\sqrt{13}; (5, 3)$

2) P(9, -6), Q(5, 2)

A) $4\sqrt{5}; (7, -2)$

B) $4; (14, -4)$

C) $4; (4, -8)$

D) $4\sqrt{5}; (-2, 7)$

12 Find Coordinates of Endpoint of Segment

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Suppose that P is the endpoint of a segment PQ and M is the midpoint of PQ. Find the coordinates of endpoint Q.

- 1) P(9, 7), M(7, 5)
A) Q(5, 3) B) Q(14, 10) C) Q(4, 4) D) Q(5, 7)
- 2) P(9, 9), M(8, 5)
A) Q(7, 1) B) Q(16, 10) C) Q(2, 8) D) Q(5, 8)

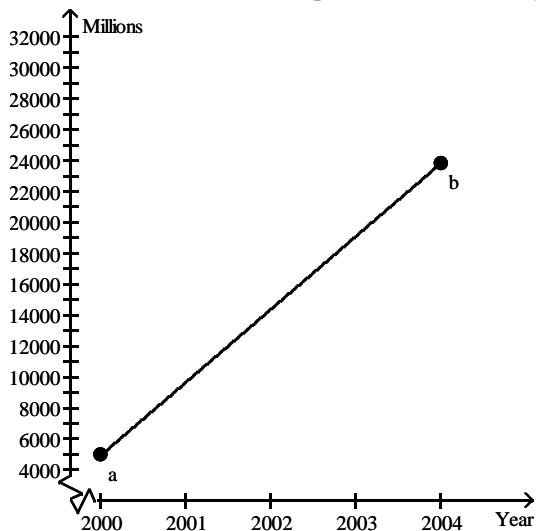
13 Solve Apps: Midpoint and Distance Formulas

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) The graph shows the Total Gross Revenue (in millions of dollars) of Top 100 Internet Companies in the United States between 2000 and 2004. Use the midpoint formula to estimate the revenue for 2002.

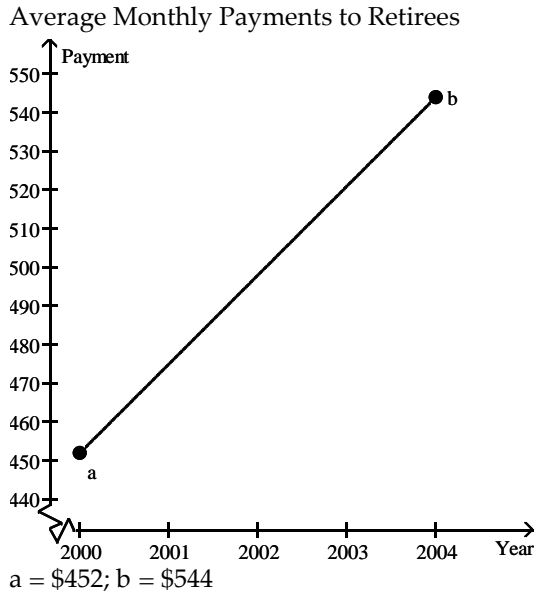
Total Gross Revenue of Top 100 Internet Companies



a = 5000 million dollars; b = 23,800 million dollars

- A) 14,400 million dollars B) 54,000 million dollars
C) 18,800 million dollars D) 17,500 million dollars

- 2) The graph shows an idealized linear relationship for the average monthly payments (in dollars) to retirees from 2000 through 2004. Use the midpoint formula to estimate the payment for 2002.



- A) \$498 B) \$544 C) \$46 D) \$500
- 3) The table lists how financial aid income cutoffs (in dollars) for a family of four have changed over time. Use the midpoint formula to approximate the financial aid cutoff for 1985.

Year	Income (in dollars)
1960	21,250
1970	27,500
1980	33,750
1990	40,000
2000	46,250

- A) \$36,875 B) \$58,750 C) \$21,250 D) \$18,125
- 4) An isosceles triangle has at least two sides of equal length. Determine whether the triangle with vertices (0, 0), (-2, -4), and (-6, -2) is isosceles.
A) Yes B) No
- 5) An isosceles triangle has at least two sides of equal length. Determine whether the triangle with vertices (0, 0), (3, 9), and (12, 7) is isosceles.
A) Yes B) No

14 Know Concepts: Real Numbers and the Coordinate System

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

- 1) Is $\sqrt{7}$ a rational or irrational number?
A) Irrational B) Rational
C) Both rational and irrational D) Neither
- 2) Are both 8 and -3 natural numbers, integers, or irrational numbers?
A) Integers B) Natural numbers C) Irrational numbers D) None of the above

- 3) Are both 6 and $\sqrt{6}$ natural numbers, integers, or irrational numbers?
A) Natural numbers B) Integers C) Irrational numbers D) None of the above
- 4) Are both $\sqrt{2}$ and $\sqrt{5}$ natural numbers, integers, or irrational numbers?
A) Irrational numbers B) Natural numbers C) Integers D) None of the above
- 5) In what quadrant of the xy-plane does P(10, 3) lie?
A) I B) III C) II D) IV
- 6) In what quadrant of the coordinate system does P(2, -6) lie?
A) IV B) II C) III D) I
- 7) In what quadrant of the xy-plane will you find P(-6, 1) ?
A) II B) I C) IV D) III

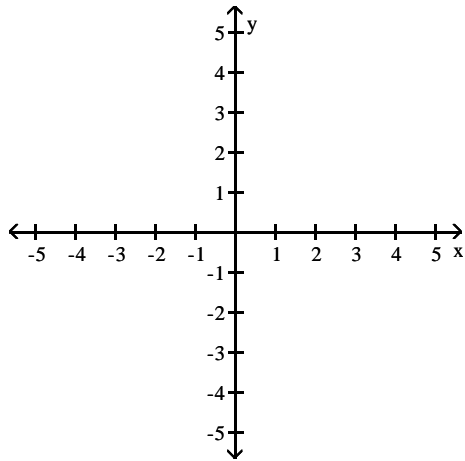
1.2 Introduction to Relations and Functions

1 Graph Function

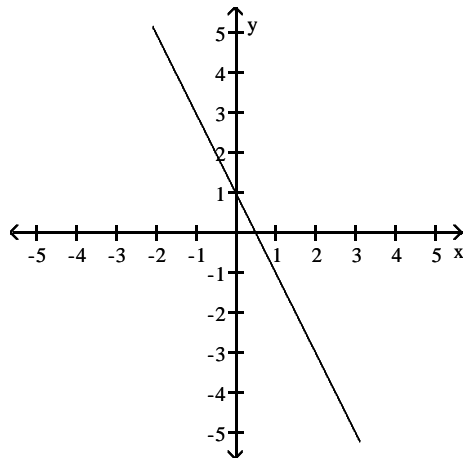
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Sketch the graph of f .

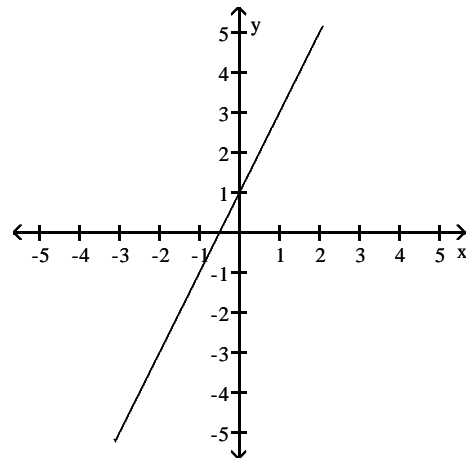
1) $f(x) = -2x + 1$



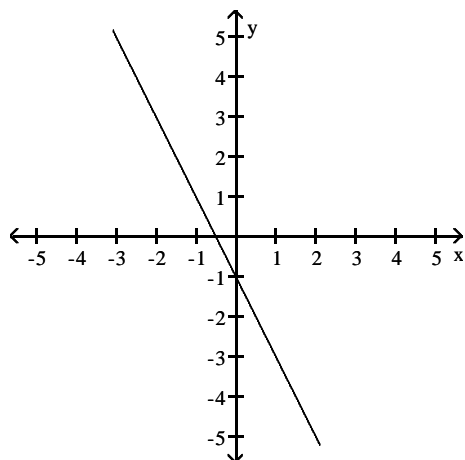
A)



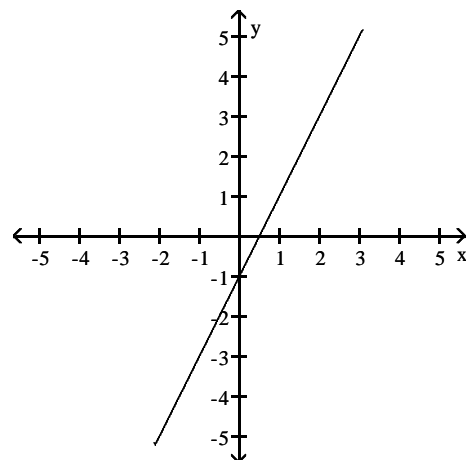
B)



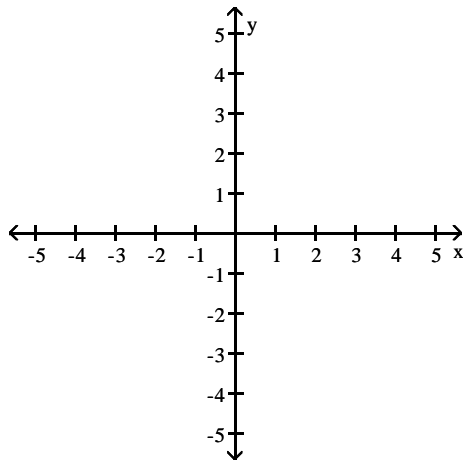
C)



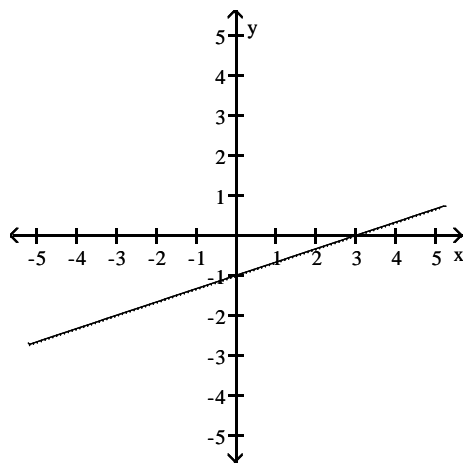
D)



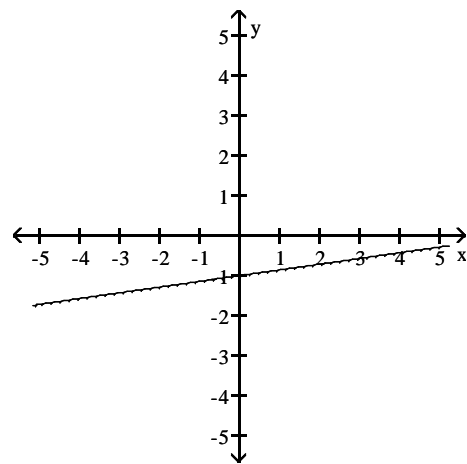
2) $f(x) = \frac{1}{3}x - 1$



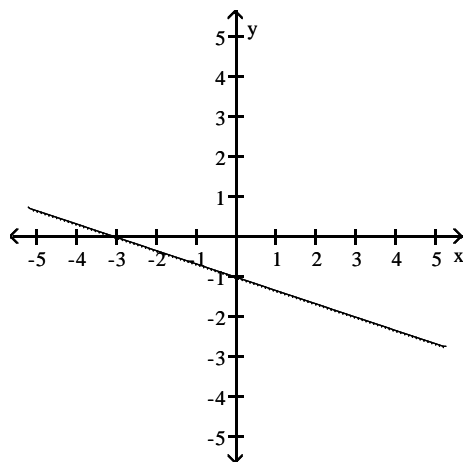
A)



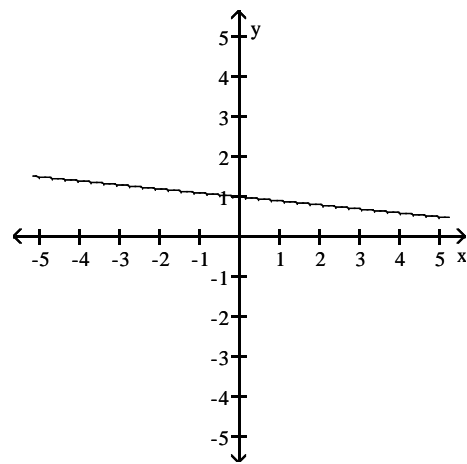
B)



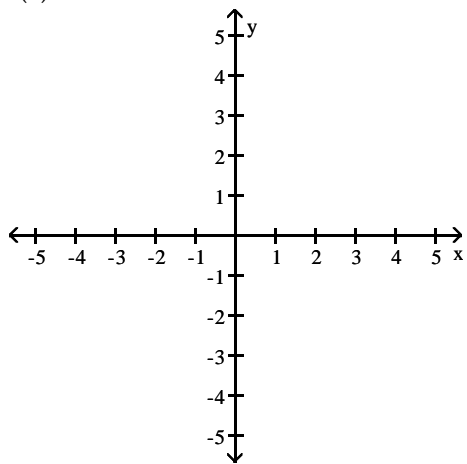
C)



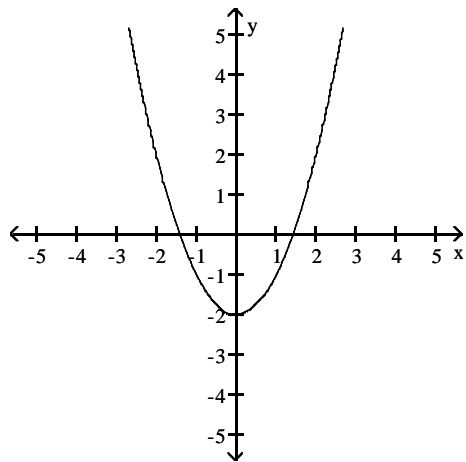
D)



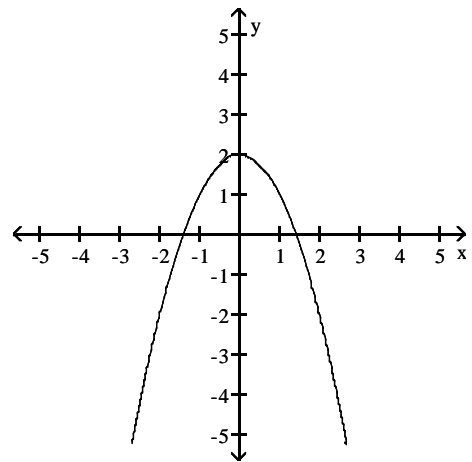
3) $f(x) = x^2 - 2$



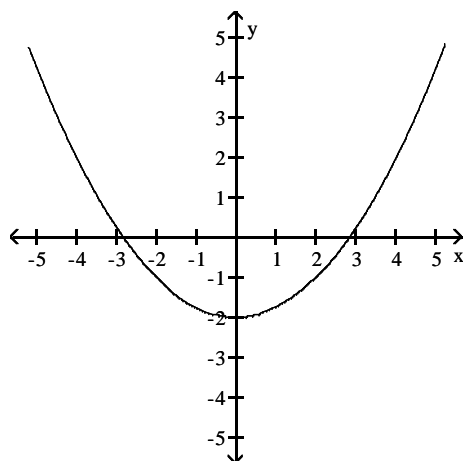
A)



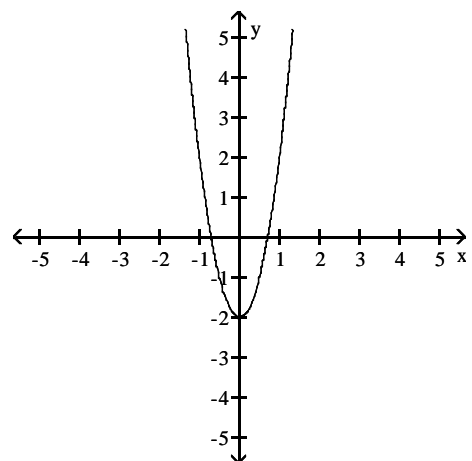
B)



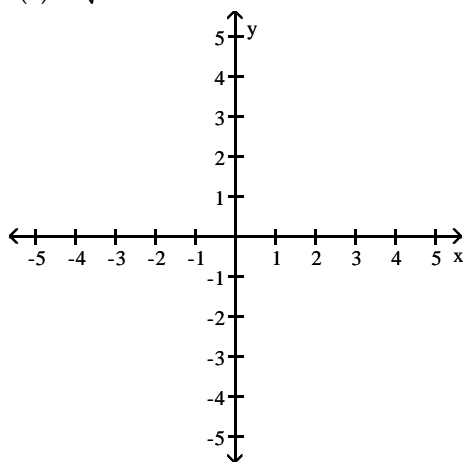
C)



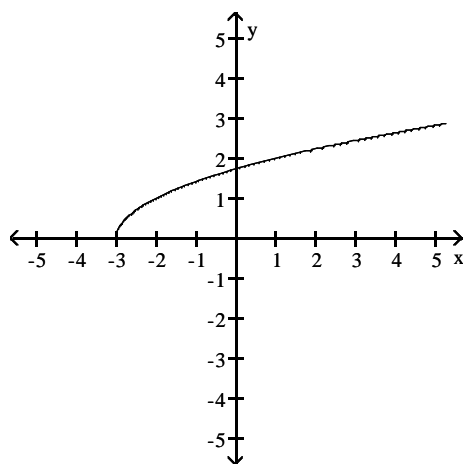
D)



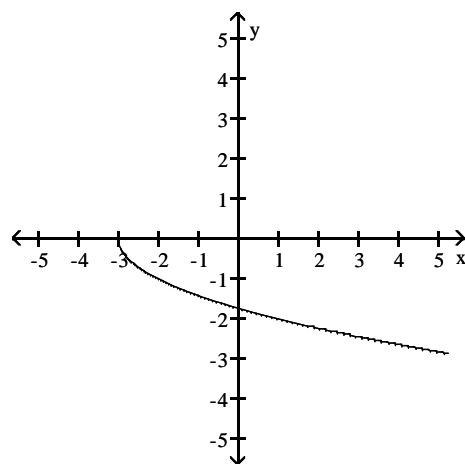
4) $f(x) = \sqrt{x+3}$



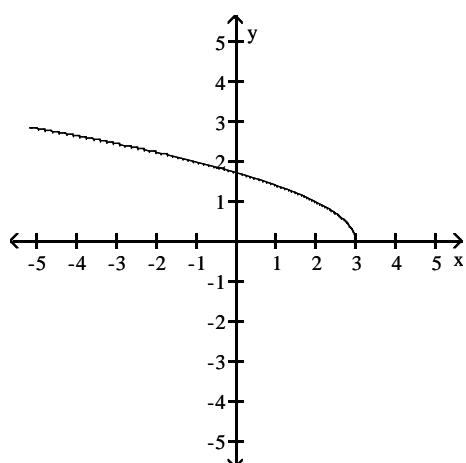
A)



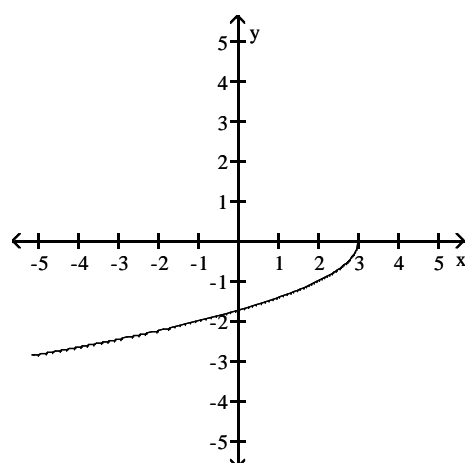
B)



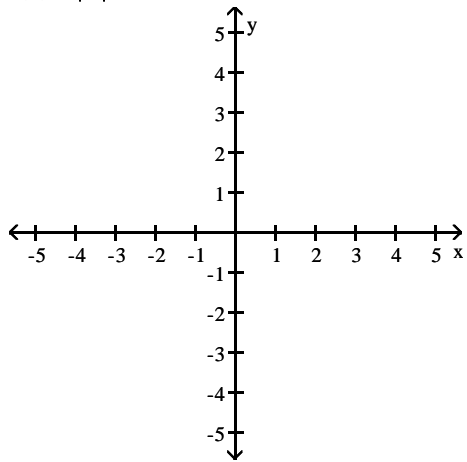
C)



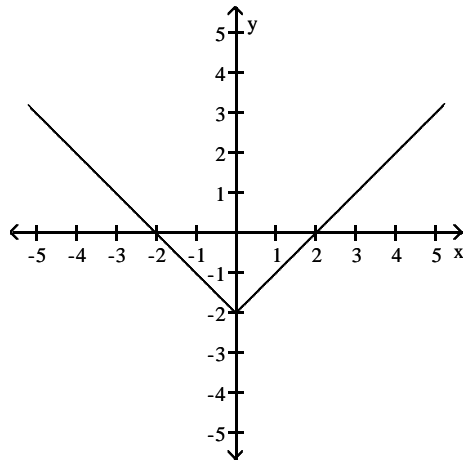
D)



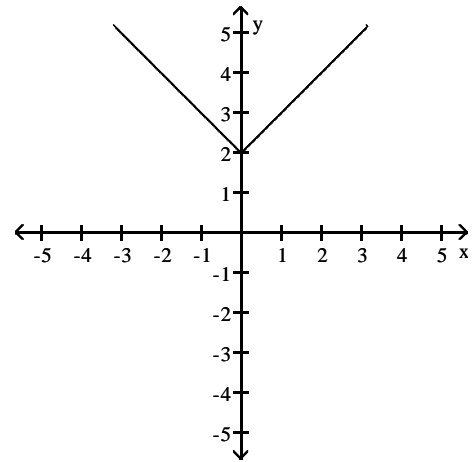
5) $f(x) = |x| - 2$



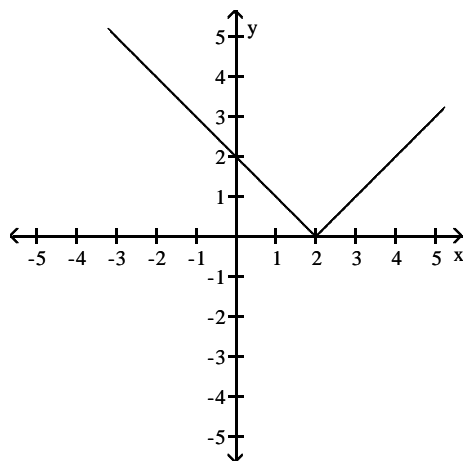
A)



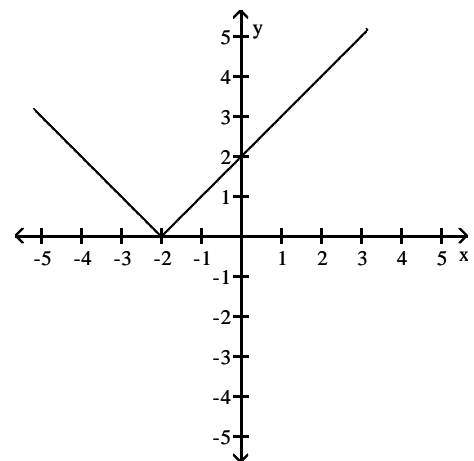
B)



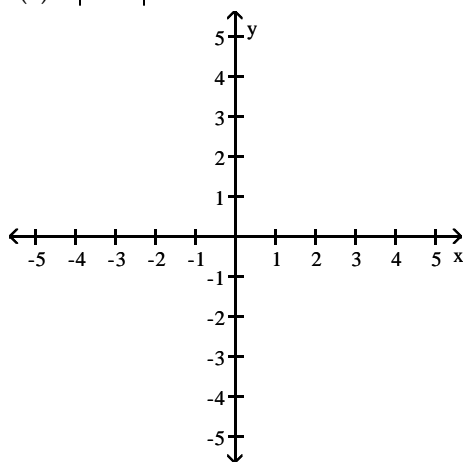
C)



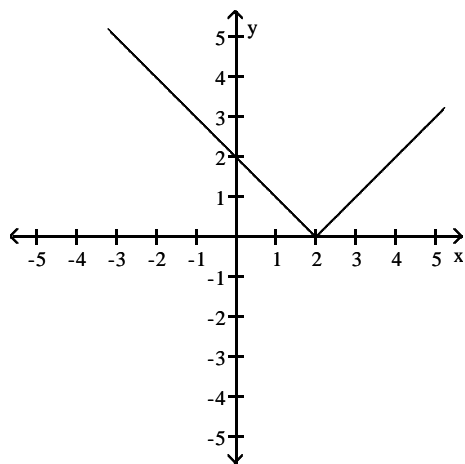
D)



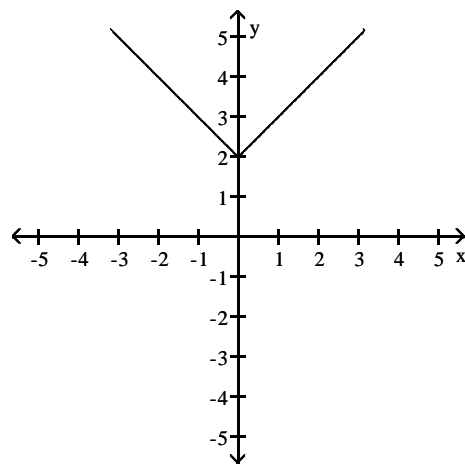
6) $f(x) = |x - 2|$



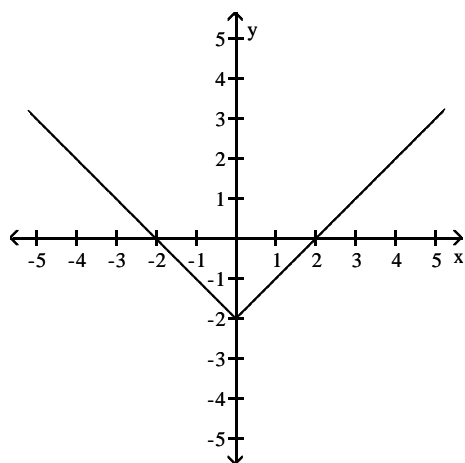
A)



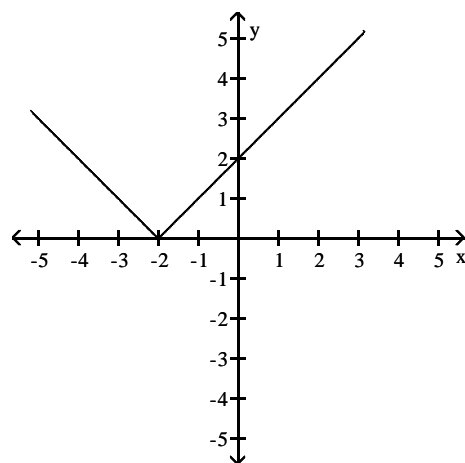
B)



C)



D)



2 Convert Set-Builder Notation to Interval Notation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Using interval notation, write the set.

1) $\{x \mid x > 6\}$

A) $(6, \infty)$

B) $[6, \infty)$

C) $(6, \infty]$

D) $[6, \infty]$

2) $\{x \mid -7 < x < 5\}$

A) $(-7, 5)$

B) $[-7, 5]$

C) $(-7, 5]$

D) $[-7, 5)$

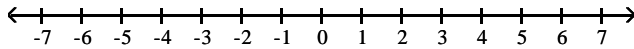
- 3) $\{x \mid x < 6\}$
 A) $(-\infty, 6)$ B) $(-\infty, 6]$ C) $[-\infty, 6]$ D) $[-\infty, 6)$
- 4) $\{x \mid x \geq 4\}$
 A) $[4, \infty)$ B) $[4, \infty]$ C) $(4, \infty)$ D) $(4, \infty]$
- 5) $\{x \mid x \leq 7\}$
 A) $(-\infty, 7]$ B) $[-\infty, 7]$ C) $(-\infty, 7)$ D) $[-\infty, 7)$
- 6) $\{x \mid -4 \leq x \leq 9\}$
 A) $[-4, 9]$ B) $(-4, 9)$ C) $[-4, 9)$ D) $(-4, 9]$
- 7) $\{x \mid -5 < x \leq 8\}$
 A) $(-5, 8]$ B) $(-5, 8)$ C) $[-5, 8]$ D) $[-5, 8)$

3 Graph Interval on Number Line

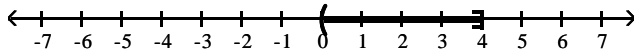
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the set on a number line.

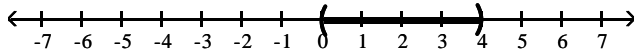
- 1) $(0, 4]$



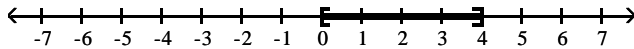
A)



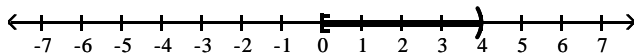
B)



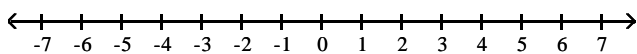
C)



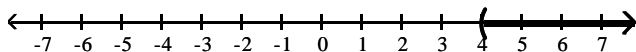
D)



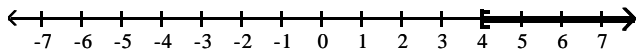
2) $(4, \infty)$



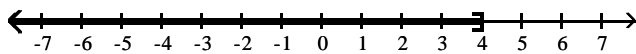
A)



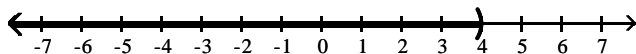
B)



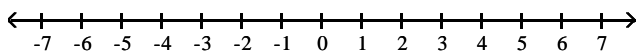
C)



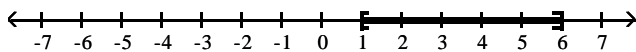
D)



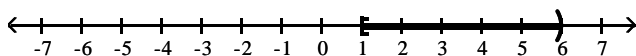
3) $[1, 6]$



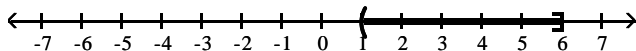
A)



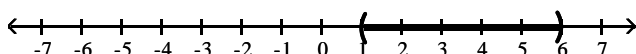
B)



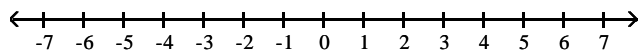
C)



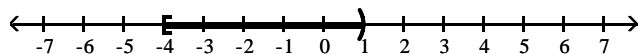
D)



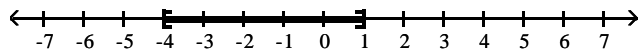
4) $[-4, 1)$



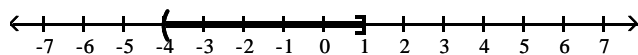
A)



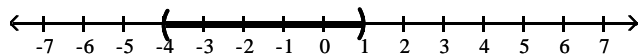
B)



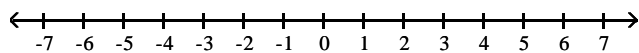
C)



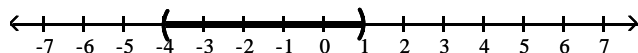
D)



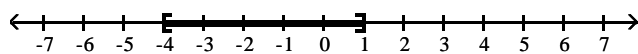
5) $(-4, 1)$



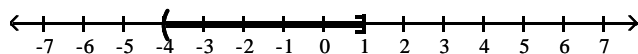
A)



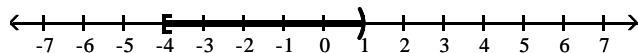
B)



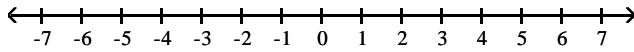
C)



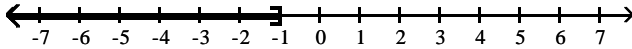
D)



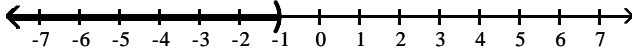
6) $(-\infty, -1]$



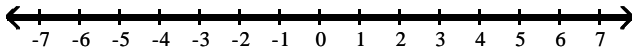
A)



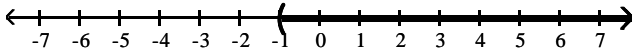
B)



C)



D)



4 Convert Interval Notation or Graph to Set-Builder Notation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Using the variable x , write the interval using set-builder notation.

1) $(-7, 1]$

A) $\{x \mid -7 < x \leq 1\}$

B) $\{x \mid -7 < x < 1\}$

C) $\{x \mid x \leq 1\}$

D) $\{x \mid -7 \leq x \leq 1\}$

2) $[-4, 7)$

A) $\{x \mid -4 \leq x < 7\}$

B) $\{x \mid -4 < x \leq 7\}$

C) $\{x \mid x < 7\}$

D) $\{x \mid -4 \leq x \leq 7\}$

3) $\left(-\infty, \frac{5}{8}\right]$

A) $\left\{x \mid x \leq \frac{5}{8}\right\}$

B) $\left\{x \mid x < \frac{5}{8}\right\}$

C) $\left\{x \mid x > \frac{5}{8}\right\}$

D) $\{x \mid 8 \leq x \leq 5\}$

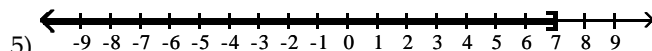
4) $\left(-\infty, \frac{6}{7}\right)$

A) $\left\{x \mid x < \frac{6}{7}\right\}$

B) $\left\{x \mid x \leq \frac{6}{7}\right\}$

C) $\left\{x \mid x > \frac{6}{7}\right\}$

D) $\{x \mid 7 \leq x \leq 6\}$

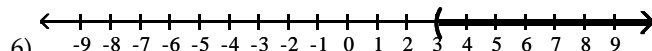


A) $\{x \mid x \leq 7\}$

B) $\{x \mid x < 7\}$

C) $\{x \mid x \geq 7\}$

D) $\{x \mid x > 7\}$



A) $\{x \mid x > 3\}$

B) $\{x \mid x \leq 3\}$

C) $\{x \mid x \geq 3\}$

D) $\{x \mid x < 3\}$

5 Determine Domain and Range of Relation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine the domain and range of the relation.

- 1) $\{(4, -5), (10, 9), (-5, -6), (-8, 2), (12, -2)\}$
A) Domain: $\{-5, 4, -8, 12, 10\}$; range: $\{-6, -5, 2, -2, 9\}$
B) Domain: $\{-6, -5, 2, -2, 9\}$; range: $\{-5, 4, -8, 12, 10\}$
C) Domain: $\{-5, -6, 4, -5, -8\}$; range: $\{2, 12, -2, 10, 9\}$
D) Domain: $\{2, 12, -2, 10, 9\}$; range: $\{-5, -6, 4, -5, -8\}$
- 2) $\{(3, -8), (1, 1), (-1, 5), (-1, 4)\}$
A) Domain: $\{-1, 1, 3\}$; range: $\{5, 1, -8, 4\}$
B) Domain: $\{5, 1, -8, 4\}$; range: $\{-1, 1, 3\}$
C) Domain: $\{-1, 1, 3, -1\}$; range: $\{5, 1, -8, 4\}$
D) Domain: $\{-1, 1, 3, 1\}$; range: $\{5, 1, -8, 4\}$
- 3) $\{(-8, 4), (-8, 5), (-2, 3), (9, 6), (-9, -6)\}$
A) Domain: $\{-8, 9, -9, -2\}$; range: $\{5, 6, -6, 3, 4\}$
B) Domain: $\{-8, -2, 9, -9, -2\}$; range: $\{5, 6, -6, 3, 4\}$
C) Domain: $\{-8, -8, 9, -9, -2\}$; range: $\{5, 6, -6, 3, 4\}$
D) Domain: $\{5, 6, -6, 3, 4\}$; range: $\{-8, -8, 9, -9, -2\}$
- 4) $\{(8, 8), (7, -6), (3, 6), (3, -1)\}$
A) Domain: $\{7, 3, 8\}$; range: $\{-6, 6, 8, -1\}$
B) Domain: $\{7, 3, 8, -3\}$; range: $\{-6, 6, 8, -1\}$
C) Domain: $\{7, 3, 8, 3\}$; range: $\{-6, 6, 8, -1\}$
D) Domain: $\{-6, 6, 8, -1\}$; range: $\{7, 3, 8\}$
- 5) $\{(-4, 3), (6, -3), (2, -9), (11, -5)\}$
A) Domain: $\{-4, 2, 6, 11\}$; range: $\{3, -9, -3, -5\}$
B) Domain: $\{3, -9, -3, -5\}$; range: $\{-4, 2, 6, 11\}$
C) Domain: $\{-4, 2, 6, 11\}$; range: $\{3, -3, -9, -3, -5\}$
D) Domain: $\{-4, 2, 6, 11\}$; range: $\{3, 3, -9, -3, -5\}$

6 Determine if Relation is Function Given Set of Points

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Tell whether the relation is a function.

- 1) $\{(-2, -8), (3, 1), (5, -6), (8, -4), (12, -5)\}$
A) Function
B) Not a function
- 2) $\{(-5, 2), (-2, -2), (4, -9), (4, -7)\}$
A) Function
B) Not a function
- 3) $\{(-8, -9), (1, -4), (6, 6), (-8, 5), (8, -8)\}$
A) Function
B) Not a function
- 4) $\{(9, -4), (3, 6), (5, 8), (12, -8), (3, 8)\}$
A) Function
B) Not a function
- 5) $\{(-4, 7), (-2, -2), (4, 9), (7, 9)\}$
A) Function
B) Not a function
- 6) $\{(10, 2), (-6, -9), (2, 2), (3, 1), (-6, 8)\}$
A) Function
B) Not a function
- 7) $\{(-8, 7), (-5, 1), (-2, -4), (2, -9)\}$
A) Function
B) Not a function

8) $\{(-5, -1), (-2, -6), (3, -2), (3, 6)\}$

A) Function

B) Not a function

9) $\{(-5, 6), (-2, -9), (2, -5), (7, 3)\}$

A) Function

B) Not a function

10) $\{(-2, 9), (2, 3), (4, 4), (9, 4), (11, -1)\}$

A) Function

B) Not a function

7 Determine if Relation is Function Given Table/Diagram

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Tell whether the relation is a function.

1)

x	-1	3	6	7	10
y	1	-1	5	1	4

A) Function

B) Not a function

2)

x	-9	-9	-1	5	7
y	4	9	6	3	9

A) Function

B) Not a function

3)

$\begin{array}{lcl} 1 & \longrightarrow & -15 \\ -6 & \longrightarrow & 15 \\ -16 & \longrightarrow & -7 \end{array}$

A) Function

B) Not a function

4)

$\begin{array}{lcl} 9 & \longrightarrow & -17 \\ -10 & \longrightarrow & 13 \\ -15 & \longrightarrow & -10 \end{array}$

A) Function

B) Not a function

5)

$\begin{array}{lcl} -9 & \longrightarrow & -16 \\ -6 & \longrightarrow & -16 \\ -15 & \longrightarrow & -16 \end{array}$

A) Function

B) Not a function

6)

$\begin{array}{lcl} a & \longrightarrow & x \\ b & \longrightarrow & y \\ c & \longrightarrow & z \end{array}$

A) Function

B) Not a function

7)

X	Y ₁	
-3	-6	
-2	-5	
-1	-4	
0	-3	
1	-2	
2	-1	
3	0	
X = -3		

A) Function

B) Not a function

8)

X	Y ₁	
-6	-3	
-5	-2	
-4	-1	
-3	0	
-2	1	
-1	2	
0	3	
X = -6		

A) Function

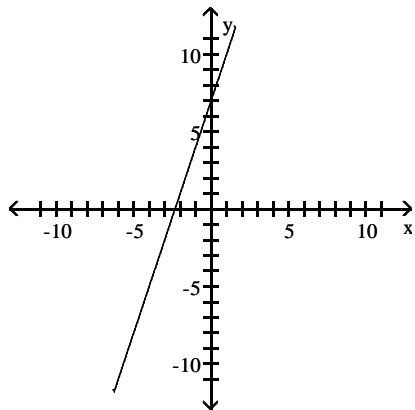
B) Not a function

8 Determine if Relation is Function Given Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Tell whether the relation is a function.

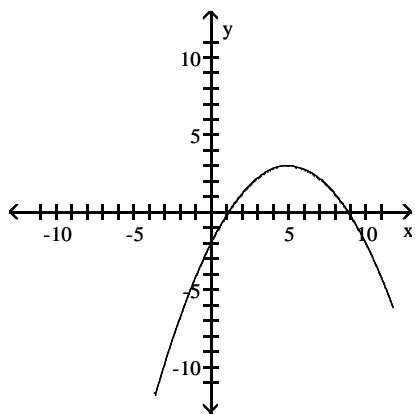
1)



A) Function

B) Not a function

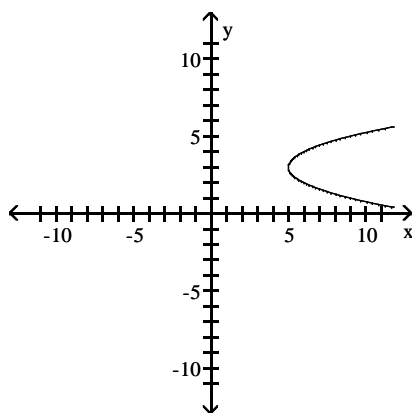
2)



A) Function

B) Not a function

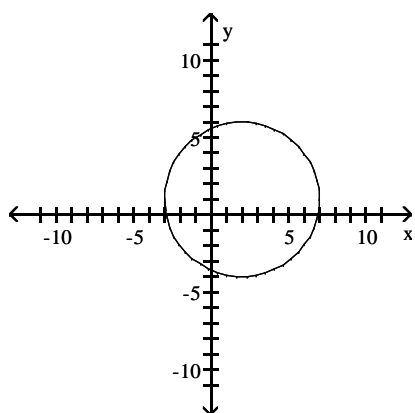
3)



A) Function

B) Not a function

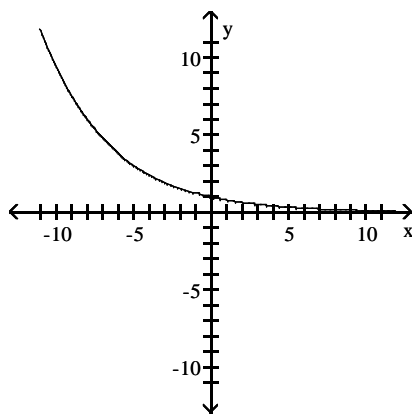
4)



A) Function

B) Not a function

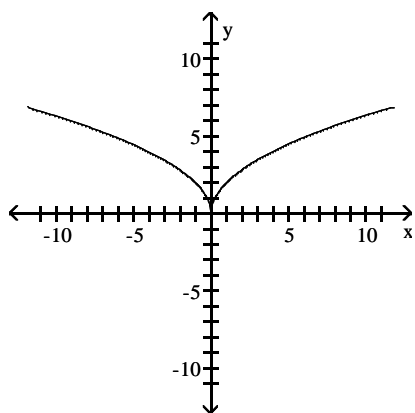
5)



A) Function

B) Not a function

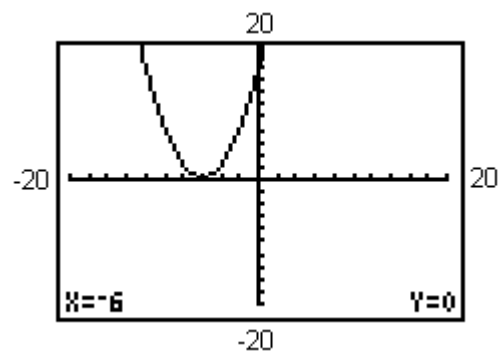
6)



A) Function

B) Not a function

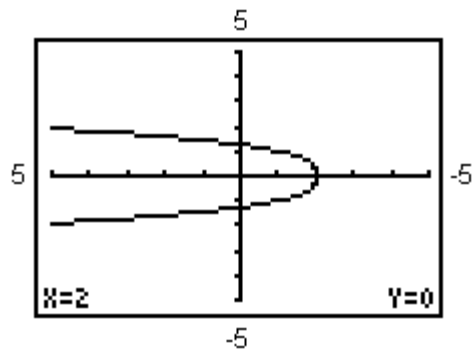
7)



A) Function

B) Not a function

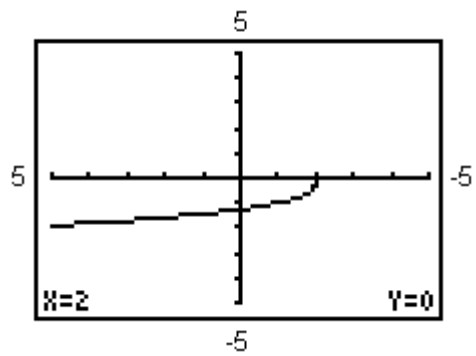
8)



A) Function

B) Not a function

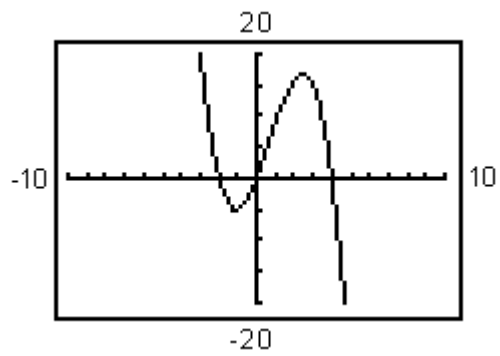
9)



A) Function

B) Not a Function

10)



A) Function

B) Not a function

9 Find Function Value

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the function value.

1)

X	Y ₁	
-3	-6	
-2	-5	
-1	-4	
0	-3	
1	-2	
2	-1	
3	0	
X = -3		

f(2) if $f(x) = Y_1$

A) -5

B) -6

C) -3

D) -4

2)

	f	
1	→	-15
-6	→	15
-16	→	-7

f(-6) for the function f

A) 15

B) -15

C) -7

D) -16

3)

x	1	3	4	7	12
y	9	2	4	9	-5

f(3) if $f(x) = y$

A) 2

B) 9

C) 4

D) -5

10 Evaluate Function at Given Value of x

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find f(x) at the indicated value of x.

1) $f(x) = -8x + 3$, $x = -3$

A) 27

B) -33

C) -1

D) -11

2) $f(x) = -5x + 2$, $x = -4$

A) 22

B) 12

C) 18

D) -3

3) $f(x) = -5x + 4$, $x = 9$

A) -41

B) 16

C) 41

D) 4

4) $f(x) = 7x + 16$, $x = 0$

A) 16

B) 0

C) 7

D) 23

5) $f(x) = -4x^2 + 9x + 1$, $x = 3$

A) -8

B) -12

C) -18

D) 16

6) $f(x) = 4x^2 + 2x - 1$, $x = -3$

A) 29

B) 25

C) 19

D) -19

7) $f(x) = \sqrt{x}$, $x = 196$

A) 14

B) 28

C) 38,416

D) 16

8) $f(x) = 9$, $x = 3$

A) 9

B) 3

C) 27

D) 12

9) $f(x) = |5 - x|$, $x = 6$

A) 1

B) -1

C) 11

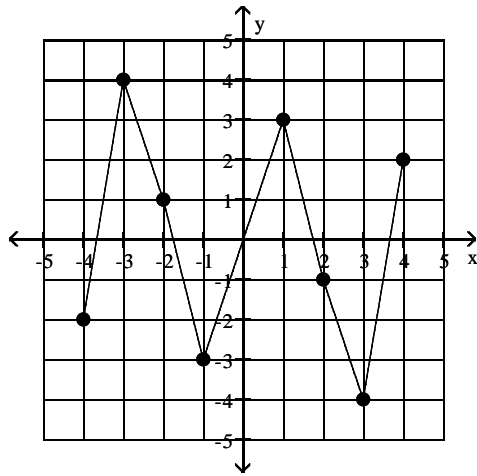
D) 30

11 Use Graph of $y = f(x)$ to Find Function Value

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the graph of $y = f(x)$ to find the function value.

1) $f(-1)$



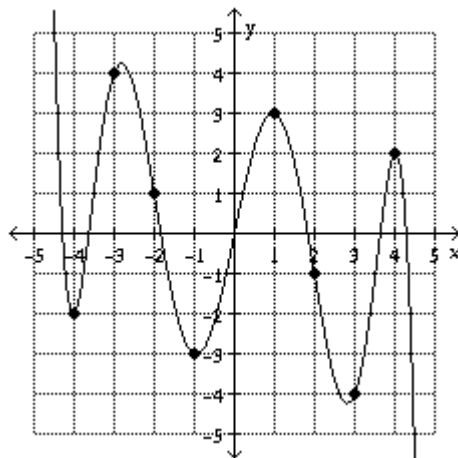
A) -3

B) 3

C) 2

D) -2

2) $f(4)$



A) 2

B) -2

C) -3

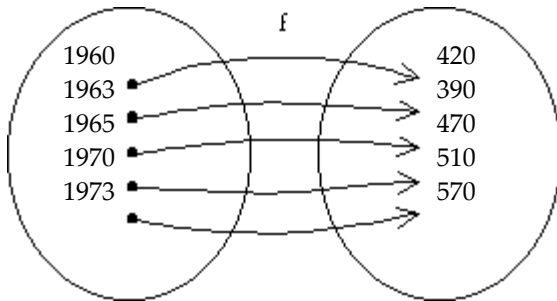
D) 3

12 Solve Apps: Functions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) The function f , given in the diagram below, computes the average cost of an item during year x . Evaluate $f(1965)$.



- A) 470 B) 420 C) 510 D) 570
- 2) The function given by the equation $f(x) = 3.785x$ will convert x gallons into $y = f(x)$ liters. If a container will hold 32 gallons, how many liters will it hold? Round your answer to the nearest hundredth, if necessary.
- A) 121.12 liters B) 121.26 liters C) 120.42 liters D) 121.69 liters
- 3) Bob finds that the cost of driving his truck is 54 cents per mile. Give a numerical representation, in the form of a table, for a function f that computes the cost in dollars of driving x miles. Let $x = 10, 20, 30, 40, 50, 60$.

A)

x	10	20	30	40	50	60
y	5.40	10.80	16.20	21.60	27.00	32.40

B)

x	10	20	30	40	50	60
y	18.52	37.04	55.56	74.07	92.59	111.11

C)

x	10	20	30	40	50	60
y	0.05	0.03	0.02	0.01	0.01	0.01

D)

x	10	20	30	40	50	60
y	10.54	20.54	30.54	111.11	0.05	0.03

- 4) The following table lists the monthly precipitation P , in inches, in Salem, Missouri, where $x = 1$ corresponds to January and $x = 9$ corresponds to September.

x	1	2	3	4	5	6	7	8	9
P	1.2	1.5	0.6	1.3	2.3	2.1	1.6	0.7	1.4

Determine the value of P during March.

- A) 0.6 inches B) 0.9 inches C) 0.4 inches D) 1.6 inches

13 Know Concepts: Relations and Functions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

- 1) Using set-builder notation, a set S is written as $\{x \mid -8 < x < -1\}$. Which of the elements of the following set is not an element of S : $\{-8, -2, -4, -7\}$
- A) -8 B) -2 C) -4 D) -7

2) For the function $f(x) = -2x - 2$, with domain of $[-1, \infty)$, find the range.

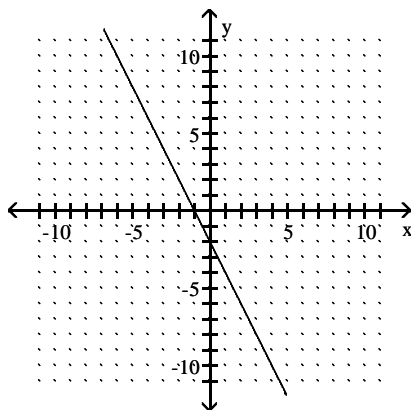
A) $(-\infty, 0]$

B) $[4, 0]$

C) $[0, \infty)$

D) $(-\infty, -4]$

3)



Use the graph of the function above to find the element of the domain that corresponds to the element of the range that equals 8.

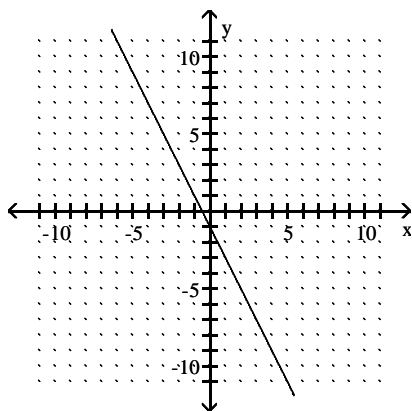
A) -5

B) -18

C) 5

D) -1

4)



Use the graph of the function above to find the element of the range that corresponds to the element of the domain that equals -4.

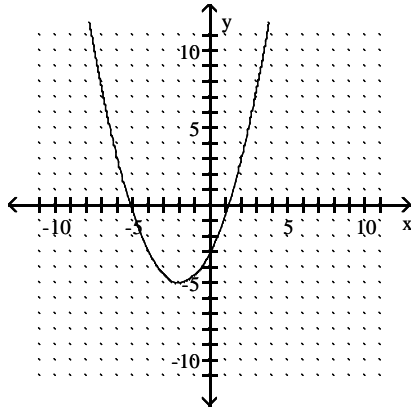
A) 7

B) 1.5

C) -7

D) -0.5

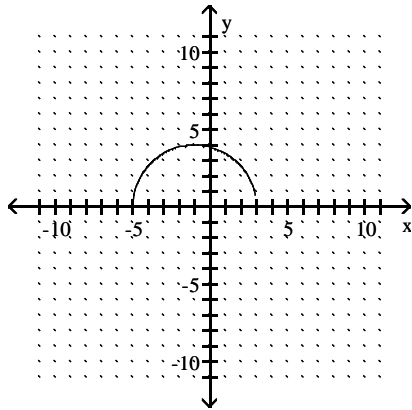
5)



Use the graph of the function above to find the element of the range that corresponds to the element of the domain that equals -2 .

- A) -5
- B) 2
- C) -3
- D) None of the above, since -2 is not in the domain of the function.

6)



Use the graph of the function above to find the element of the range that corresponds to the element of the domain that equals -6 .

- A) 0
- B) 4
- C) -5
- D) None of the above, since -6 is not in the domain of the function.

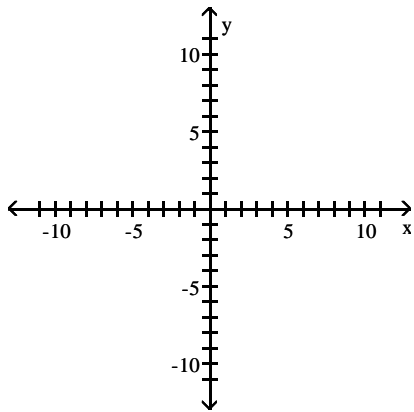
1.3 Linear Functions

1 Graph Linear Function and Give Intercepts and Slope

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

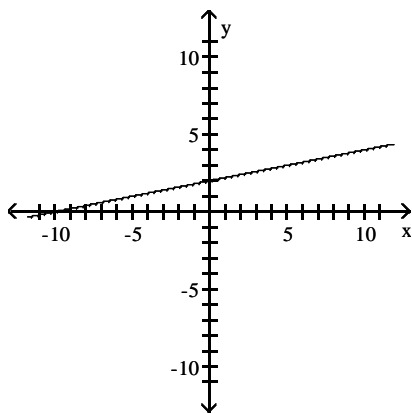
Graph the line. Also, give the x-intercept (if any), y-intercept (if any), and slope of the line (if defined).

1) $f(x) = \frac{1}{5}x + 2$

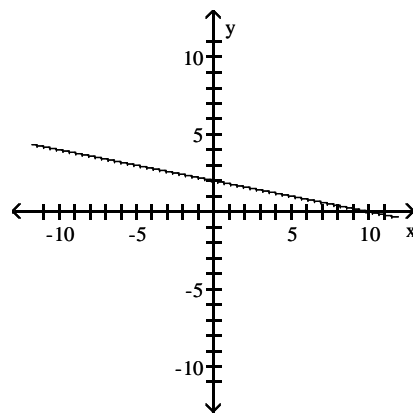


A) x-intercept: $(-10, 0)$; y-intercept: $(0, 2)$;
slope: $\frac{1}{5}$

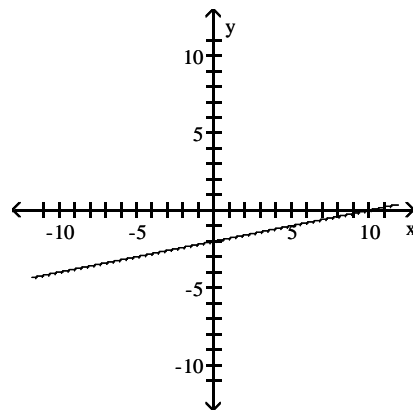
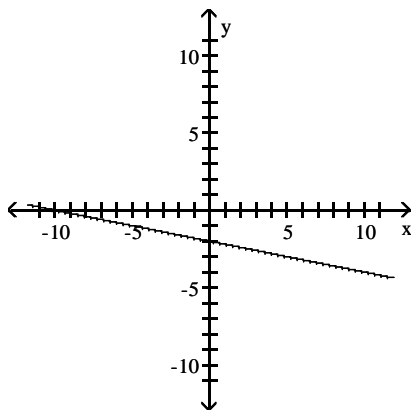
B) x-intercept: $(10, 0)$; y-intercept: $(0, 2)$;
slope: $-\frac{1}{5}$



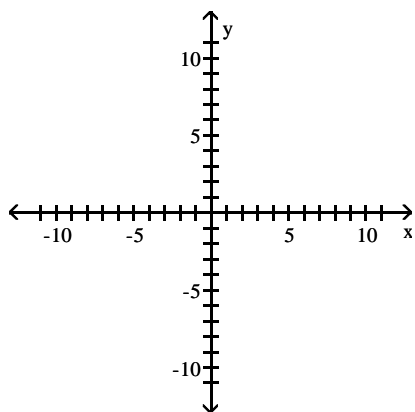
C) x-intercept: $(-10, 0)$; y-intercept: $(0, -2)$;
slope: $-\frac{1}{5}$



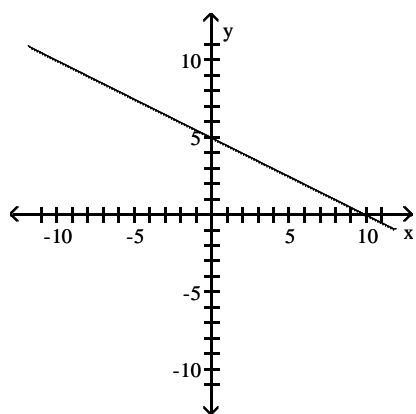
D) x-intercept: $(10, 0)$; y-intercept: $(0, -2)$;
slope: $\frac{1}{5}$



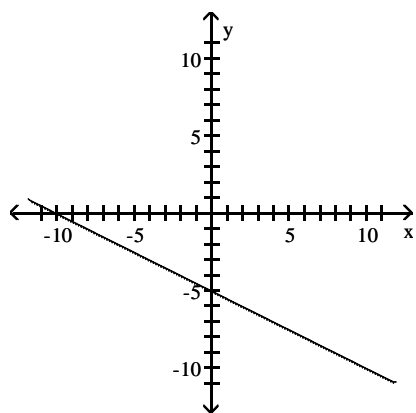
2) $f(x) = -\frac{1}{2}x + 5$



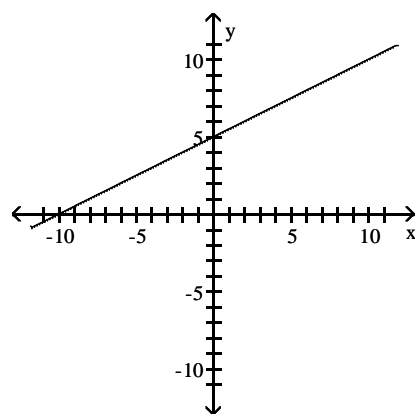
A) x-intercept: (10, 0); y-intercept: (0, 5);
slope: $-\frac{1}{2}$



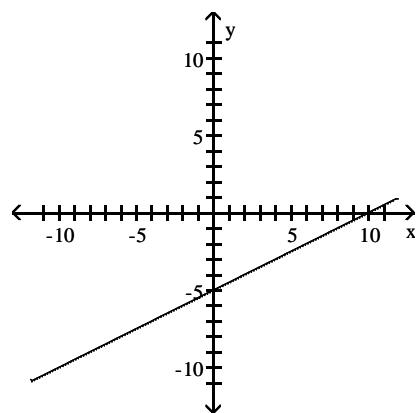
C) x-intercept: (-10, 0); y-intercept: (0, -5);
slope: $-\frac{1}{2}$



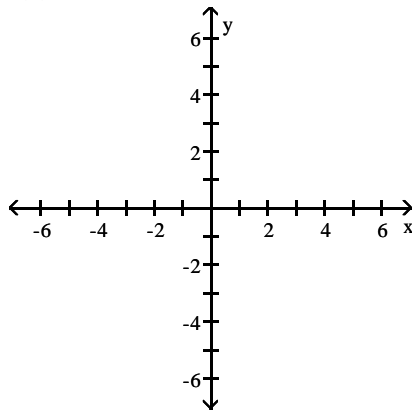
B) x-intercept: (-10, 0); y-intercept: (0, 5);
slope: $\frac{1}{2}$



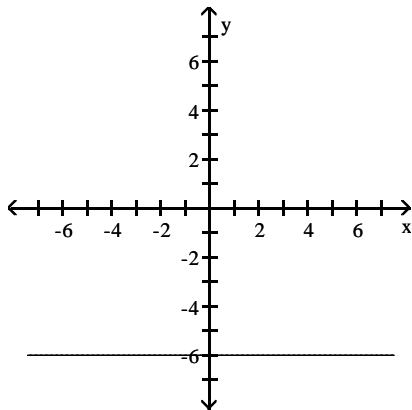
D) x-intercept: (10, 0); y-intercept: (0, -5);
slope: $\frac{1}{2}$



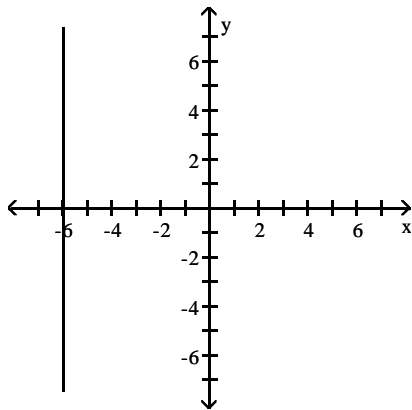
3) $f(x) = -6$



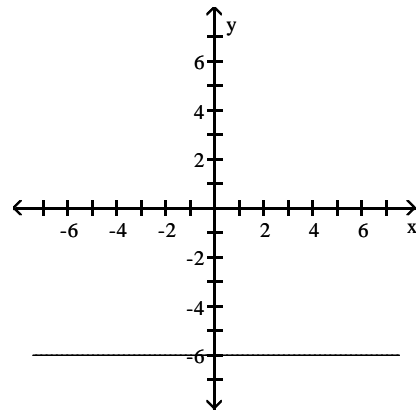
A) x-intercept: none; y-intercept: $(0, -6)$;
slope: 0



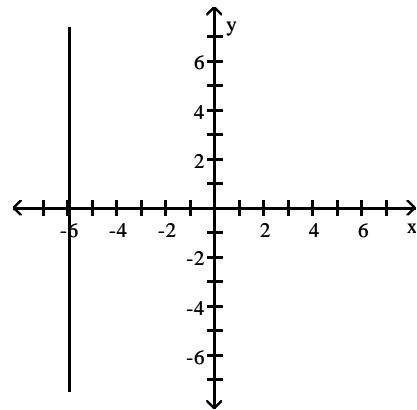
C) x-intercept: $(-6, 0)$; y-intercept: none;
slope: 0



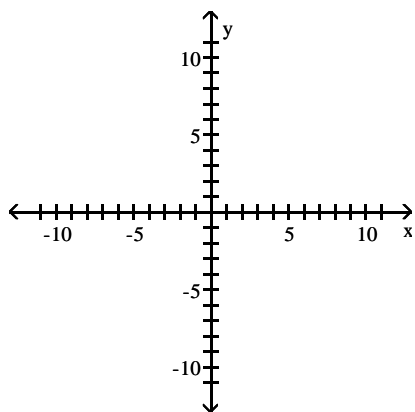
B) x-intercept: none; y-intercept: $(0, -6)$;
slope: undefined



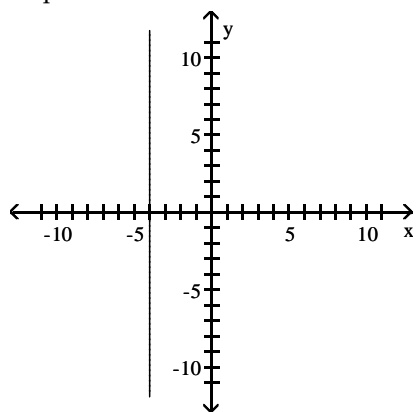
D) x-intercept: $(-6, 0)$; y-intercept: none;
slope: undefined



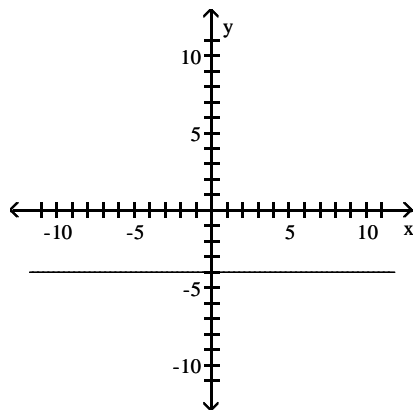
4) $x = -4$



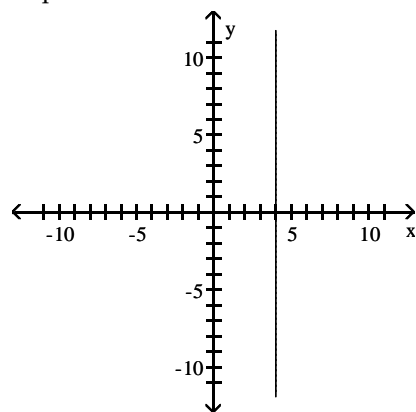
A) x-intercept: $(-4, 0)$; y-intercept: none;
slope: undefined



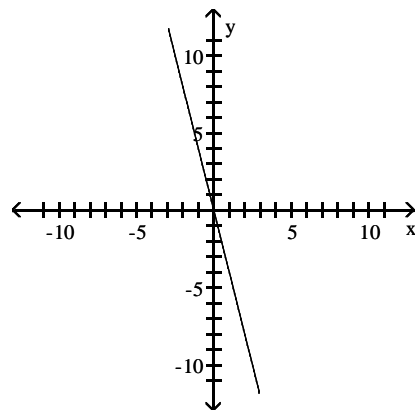
C) x-intercept: none; y-intercept: $(0, -4)$;
slope: 0



B) x-intercept: $(4, 0)$; y-intercept: none;
slope: undefined



D) x-intercept: $(0, 0)$; y-intercept: $(0, 0)$;
slope: -4

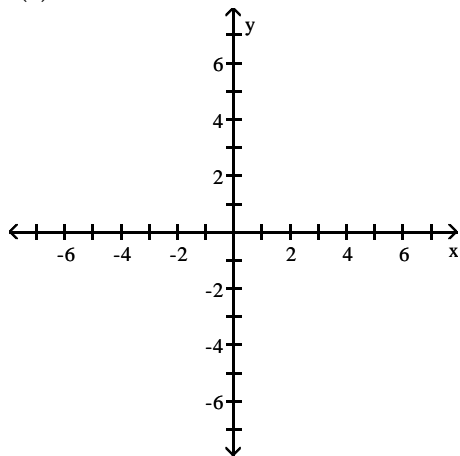


2 Graph Linear Function and Give Domain and Range

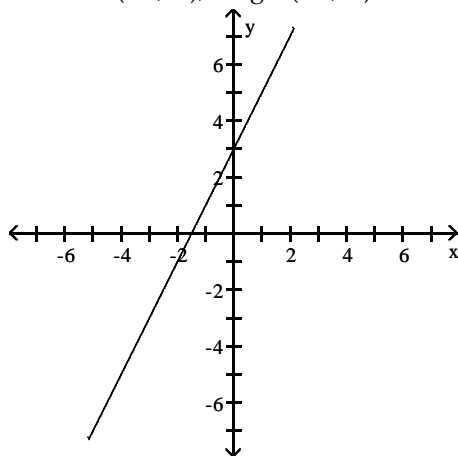
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the linear function. Give the domain and range.

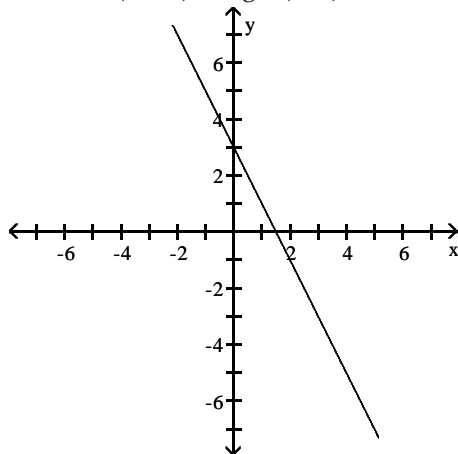
1) $f(x) = 2x + 3$



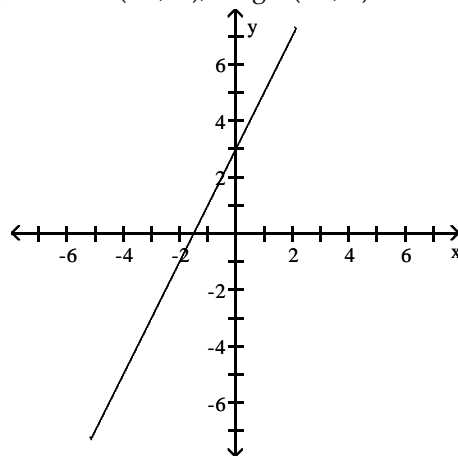
A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



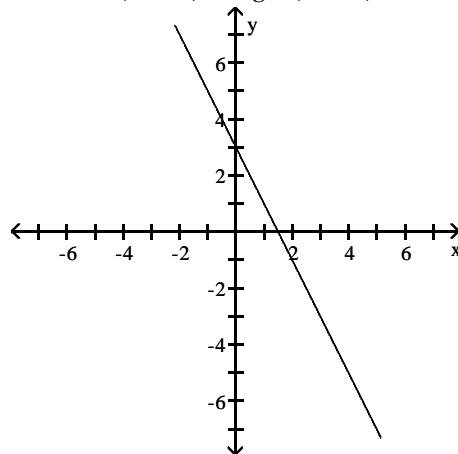
C) Domain: $(-6, 6)$; range: $(6, 6)$



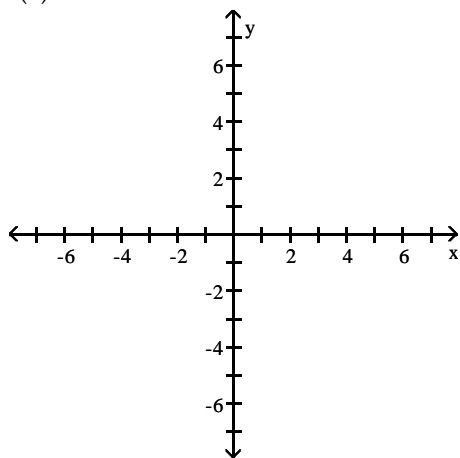
B) Domain: $(-\infty, \infty)$; range: $(-\infty, 6)$



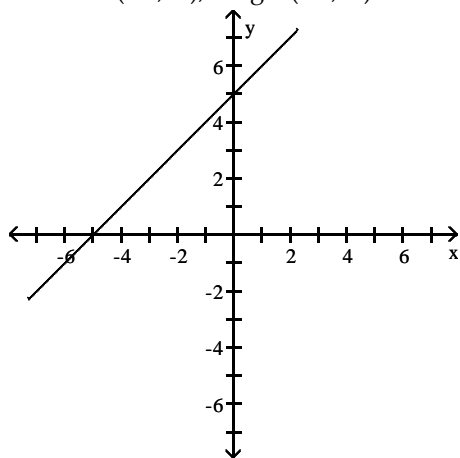
D) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



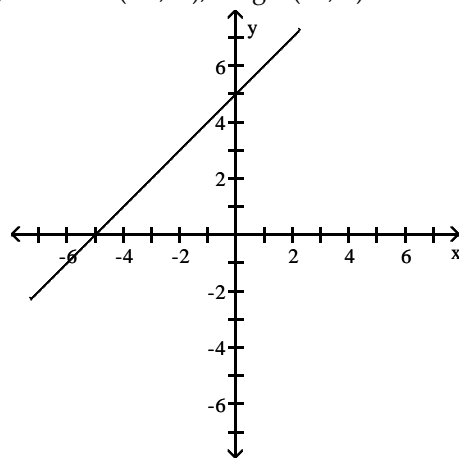
2) $f(x) = x + 5$



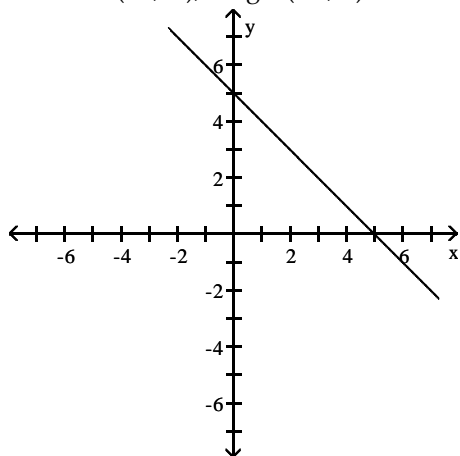
A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



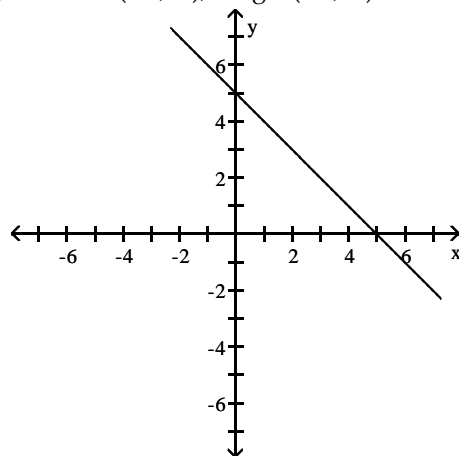
B) Domain: $(-\infty, \infty)$; range: $(-6, 6)$



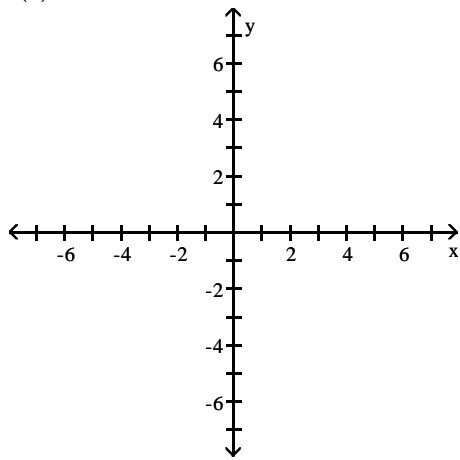
C) Domain: $(-6, \infty)$; range: $(-\infty, 6)$



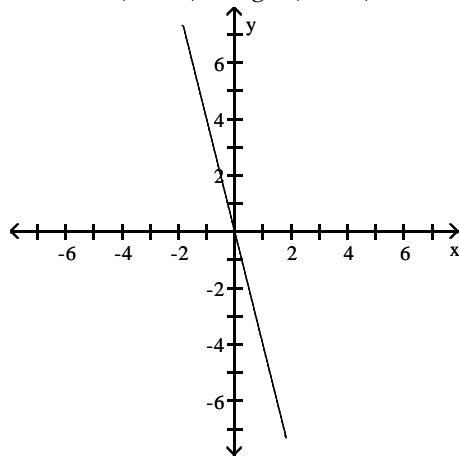
D) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



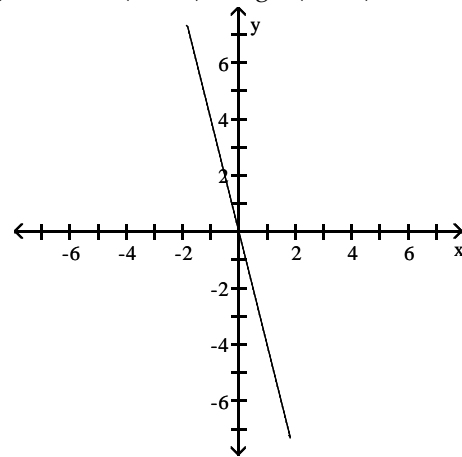
3) $f(x) = -4x$



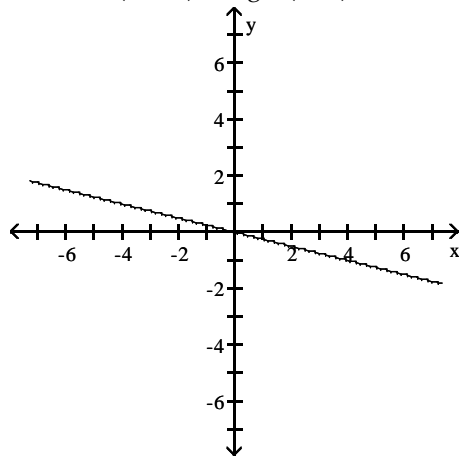
A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



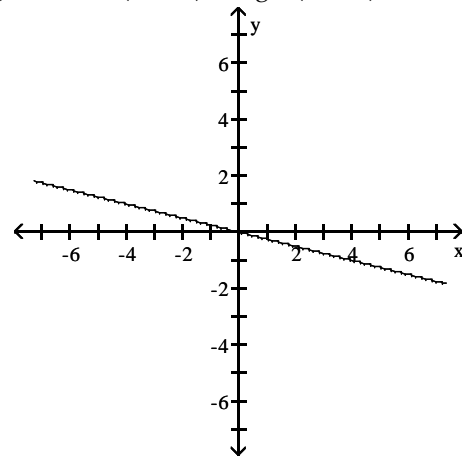
B) Domain: $(-\infty, \infty)$; range: $(-\infty, 0)$



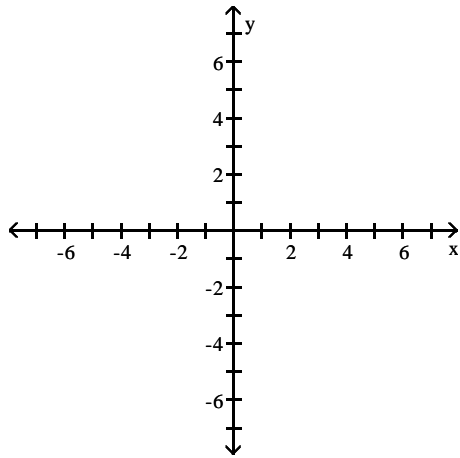
C) Domain: $(-\infty, 0)$; range: $(0, \infty)$



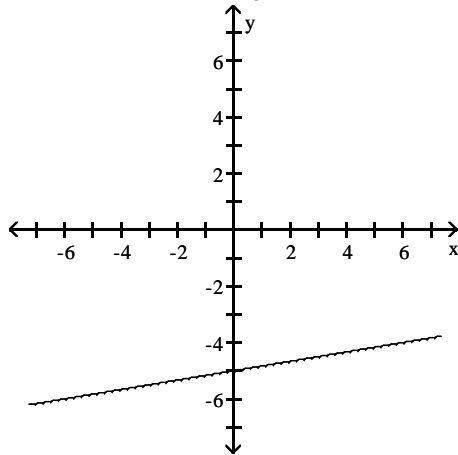
D) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



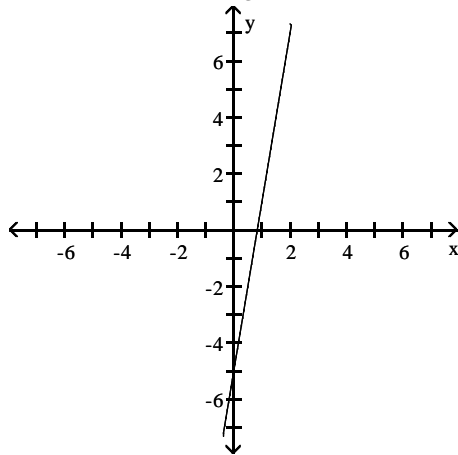
4) $f(x) = \frac{1}{6}x - 5$



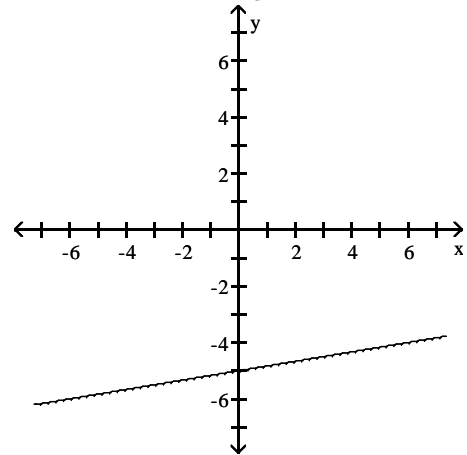
A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



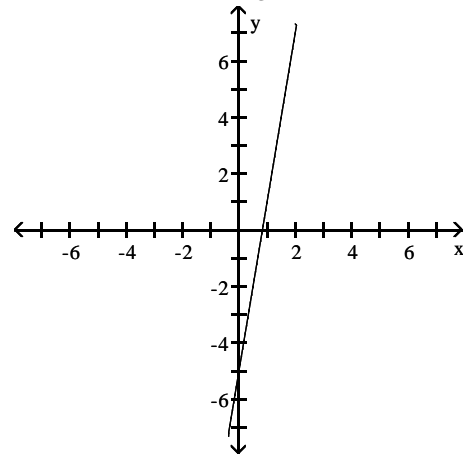
C) Domain: $(-6, 6)$; range: $(-6, 6)$



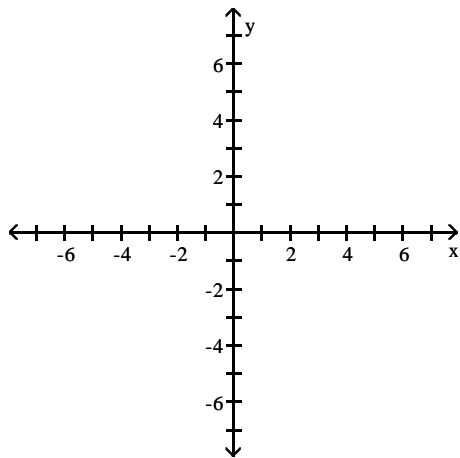
B) Domain: $(-\infty, 0)$; range: $(0, \infty)$



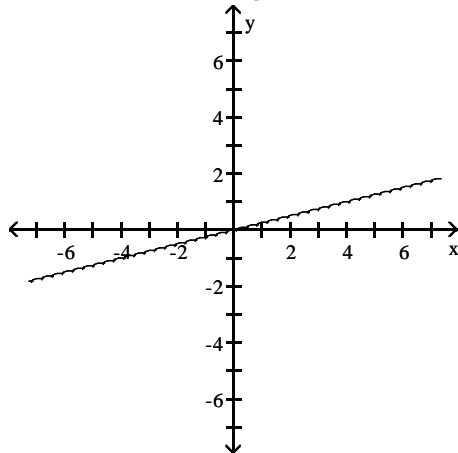
D) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



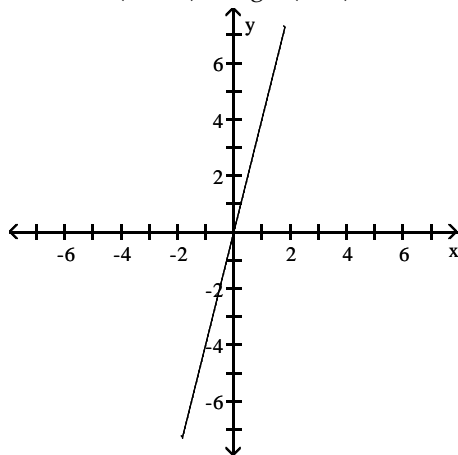
5) $f(x) = \frac{1}{4}x$



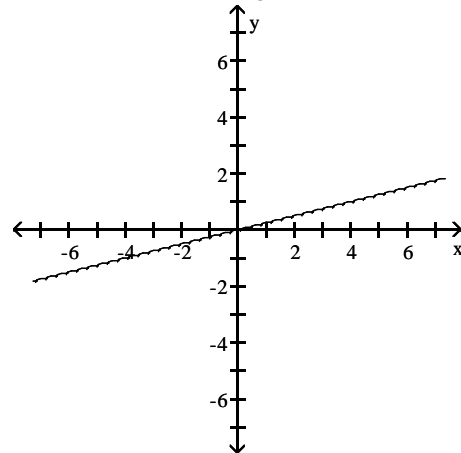
A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



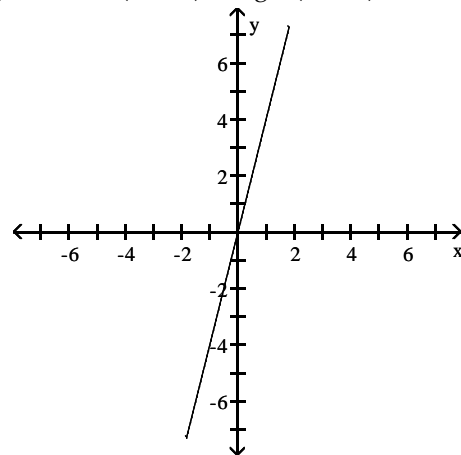
C) Domain: $(-\infty, \infty)$; range: $(0, \infty)$



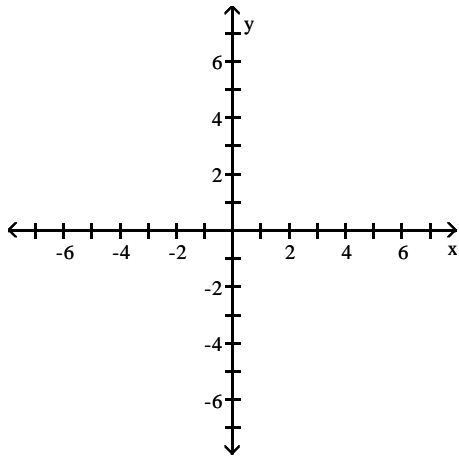
B) Domain: $(-\infty, \infty)$; range: $(0, \infty)$



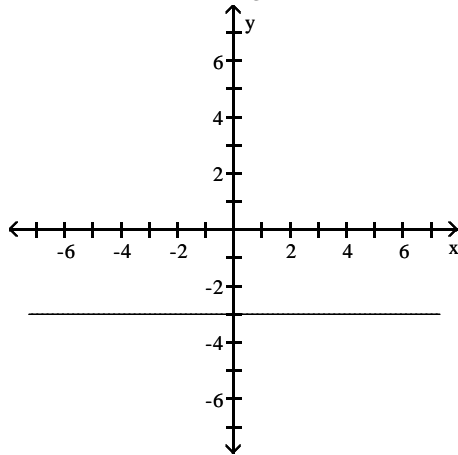
D) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$



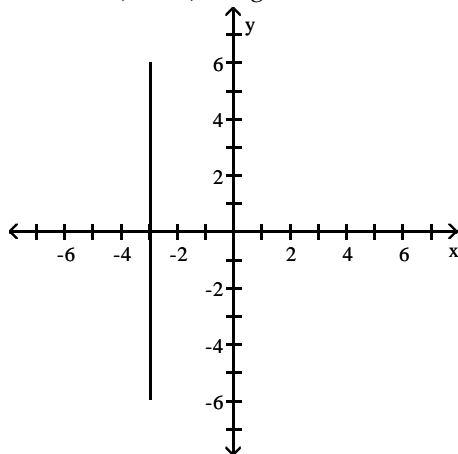
6) $f(x) = -3$



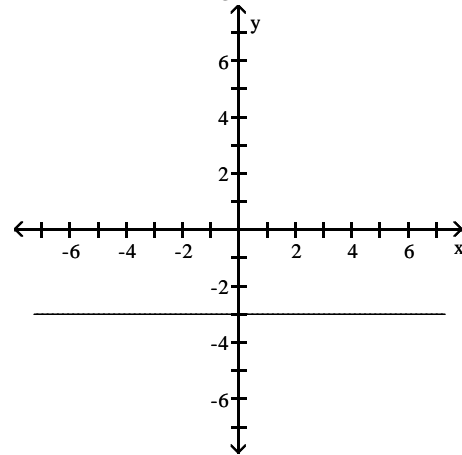
A) Domain: $(-\infty, \infty)$; range: $\{-3\}$



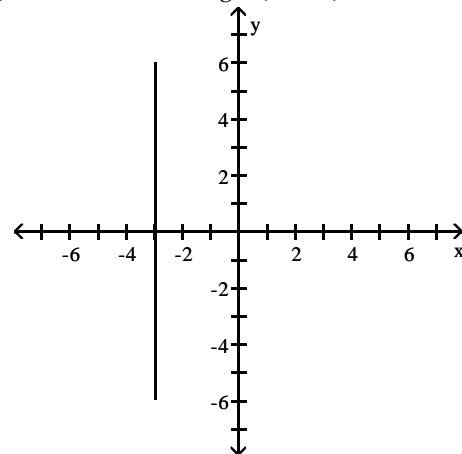
C) Domain: $(-\infty, \infty)$; range: $\{-3\}$



B) Domain: $\{-3\}$; range: $(-\infty, \infty)$



D) Domain: $\{-3\}$; range: $(-\infty, \infty)$



3 Evaluate Linear Function at Given Value of x

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the function.

1) Find $f(-16)$ when $f(x) = -16x + 9$.

A) 265

B) -247

C) 247

D) 256.9

2) Find $f(4.1)$ when $f(x) = -5x - 0.15$.

A) -20.65

B) 20.35

C) -22

D) -20.35

3) Find $f(-7.3)$ when $f(x) = -7.2x - 13$.

A) 39.56

B) -65.56

C) 51.26

D) 65.56

4) Find $f(-7)$ when $f(x) = \frac{1}{6}x + \frac{1}{3}$.

A) $-\frac{5}{6}$

B) -1

C) $-\frac{2}{3}$

D) $\frac{3}{2}$

5) Find $f(8.8)$ when $f(x) = 7x - 1.6$.

A) 60

B) -63.2

C) 61.44

D) 63.2

6) Find $f(-9)$ when $f(x) = \frac{2-x}{4}$.

A) $\frac{11}{4}$

B) $\frac{9}{2}$

C) $-\frac{7}{4}$

D) 5

4 Find Zero of Linear Function

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the zero of f.

1) $f(x) = 4x + 8$

A) -2

B) 2

C) 8

D) -8

2) $f(x) = \frac{1}{3}x + \frac{1}{6}$

A) $-\frac{1}{2}$

B) $\frac{1}{6}$

C) $\frac{1}{2}$

D) $-\frac{1}{6}$

3) $f(x) = \frac{1}{4}x$

A) 0

B) 4

C) -4

D) Does not exist

4) $f(x) = 15x$

A) 0

B) -15

C) 15

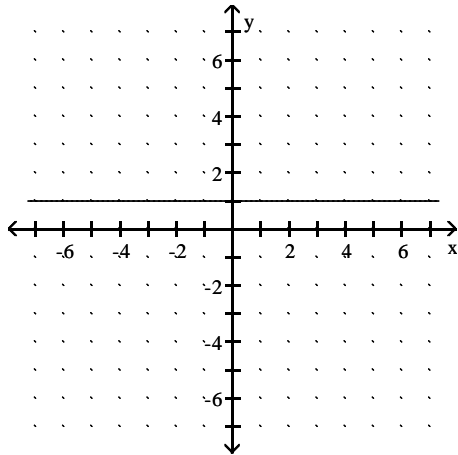
D) Does not exist

5 Give Equation of Line Illustrated

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Give the equation of the line illustrated.

1)



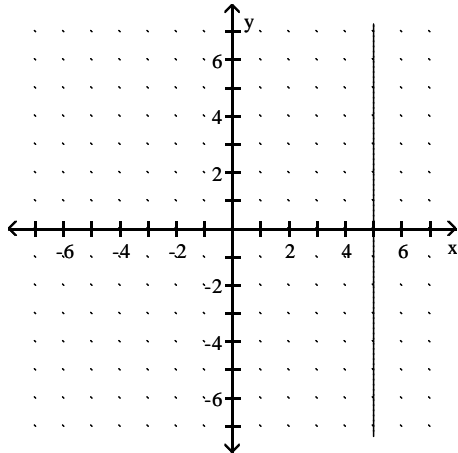
A) $y = 1$

B) $y = -1$

C) $x = 1$

D) $x = -1$

2)



A) $x = 5$

B) $y = -5$

C) $y = 5$

D) $x = -5$

6 Tech: Determine if Window Shows Comprehensive Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the linear function on a graphing calculator, using the window given. State whether the window shows a comprehensive graph.

1) $f(x) = 4x - 27$; window: $[-27, 11]$ by $[-17, 10]$

A) No

B) Yes

7 Find Slope of Line Given Two Points

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the slope (if defined) of the line that passes through the given points.

1) $(-4, 7)$ and $(2, 2)$

A) $-\frac{5}{6}$

B) $-\frac{6}{5}$

C) $-\frac{9}{2}$

D) $\frac{5}{6}$

2) (6, 3) and (6, -7)

A) Undefined

B) 0

C) $\frac{5}{6}$

D) $-\frac{1}{3}$

3) (-3, -5) and (1, -5)

A) 0

B) $-\frac{5}{2}$

C) 5

D) Undefined

4) (0.7, 0.9) and (0.5, 0.4)

A) $\frac{5}{2}$

B) $\frac{2}{5}$

C) $\frac{13}{12}$

D) $-\frac{5}{2}$

5) (9, 7) and (-8, 19)

A) $-\frac{12}{17}$

B) $-\frac{17}{12}$

C) 26

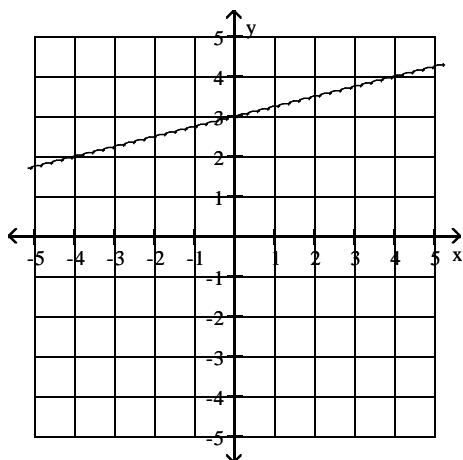
D) $\frac{12}{17}$

8 Find Slope of Line Given Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The graph of a linear function f is shown. Identify the slope.

1)



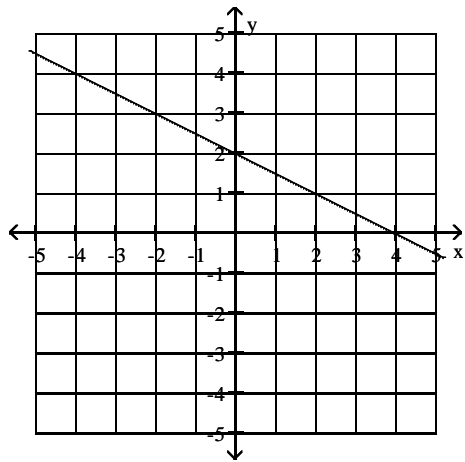
A) $\frac{1}{4}$

B) -4

C) $\frac{1}{5}$

D) 4

2)



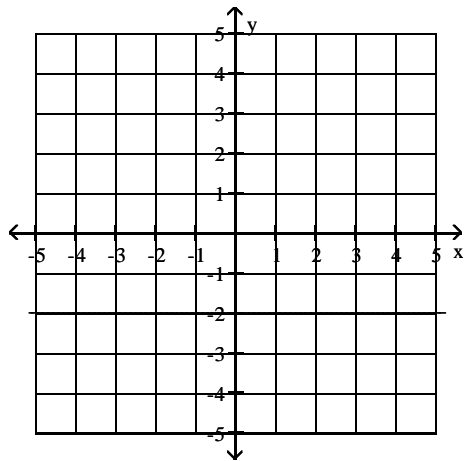
A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) $-\frac{2}{1}$

D) $\frac{2}{1}$

3)



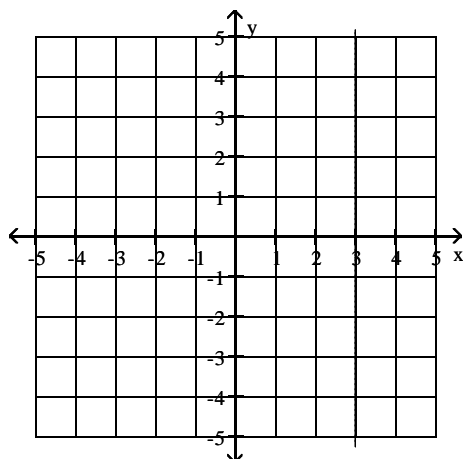
A) 0

B) -1

C) 1

D) Undefined

4)



A) 0

B) $\frac{2}{3}$

C) -1

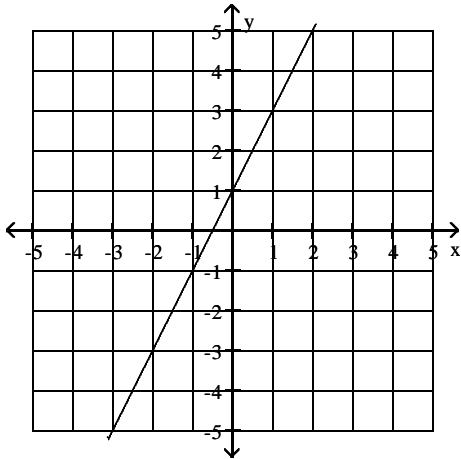
D) Undefined

9 Find Intercepts Given Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The graph of a linear function f is shown. Identify the y -intercept and x -intercept.

1)



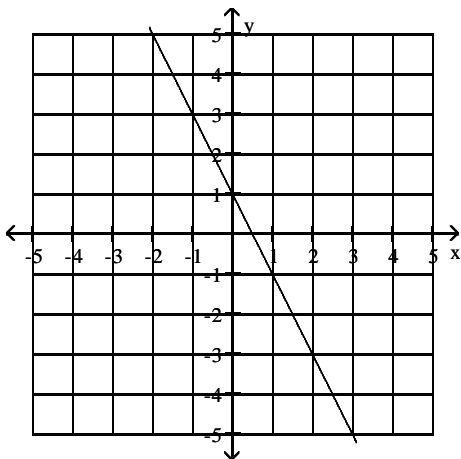
A) y -intercept: $(0, 1)$; x -intercept: $\left(-\frac{1}{2}, 0\right)$

C) y -intercept: $(0, 1)$; x -intercept: $(1, 0)$

B) y -intercept: $\left(0, -\frac{1}{2}\right)$; x -intercept: $(1, 0)$

D) y -intercept: $\left(0, -\frac{1}{2}\right)$; x -intercept: $\left(-\frac{1}{2}, 0\right)$

2)



A) y -intercept: $(0, 1)$; x -intercept: $\left(\frac{1}{2}, 0\right)$

C) y -intercept: $(0, -1)$; x -intercept: $\left(\frac{1}{2}, 0\right)$

B) y -intercept: $(0, -1)$; x -intercept: $\left(-\frac{1}{2}, 0\right)$

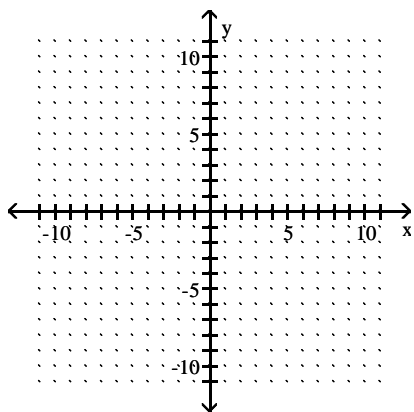
D) y -intercept: $(0, 1)$; x -intercept: $\left(-\frac{1}{2}, 0\right)$

10 Graph Line Given Point and Slope

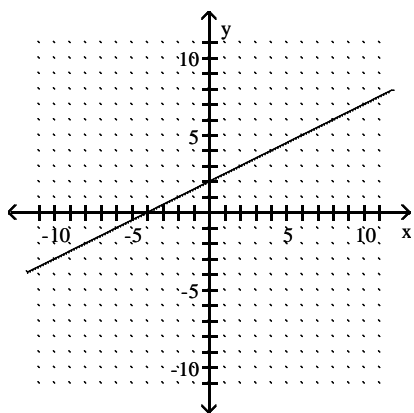
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the line passing through the given point and having the given slope.

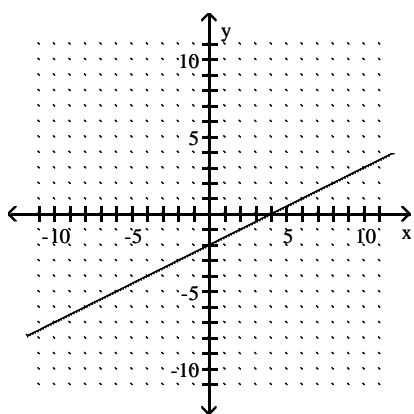
1) Through $(0, 2)$, $m = \frac{1}{2}$



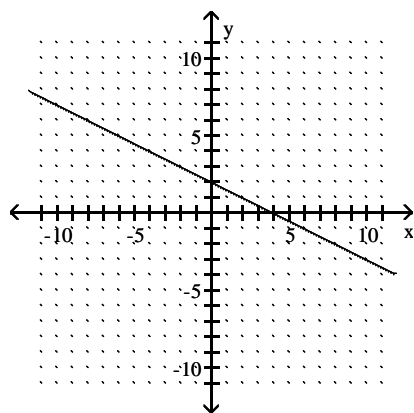
A)



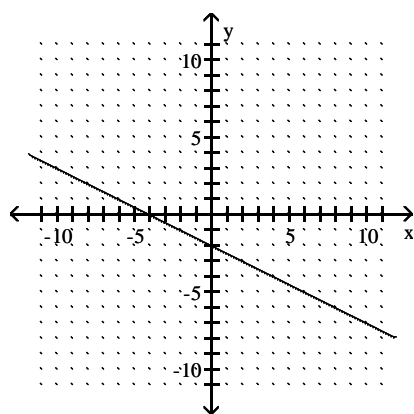
C)



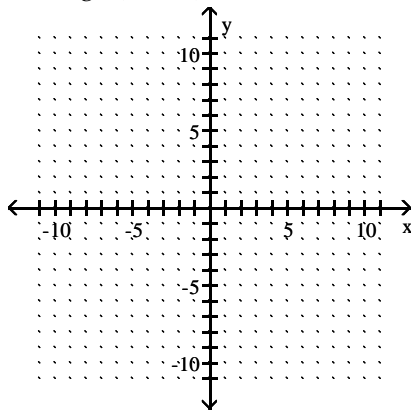
B)



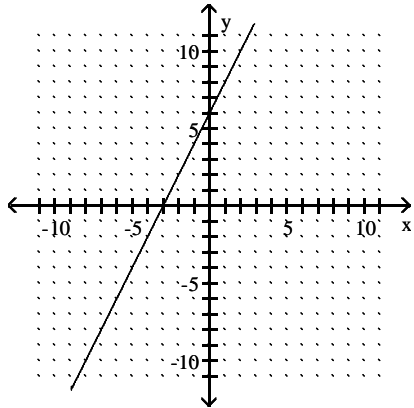
D)



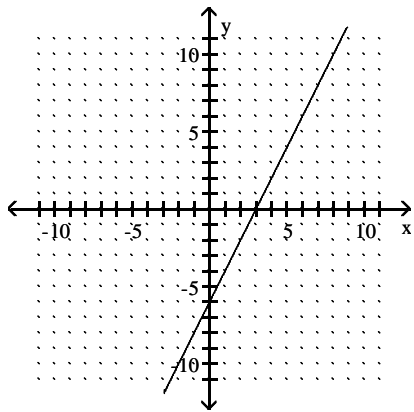
2) Through $(-4, -2)$, $m = 2$



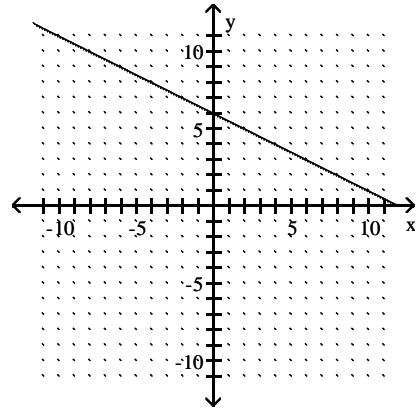
A)



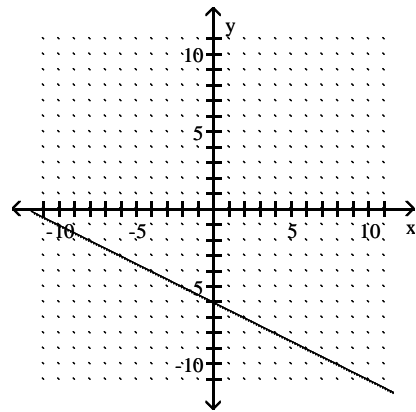
C)



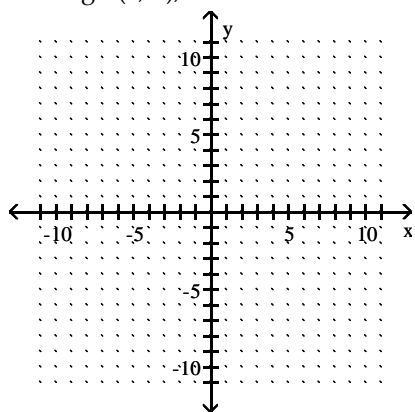
B)



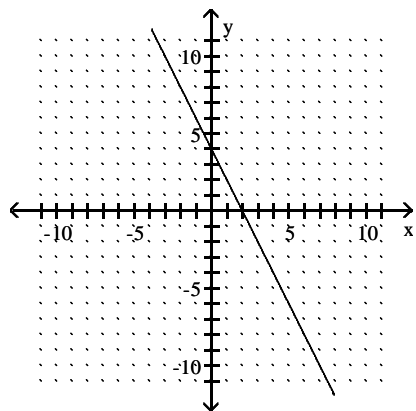
D)



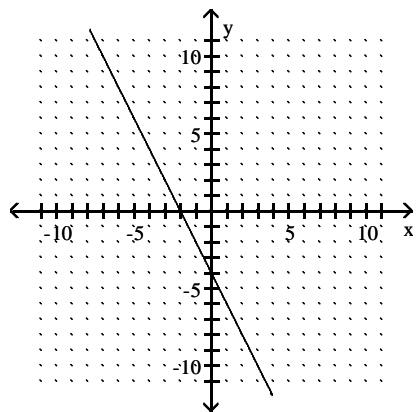
3) Through $(0, 4)$, $m = -2$



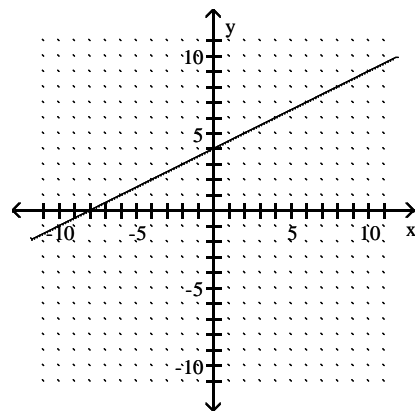
A)



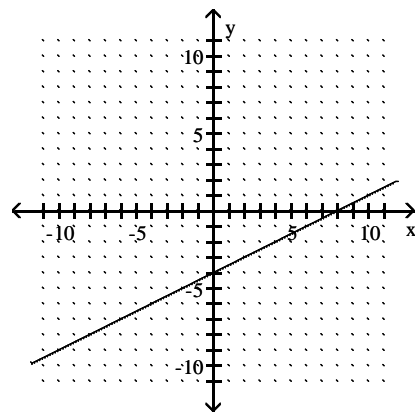
C)



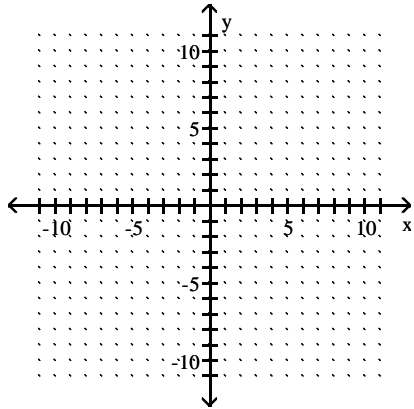
B)



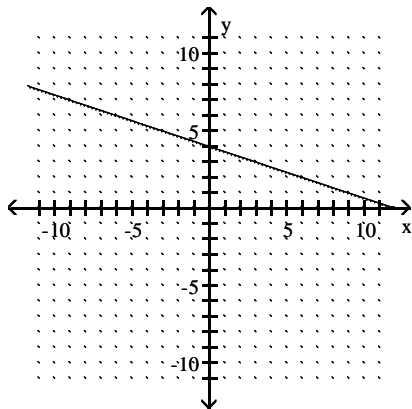
D)



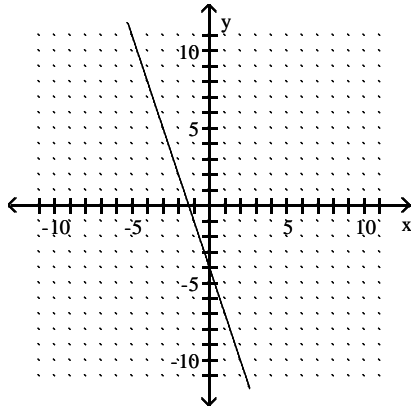
4) Through $(0, 4)$, $m = -\frac{1}{3}$



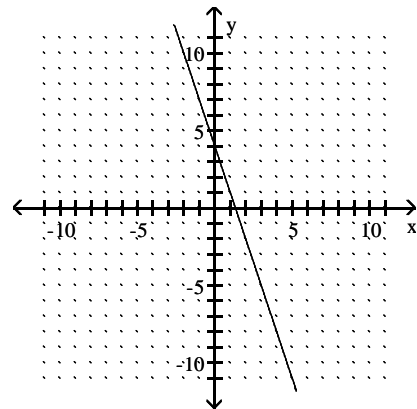
A)



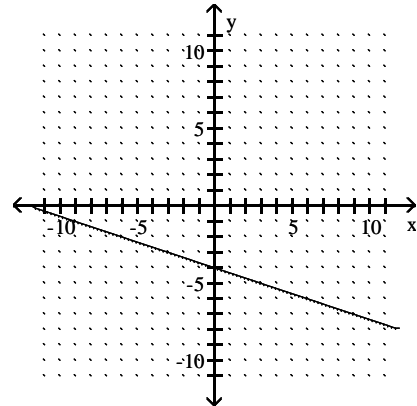
C)



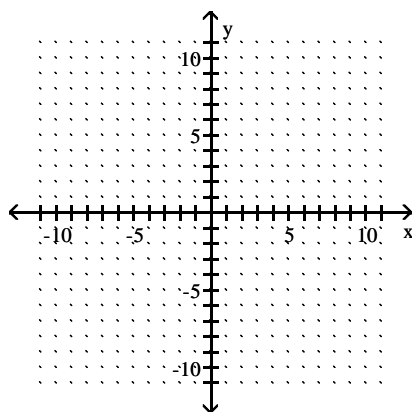
B)



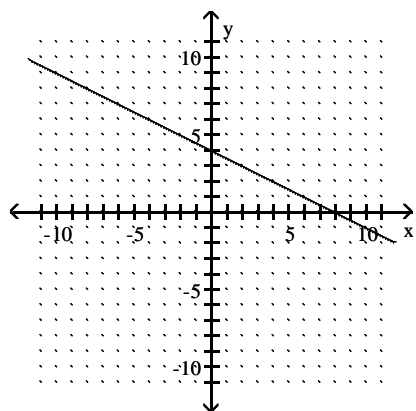
D)



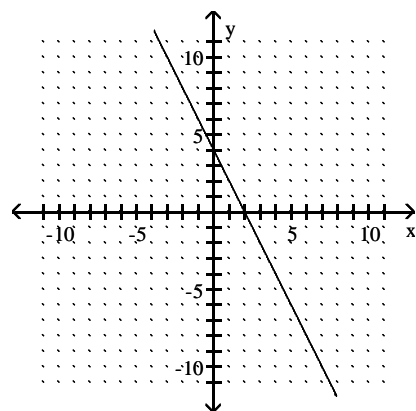
5) Through $(8, 0)$, $m = -\frac{1}{2}$



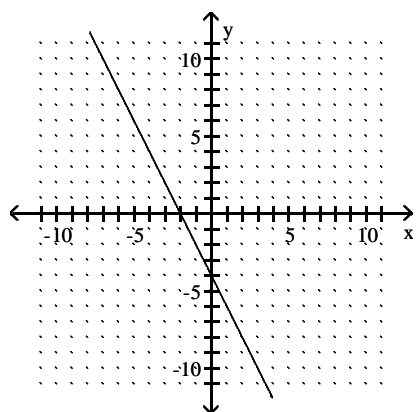
A)



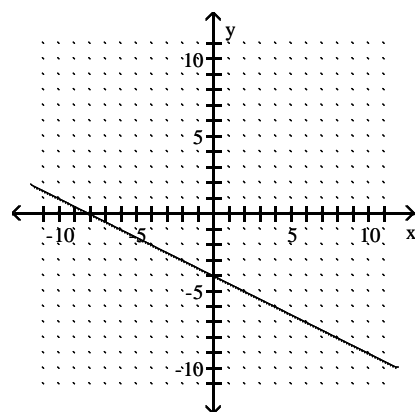
B)



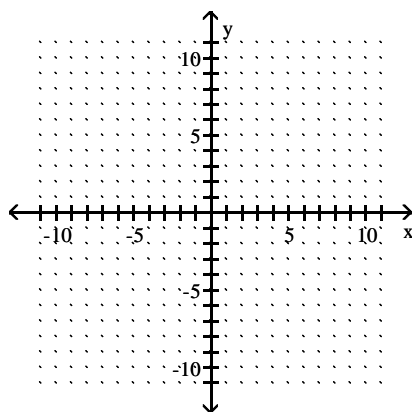
C)



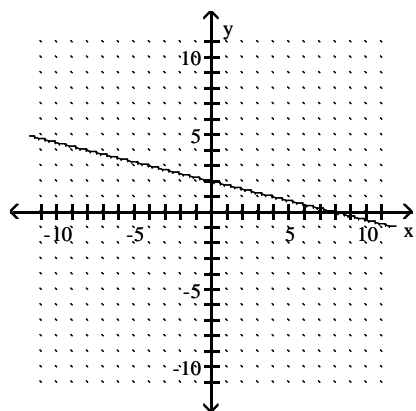
D)



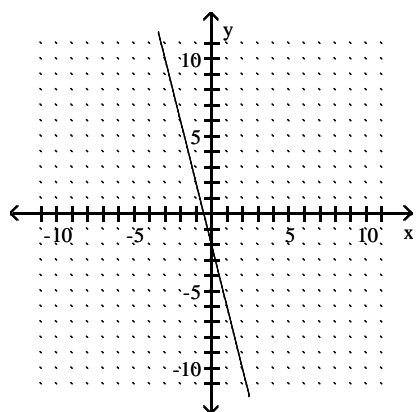
6) Through $(0, 2)$, $m = -\frac{1}{4}$



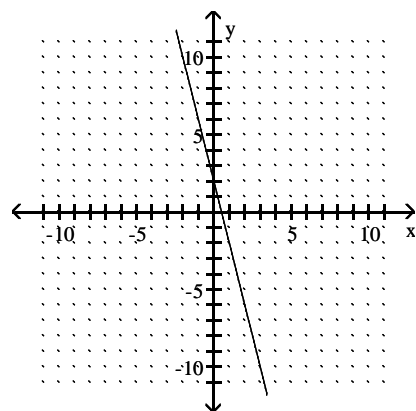
A)



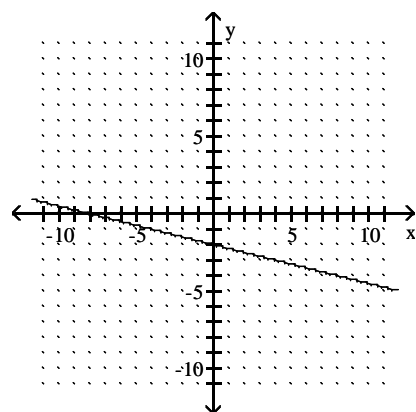
C)



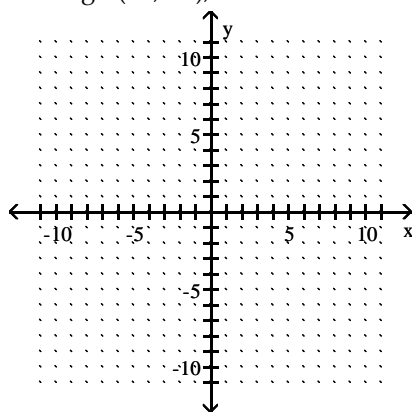
B)



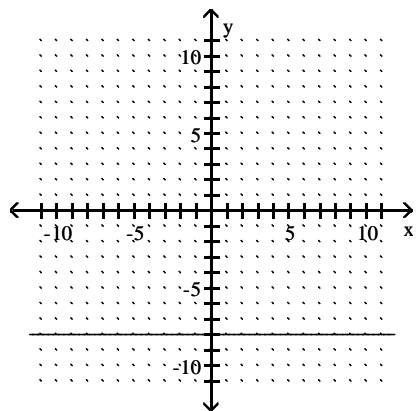
D)



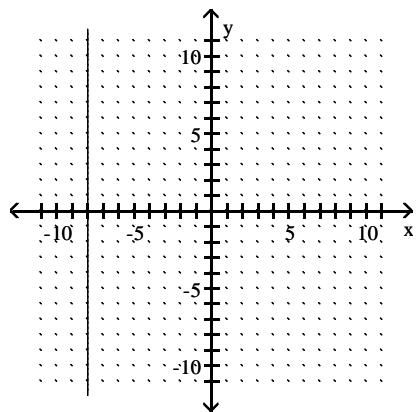
7) Through $(-3, -8)$, $m = 0$



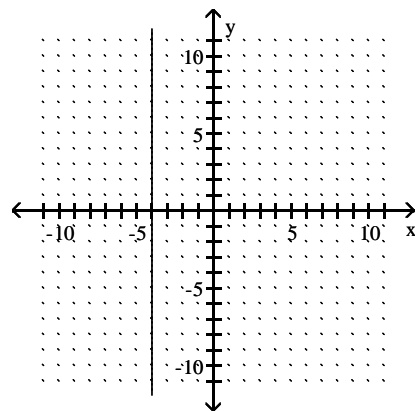
A)



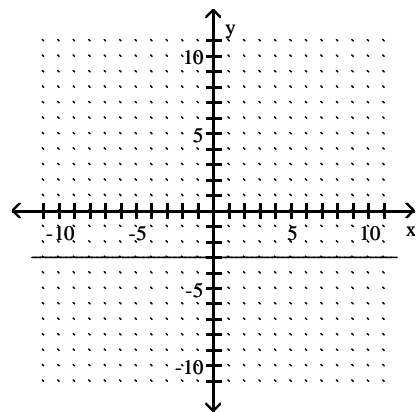
C)



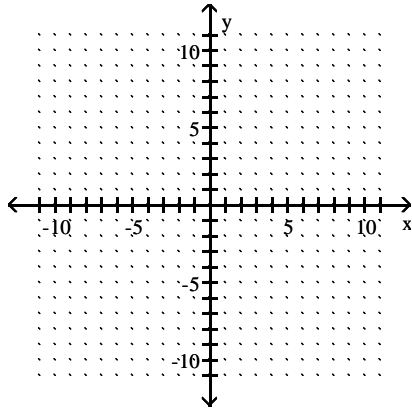
B)



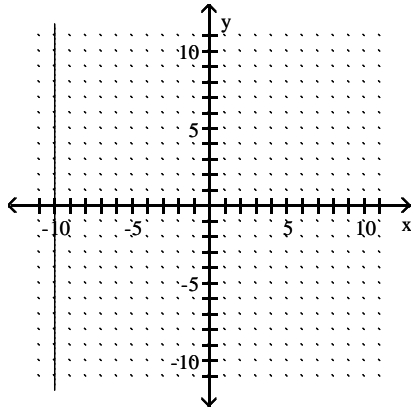
D)



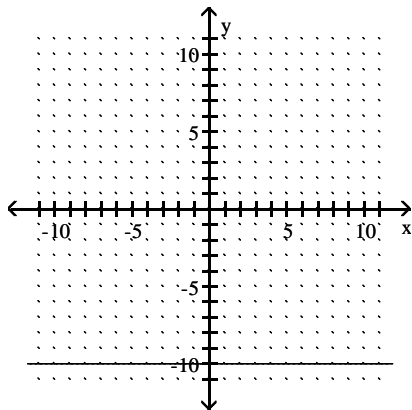
8) Through $(-3, -10)$, undefined slope



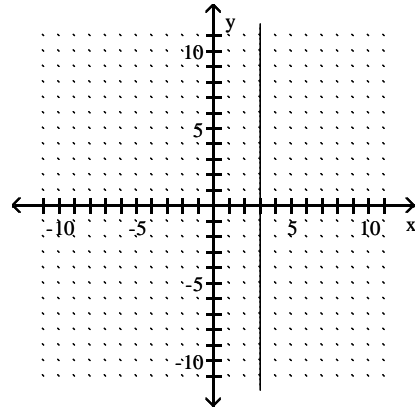
A)



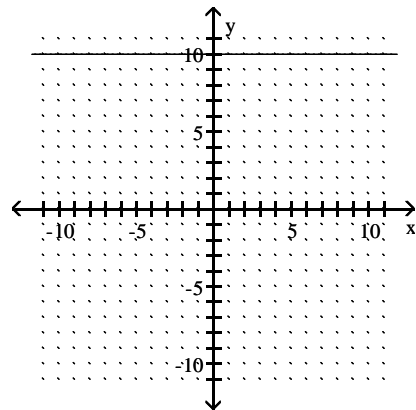
C)



B)



D)



11 Solve Apps: Linear Functions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) Suppose the annual sales of a particular brand of appliance are given by the linear function $f(x) = 180x + 1800$, where $f(x)$ represents the number of sales in year x , with $x = 0$ corresponding to 1982. Find the number of sales in 1992.

A) 3600

B) 3420

C) 7200

D) 7020

- 2) Assume that the annual sales of a small manufacturer can be modeled by a linear function and that sales were \$ 12,500 in 1982 and \$ 61,000 in 1987. Let $x = 0$ represent 1982 and $f(x)$ represent annual sales, and write a formula for $f(x)$.
- A) $f(x) = 9700x + 12,500$ B) $f(x) = 9700x + 61,000$
 C) $f(x) = 48,500x + 12,500$ D) $f(x) = 48,500x + 61,000$
- 3) A moving firm charges a flat fee of \$30 plus \$25 per hour. Let $f(x)$ represent the cost, in dollars, of using the moving firm for x hours. Write a formula for $f(x)$.
- A) $f(x) = 25x + 30$ B) $f(x) = 25x - 30$ C) $f(x) = 30x + 25$ D) $f(x) = 30x - 25$
- 4) An electrician charges a fee of \$45 plus \$30 per hour. Let $f(x)$ be the cost, in dollars, of using the electrician for x hours. Find a formula for $f(x)$.
- A) $f(x) = 30x + 45$ B) $f(x) = 30x - 45$ C) $f(x) = 45x + 30$ D) $f(x) = 45x - 30$
- 5) Ace Cable charges \$28 for the basic service plus \$8 for each movie channel. Let $f(x)$ be the total cost, in dollars, of subscribing to Ace Cable and including x movie channels. Write a formula for $f(x)$.
- A) $f(x) = 8x + 28$ B) $f(x) = 8x - 28$ C) $f(x) = 28x + 8$ D) $f(x) = 28x - 8$

12 Know Concepts: Linear Functions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

- 1) In the linear function, $y = mx + b$, b is the ? of the function.
 A) y-intercept B) x-intercept C) slope D) domain
- 2) In the linear function, $y = mx + b$, m is the ? of the function.
 A) slope B) x-intercept C) y-intercept D) range
- 3) In the linear function, $y = -6 + 9x$, -6 is the ? of the function.
 A) y-intercept B) x-intercept C) slope D) domain
- 4) If the y-intercept of the linear function $y = 4x + b$ lies below the x-axis, then what can you say about b ?
 A) $b < 0$ B) $b > 0$ C) $b = 0$ D) $b \geq 0$
- 5) If $m = 0$, the graph of $y = mx + b$?.
 A) is a horizontal line B) is a vertical line
 C) has no intercept D) slopes upward to the right
- 6) For the equation $y = mx + b$, find a formula for the value of x given any value of y .
 A) $x = \frac{y - b}{m}$ B) $x = y - mx - b$ C) $x = \frac{y + b}{m}$ D) $x = \frac{my - b}{b}$

1.4 Equations of Lines and Linear Models

1 Find Slope-Intercept Form of Line Given Point and Slope

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the slope-intercept form of the line that passes through the given point with slope m .

- 1) Through $(5, 4)$, $m = -\frac{4}{9}$
- A) $y = -\frac{4}{9}x + \frac{56}{9}$ B) $y = \frac{4}{9}x - \frac{56}{9}$ C) $y = -\frac{4}{9}x + \frac{20}{9}$ D) $y = \frac{4}{9}x + \frac{20}{9}$

2) Through (2, 2), $m = -\frac{7}{8}$

A) $y = -\frac{7}{8}x + \frac{15}{4}$

B) $y = \frac{7}{8}x - \frac{15}{4}$

C) $y = -\frac{7}{8}x + \frac{7}{4}$

D) $y = \frac{7}{8}x + \frac{7}{4}$

3) Through (5, 2), $m = 0$

A) $y = 2$

B) $x = 5$

C) $y = 5$

D) $x = 2$

4) Through (3, 0), $m = -1$

A) $y = -x + 3$

B) $y = 3x$

C) $y = x - 3$

D) $y = -3x$

5) Through (-1, -6), $m = 5$

A) $y = 5x - 1$

B) $y = 5x - 11$

C) $y = -5x - 11$

D) $y = -5x - 1$

6) Through (-1, -5), $m = -1.5$

A) $y = -1.5x - 6.5$

B) $y = -1.5x - 3.5$

C) $y = 1.5x - 3.5$

D) $y = 1.5x - 6.5$

2 Find Slope-Intercept Form of Line Given Two Points

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the slope-intercept form of the line satisfying the given conditions.

1) Through (-8, 7) and (0, -2)

A) $y = -\frac{9}{8}x - 2$

B) $y = \frac{9}{8}x - 2$

C) $y = \frac{15}{2}x - 2$

D) $y = -\frac{15}{2}x - 2$

2) Through (8, 0) and (-9, 2)

A) $y = -\frac{2}{17}x + \frac{16}{17}$

B) $y = \frac{2}{17}x + \frac{16}{17}$

C) $y = \frac{8}{11}x - \frac{50}{11}$

D) $y = -\frac{8}{11}x - \frac{50}{11}$

3) Through (0, 4) and (5, -8)

A) $y = -\frac{12}{5}x + 4$

B) $y = \frac{12}{5}x + 4$

C) $y = \frac{4}{13}x - \frac{84}{13}$

D) $y = -\frac{4}{13}x - \frac{84}{13}$

4) Through (9, 2) and (4, -4)

A) $y = \frac{6}{5}x - \frac{44}{5}$

B) $y = -\frac{6}{5}x - \frac{44}{5}$

C) $y = -\frac{7}{8}x - \frac{15}{2}$

D) $y = \frac{7}{8}x - \frac{15}{2}$

5) Through (0, -9) and (1, 0)

A) $y = 9x - 9$

B) $y = \frac{1}{9}x + 1$

C) $y = -9x - 9$

D) $y = -\frac{1}{9}x + 1$

6) Through (5, -4.5) and (9, 0.5)

A) $y = 1.25x - 10.75$

B) $y = 0.8x - 10.75$

C) $y = -1.25x - 10.75$

D) $y = -0.8x - 10.75$

7)

x	-4	-2	0	2	4
y	-16	-6	4	14	24

A) $y = 5x + 4$

B) $y = -10x + 24$

C) $y = 10x + 24$

D) $y = -5x + 4$

8)

x	-4	-2	0	2	4
y	26	16	6	-4	-14

A) $y = -5x + 6$

B) $y = -10x - 14$

C) $y = 5x + 6$

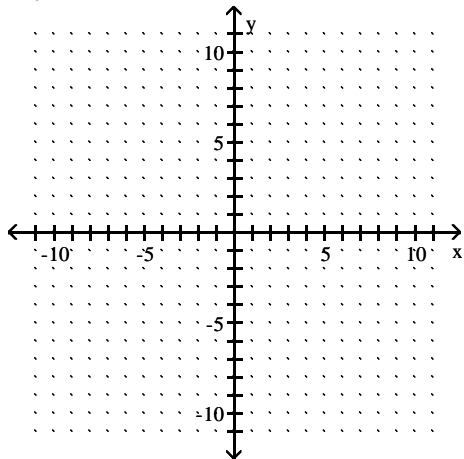
D) $y = 10x - 14$

3 Graph Linear Equation and Find Intercepts Given Formula

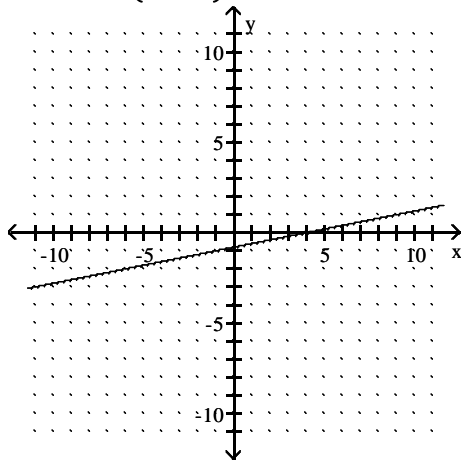
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the line, finding intercepts to determine two points on the line.

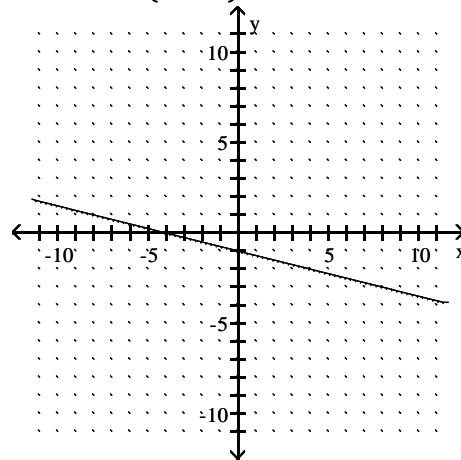
1) $10y - 2x = -8$



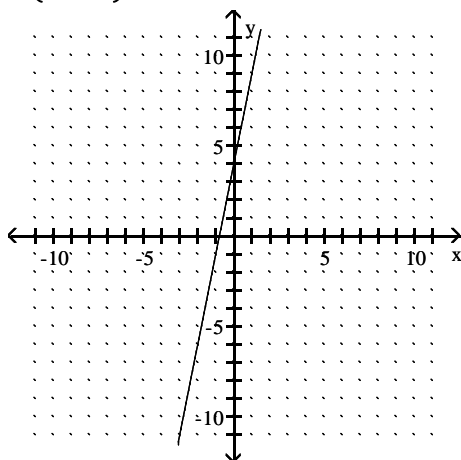
A) $x: (4, 0); y: \left(0, -\frac{4}{5}\right)$



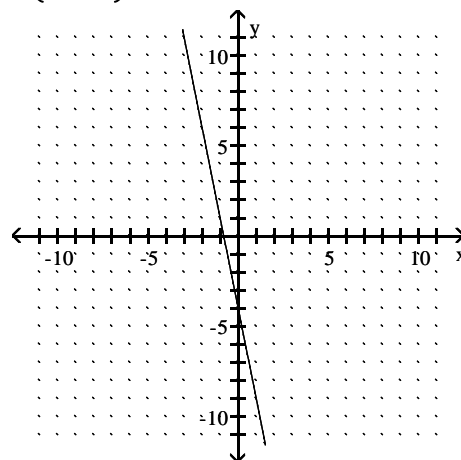
B) $x: (-4, 0); y: \left(0, -\frac{4}{5}\right)$



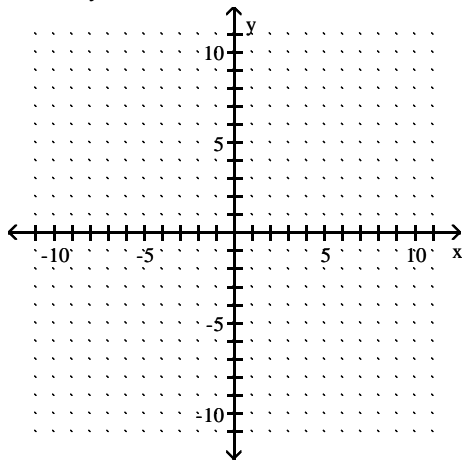
C) $x: \left(-\frac{4}{5}, 0\right); y: (0, 4)$



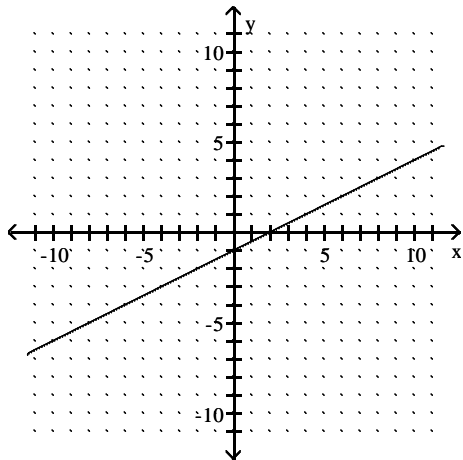
D) $x: \left(-\frac{4}{5}, 0\right); y: (0, -4)$



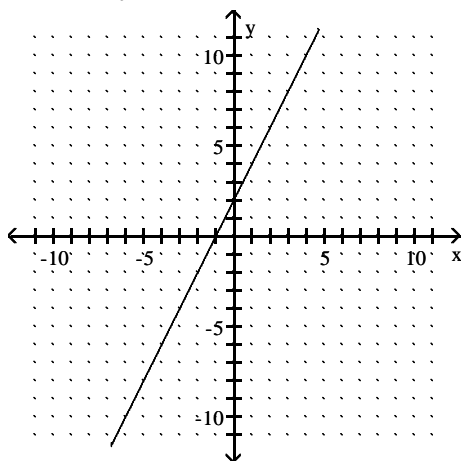
2) $5x - 10y = 10$



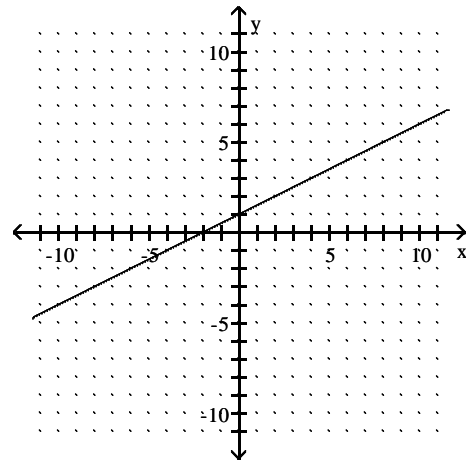
A) x: (2, 0); y: (0, -1)



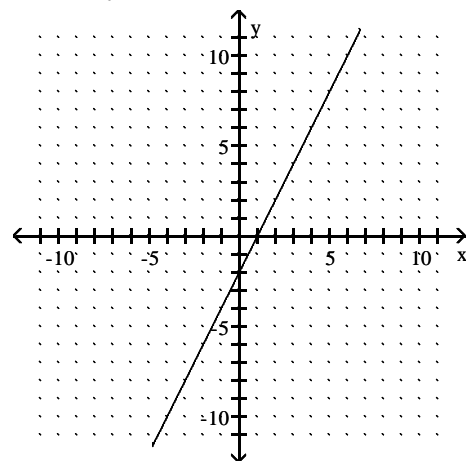
C) x: (-1, 0); y: (0, 2)



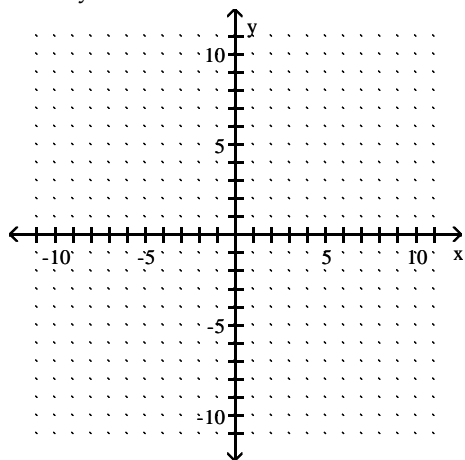
B) x: (-2, 0); y: (0, 1)



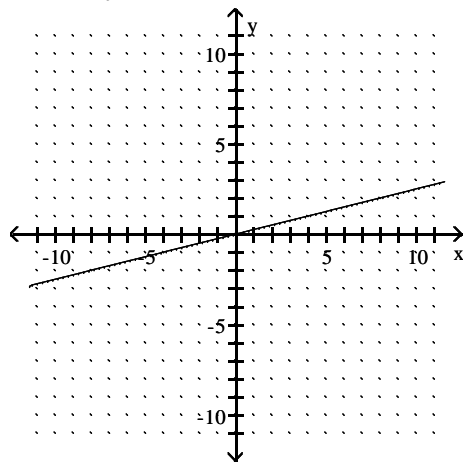
D) x: (1, 0); y: (0, -2)



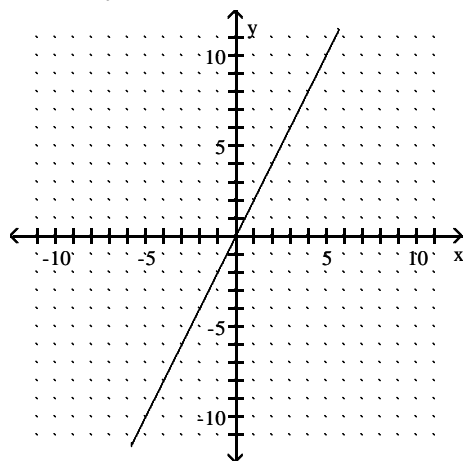
3) $2x - 8y = 0$



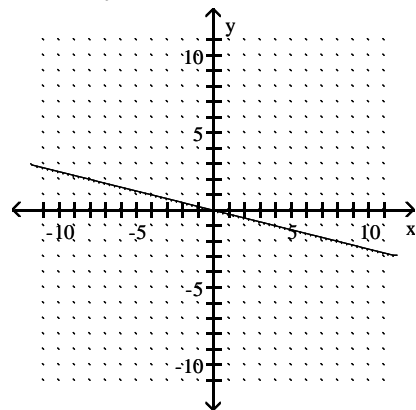
A) x: (0, 0); y: (0, 0)



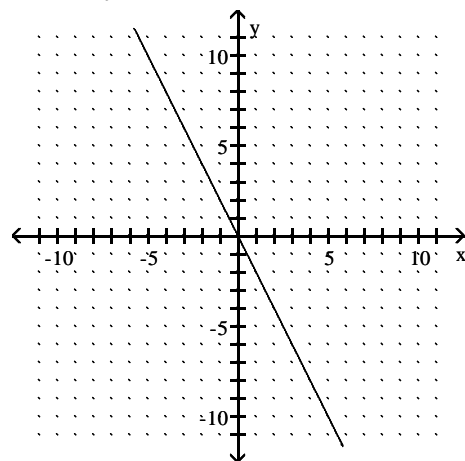
C) x: (0, 0); y: (0, 0)



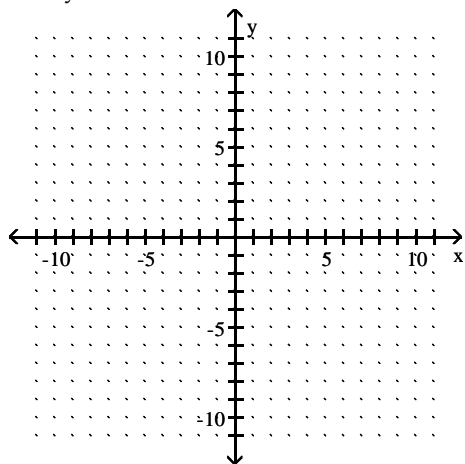
B) x: (0, 0); y: (0, 0)



D) x: (0, 0); y: (0, 0)

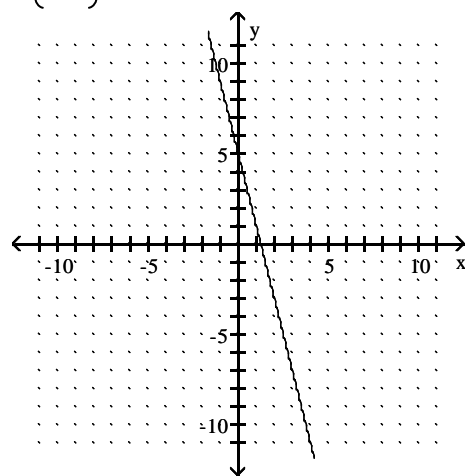
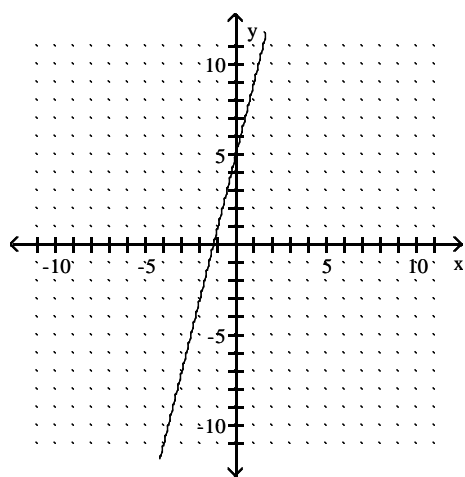


4) $4x - y = -5$



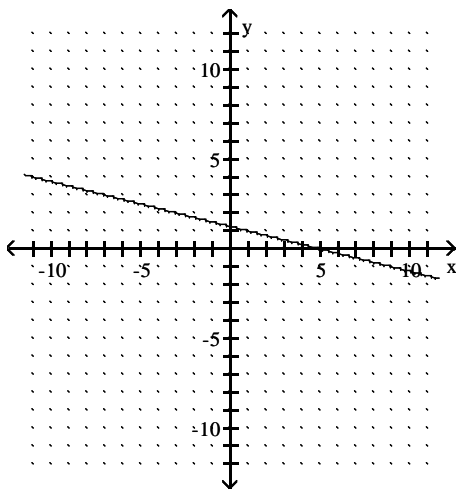
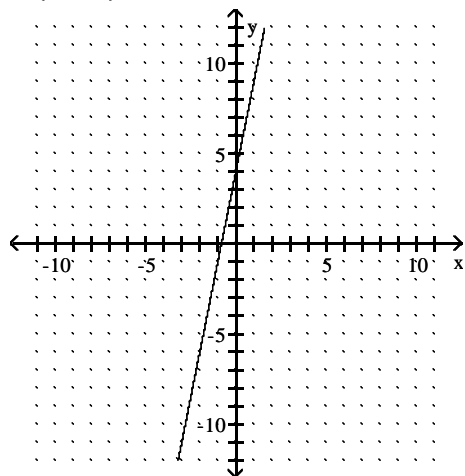
A) $x: \left(-\frac{5}{4}, 0\right); y: (0, 5)$

B) $x: \left(\frac{5}{4}, 0\right); y: (0, 5)$

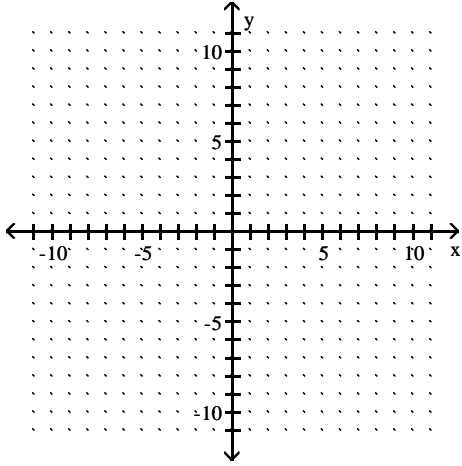


C) $x: \left(-\frac{4}{5}, 0\right); y: (0, 4)$

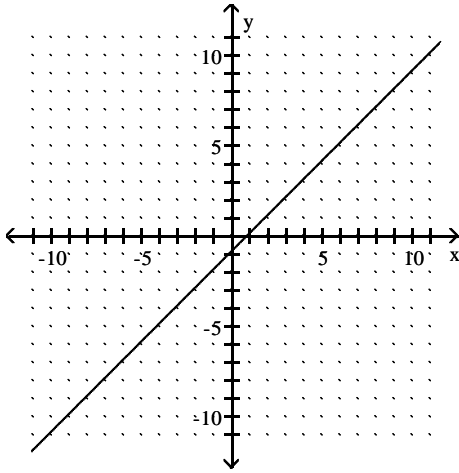
D) $x: (5, 0); y: \left(0, \frac{5}{4}\right)$



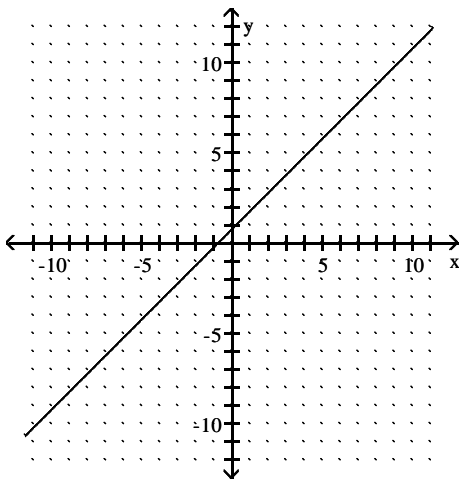
5) $8x - 8y = 6.4$



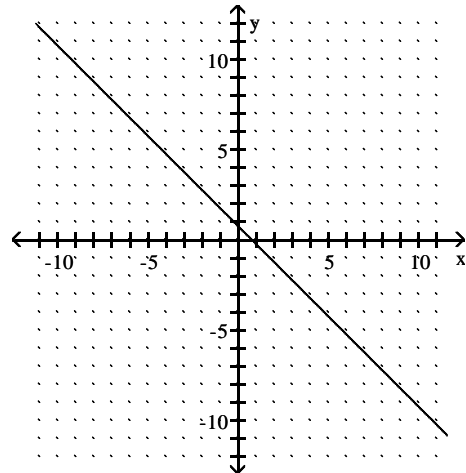
A) x: (0.8, 0); y: (0, -0.8)



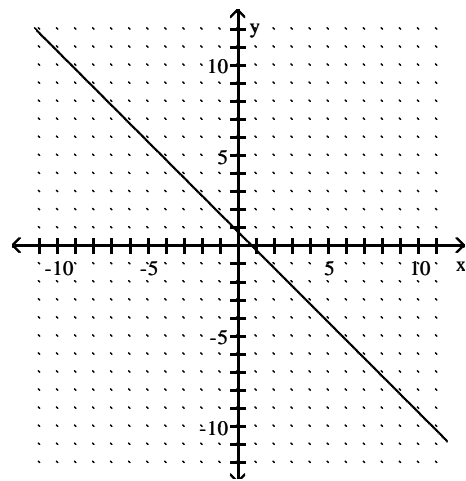
C) x: (-0.8, 0); y: (0, 0.8)



B) x: (8, 0); y: (0, 0.8)



D) (0.8, 0), (0, 0.8)



4 Write Equation in Slope-Intercept Form

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the equation in the form $y = mx + b$.

1) $19x + 10y = 10$

A) $y = -\frac{19}{10}x + 1$

B) $y = \frac{19}{10}x + 1$

C) $y = 19x - 10$

D) $y = \frac{19}{10}x - 1$

2) $-3x + 4y = 13$

A) $y = \frac{3}{4}x + \frac{13}{4}$

B) $y = -\frac{3}{4}x + \frac{13}{4}$

C) $y = \frac{3}{4}x - \frac{13}{4}$

D) $y = \frac{4}{3}x + \frac{13}{4}$

3) $0.2x - 0.8y = 0.7$

A) $y = \frac{1}{4}x - \frac{7}{8}$

B) $y = \frac{1}{4}x + \frac{7}{8}$

C) $y = 4x + \frac{7}{2}$

D) $y = 2x - 7$

4) $9y - 2x = 12$

A) $y = \frac{2}{9}x + \frac{4}{3}$

B) $y = -\frac{2}{9}x + \frac{4}{3}$

C) $y = \frac{2}{9}x - \frac{4}{3}$

D) $y = \frac{9}{2}x + \frac{4}{3}$

5 Find Lin Eqn Through Pt, Parallel/Perpendicular to Line

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the equation of the line satisfying the given conditions, giving it in slope-intercept form if possible.

1) Through (1, 6), perpendicular to $-4x + 7y = 38$

A) $y = -\frac{7}{4}x + \frac{31}{4}$

B) $y = \frac{7}{4}x - \frac{31}{4}$

C) $y = -\frac{7}{4}x$

D) $y = -\frac{4}{7}x + 31$

2) Through (9, -13), parallel to $-7x + 2y = -71$

A) $y = \frac{7}{2}x - \frac{89}{2}$

B) $y = -\frac{7}{2}x + \frac{89}{2}$

C) $y = \frac{2}{7}x + \frac{13}{7}$

D) $y = -\frac{9}{2}x - \frac{71}{2}$

3) Through (6, -10), parallel to $4x - 7y = 31$

A) $y = \frac{4}{7}x - \frac{94}{7}$

B) $y = -\frac{4}{7}x + \frac{94}{7}$

C) $y = \frac{7}{4}x - \frac{5}{2}$

D) $y = \frac{6}{7}x - \frac{31}{7}$

4) Through (-2, -3), perpendicular to $3x + 4y = 6$

A) $y = \frac{4}{3}x - \frac{1}{3}$

B) $y = -\frac{4}{3}x - \frac{1}{3}$

C) $y = \frac{3}{4}x + \frac{3}{4}$

D) $y = -\frac{1}{2}x - \frac{3}{2}$

5) Through (7, 2), perpendicular to $7x + 5y = 59$

A) $y = \frac{5}{7}x - 3$

B) $y = -\frac{5}{7}x + 3$

C) $y = \frac{5}{7}x$

D) $y = \frac{7}{5}x + 21$

6) Through (3, 5), perpendicular to $x = -3$

A) $y = 5$

B) $y = -5$

C) $x = -3$

D) $y = -3$

6 Solve Apps: Linear Equations

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) If an object is dropped from a tower of unknown height, the velocity of the object after t seconds can be obtained by multiplying t by 32 and adding 10 to the result. Therefore, you can express V as a linear function of t . Find the domain of this function.

A) $[0, \infty)$

B) $[1, 4]$

C) $(-1, \infty)$

D) $(-\infty, \infty)$

- 2) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of \$2.95 as soon as you get in the taxi, to which a charge of \$1.75 per mile is added. Find an equation that can be used to determine the cost, $C(x)$, of an x -mile taxi ride.
- A) $C(x) = 2.95 + 1.75x$ B) $C(x) = 1.75 + 2.95x$ C) $C(x) = 4.70x$ D) $C(x) = 3.20x$
- 3) Marty's Tee Shirt & Jacket Company is to produce a new line of jackets with an embroidery of a Great Pyrenees dog on the front. There are fixed costs of \$620 to set up for production, and variable costs of \$48 per jacket. Write an equation that can be used to determine the total cost, $C(x)$, encountered by Marty's Company in producing x jackets.
- A) $C(x) = 620 + 48x$ B) $C(x) = 620x + 48$ C) $C(x) = (620 + 48)x$ D) $C(x) = 620 - 48x$
- 4) Marty's Tee Shirt & Jacket Company is to produce a new line of jackets with a embroidery of a Great Pyrenees dog on the front. There are fixed costs of \$560 to set up for production, and variable costs of \$45 per jacket. Write an equation that can be used to determine the total cost, $C(x)$, encountered by Marty's Company in producing x jackets, and use the equation to find the total cost of producing 103 jackets.
- A) \$5195 B) \$5207 C) \$5175 D) \$5187
- 5) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs) when they entered the program were between 3.5 and 4.0. The following data were obtained regarding their GPAs on entering the program versus their current GPAs. Find the equation of the least-squares regression line that models the data.

Entering GPA	Current GPA
3.5	3.6
3.8	3.7
3.6	3.9
3.6	3.6
3.5	3.9
3.9	3.8
4.0	3.7
3.9	3.9
3.5	3.8
3.7	4.0

- A) $y \approx 3.67 + 0.0313x$ B) $y \approx 4.91 + 0.0212x$ C) $y \approx 5.81 + 0.497x$ D) $y \approx 2.51 + 0.329x$
- 6) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. Find the equation of the least-squares regression line that models the data.
- | | | | | | | |
|-------|----|----|----|----|----|----|
| Hours | 5 | 10 | 4 | 6 | 10 | 9 |
| Score | 64 | 86 | 69 | 86 | 59 | 87 |
- A) $y \approx 67.3 + 1.07x$ B) $y \approx 33.7 + 2.14x$ C) $y \approx -67.3 + 1.07x$ D) $y \approx 33.7 - 2.14x$
- 7) The paired data below consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands). Find the equation of the least-squares regression line that models the data

Cost	9	2	3	4	2	5	9	10
Number	85	52	55	68	67	86	83	73

- A) $y \approx 55.8 + 2.79x$ B) $y \approx -26.4 - 1.42x$ C) $y \approx 55.8 - 2.79x$ D) $y \approx 26.4 + 1.42x$

- 8) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters). Find the equation of the least-squares regression line that models the data.

Temp	62	76	50	51	71	46	51	44	79
Growth	36	39	50	13	33	33	17	6	16

- A) $y \approx 14.6 + 0.211x$ B) $y \approx 7.30 + 0.122x$ C) $y \approx 7.30 - 0.112x$ D) $y \approx -14.6 - 0.211x$

- 9) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below. Find the equation of the least-squares regression line that models the data.

Number of hours spent in lab	Grade (percent)
10	96
11	51
16	62
9	58
7	89
15	81
16	46
10	51

- A) $y \approx 88.6 - 1.86x$ B) $y \approx 44.3 + 0.930x$ C) $y \approx 0.930 + 44.3x$ D) $y \approx 1.86 + 88.6x$

- 10) Two separate tests are designed to measure a student's ability to solve problems. Several students are randomly selected to take both tests and the results are shown below. Find the equation of the least-squares regression line that models the data.

Test A	48	52	58	44	43	43	40	51	59
Test B	73	67	73	59	58	56	58	64	74

- A) $y \approx 19.4 + 0.930x$ B) $y \approx 0.930 - 19.4x$ C) $y \approx -0.930 + 19.4x$ D) $y \approx -19.4 - 0.930x$

7 *Know Concepts: Equations of Lines

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

- A line passes through the points (9, 2) and (9, 6). The equation of this line is ?. The slope of the line is ?.
A) $x = 9$; undefined B) $x = 9$; 0 C) $y = 9$; 0 D) $y = 9$; undefined
- A line passes through the points (4, 3) and (9, 3). The equation of this line is ?. The slope of the line is ?.
A) $y = 3$; 0 B) $y = 3$; undefined C) $x = 3$; 0 D) $x = 3$; undefined
- What is the general equation of all lines of slope 1?
A) $y = x + b$ B) $y = mx + b$ C) $x = 1$ D) $y = 1$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- Explain why the rule that the product of the slopes of perpendicular lines equals -1 does not apply when one of the lines is horizontal.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

5) Write the general equation of any line that passes through the origin.

A) $y = mx$

B) $y = mx + b$

C) $y = 0$

D) $x = 0$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

6) Show that the points $P_1(2, 4)$, $P_2(5, 2)$, and $P_3(7, 5)$ are the vertices of a right triangle.

1.5 Linear Equations and Inequalities

1 Find Zero of Linear Equation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the zero of the function f.

1) $f(x) = \frac{1}{2}x + \frac{1}{4}$

A) $-\frac{1}{2}$

B) $\frac{1}{4}$

C) $\frac{1}{2}$

D) $-\frac{1}{4}$

2) $f(x) = 3x + 6$

A) -2

B) 2

C) 6

D) -6

3) $f(x) = \frac{1}{3}x$

A) 0

B) 3

C) -3

D) Does not exist

4) $f(x) = -8x$

A) 0

B) 8

C) -8

D) Does not exist

5) $f(x) = 8x - 6$

A) $\frac{3}{4}$

B) $-\frac{3}{4}$

C) 3

D) -3

6) $f(x) = -3(7x - 3) + 5(-5x + 7)$

A) $\frac{22}{23}$

B) $-\frac{23}{13}$

C) $-\frac{22}{23}$

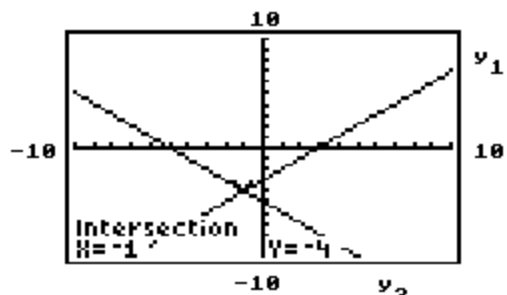
D) $-\frac{23}{22}$

2 Tech: Find Solution of $Y_1=Y_2$ by Intersection Method

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Two linear functions, y_1 and y_2 , are graphed with their point of intersection indicated. Give the solution set of $y_1 = y_2$.

1)



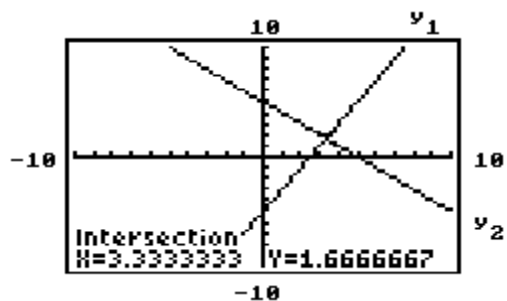
A) $\{-1\}$

B) $\{-4\}$

C) $\{-2\}$

D) $\{3\}$

2)



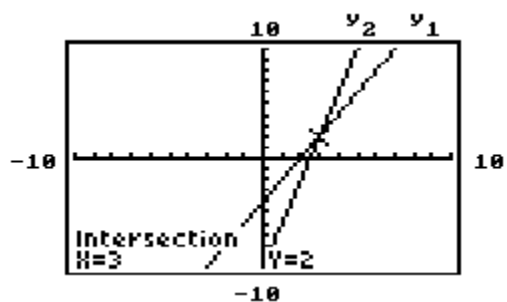
A) $\left\{\frac{10}{3}\right\}$

B) $\left\{\frac{1}{3}\right\}$

C) $\left\{\frac{5}{3}\right\}$

D) $\left\{\frac{1}{6}\right\}$

3)



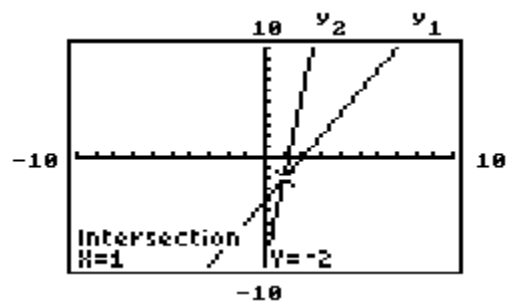
A) $\{3\}$

B) $\{2\}$

C) $\left\{\frac{5}{2}\right\}$

D) $\{-3\}$

4)



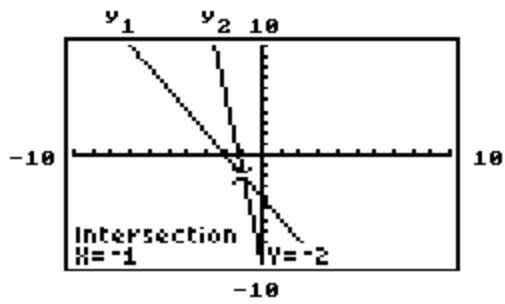
A) $\{1\}$

B) $\{2\}$

C) $\{4\}$

D) $\{-2\}$

5)



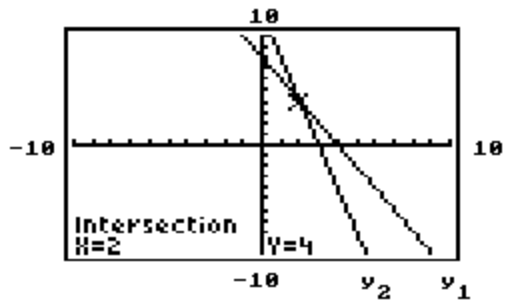
A) $\{-1\}$

B) $\{-2\}$

C) $\left\{-\frac{5}{2}\right\}$

D) $\{1\}$

6)



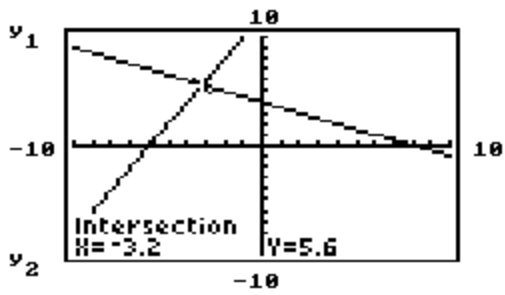
A) $\{2\}$

B) $\{4\}$

C) $\left\{\frac{7}{2}\right\}$

D) $\{8\}$

7)



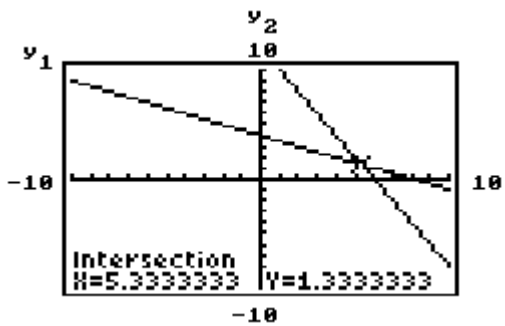
A) $\{-3.2\}$

B) $\{5.6\}$

C) $\{8\}$

D) $\{6\}$

8)



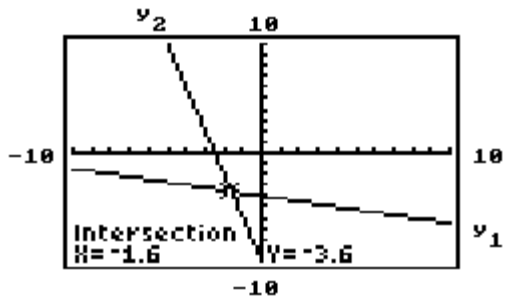
A) $\left\{\frac{16}{3}\right\}$

B) $\left\{\frac{4}{3}\right\}$

C) $\{8\}$

D) $\{6\}$

9)



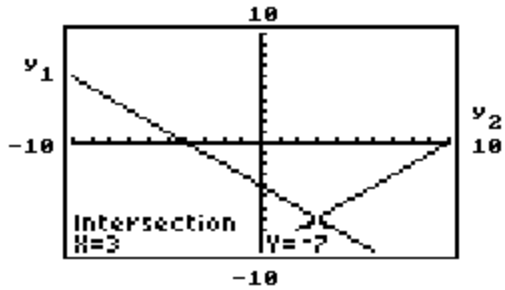
A) $\{-1.6\}$

B) $\{-3.6\}$

C) $\{-16\}$

D) $\left\{-\frac{5}{2}\right\}$

10)



A) $\{3\}$

B) $\{-7\}$

C) $\{-4\}$

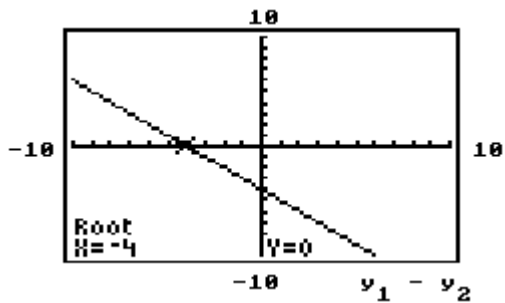
D) $\{10\}$

3 Tech: Find Solution of $Y_1=Y_2$ by x-Intercept Method

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the graph of $y = y_1 - y_2$ to solve the equation $y_1 = y_2$, where y_1 and y_2 represent linear functions.

1)



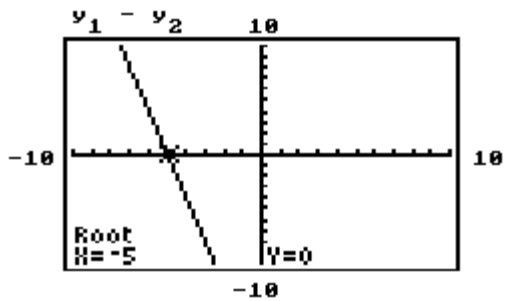
A) $\{-4\}$

B) $\{0\}$

C) $\{-5\}$

D) $\{-3\}$

2)



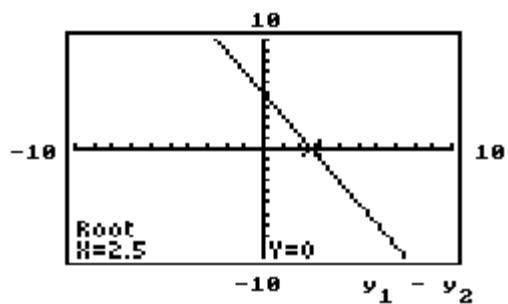
A) $\{-5\}$

B) $\{0\}$

C) $\{-4\}$

D) $\{-6\}$

3)



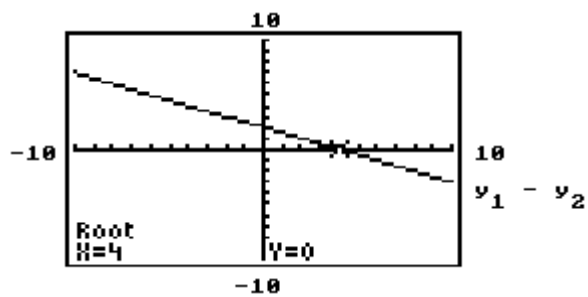
A) {2.5}

B) {0}

C) {5}

D) {3}

4)



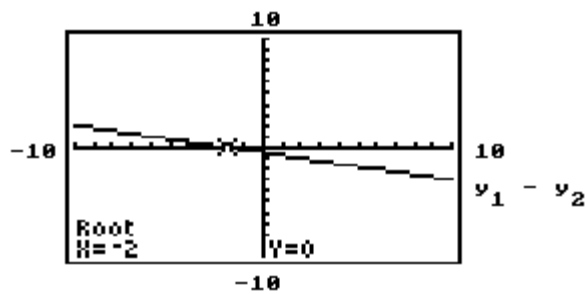
A) {4}

B) {0}

C) {2}

D) {5}

5)



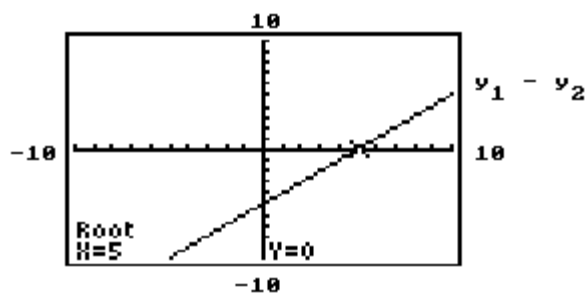
A) {-2}

B) $\left\{-\frac{1}{2}\right\}$

C) {0}

D) {-1}

6)



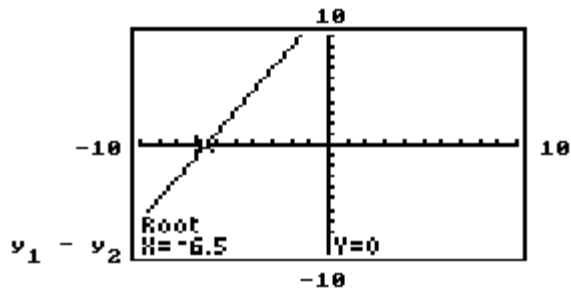
A) {5}

B) {0}

C) {-5}

D) {4}

7)



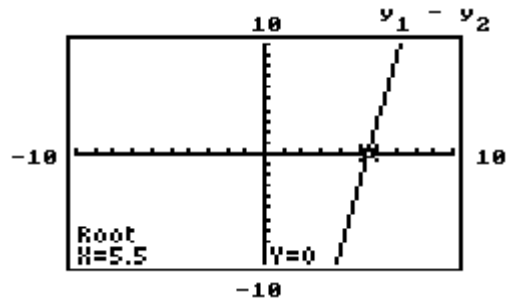
A) $\{-6.5\}$

B) $\{0\}$

C) $\{13\}$

D) $\{-7\}$

8)



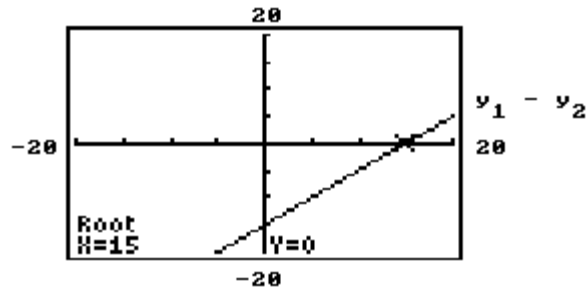
A) $\{5.5\}$

B) $\{0\}$

C) $\{5\}$

D) $\{6\}$

9)



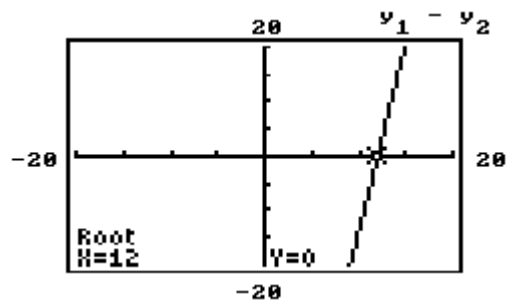
A) $\{15\}$

B) $\{0\}$

C) $\{-15\}$

D) $\{16\}$

10)



A) $\{12\}$

B) $\{0\}$

C) $\{-12\}$

D) $\{-11\}$

4 Solve Linear Equation (Ungrouped/Parentheses)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation analytically.

1) $3x + 19 = 2x + 6$

A) $\{-13\}$

B) $\{13\}$

C) $\{25\}$

D) $\{-25\}$

$$2) 22x + 2 = 4x + 12$$

$$A) \left\{ \frac{5}{9} \right\}$$

$$B) \left\{ \frac{26}{11} \right\}$$

$$C) \left\{ -\frac{5}{9} \right\}$$

$$D) \left\{ \frac{13}{7} \right\}$$

$$3) 19(x - 76) = 38$$

$$A) \{78\}$$

$$B) \{76\}$$

$$C) \{74\}$$

$$D) \{38\}$$

$$4) 8x - (3x - 1) = 2$$

$$A) \left\{ \frac{1}{5} \right\}$$

$$B) \left\{ \frac{1}{11} \right\}$$

$$C) \left\{ -\frac{1}{5} \right\}$$

$$D) \left\{ -\frac{1}{11} \right\}$$

$$5) (x - 5) - (x + 4) = 6x$$

$$A) \left\{ -\frac{3}{2} \right\}$$

$$B) \left\{ -\frac{1}{6} \right\}$$

$$C) \left\{ -\frac{1}{4} \right\}$$

$$D) \left\{ -\frac{9}{4} \right\}$$

$$6) 5(8x - 1) = 20$$

$$A) \left\{ \frac{5}{8} \right\}$$

$$B) \left\{ \frac{3}{8} \right\}$$

$$C) \left\{ \frac{21}{40} \right\}$$

$$D) \left\{ \frac{19}{40} \right\}$$

$$7) 8x - (7 - x) = 2[9 - (8 + 3x - 8)]$$

$$A) \left\{ \frac{5}{3} \right\}$$

$$B) \left\{ \frac{25}{3} \right\}$$

$$C) \left\{ -\frac{7}{15} \right\}$$

$$D) \left\{ -\frac{7}{13} \right\}$$

$$8) -[x - (-4x + 5)] = 7 - (-6x + 5)$$

$$A) \left\{ \frac{3}{11} \right\}$$

$$B) \left\{ -\frac{7}{3} \right\}$$

$$C) \left\{ -\frac{7}{11} \right\}$$

$$D) \left\{ -\frac{17}{10} \right\}$$

5 Solve Linear Equation (Decimals/Fractions)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation analytically.

$$1) -5.2x = -42.9 - 1.3x$$

$$A) \{11\}$$

$$B) \{-47\}$$

$$C) \{8.3\}$$

$$D) \{8.5\}$$

$$2) -2.7x + 1.4 = -15.4 - 1.3x$$

$$A) \{12\}$$

$$B) \{-18\}$$

$$C) \{6.2\}$$

$$D) \{6.7\}$$

$$3) \frac{2}{5}x - \frac{1}{3}x = 4$$

$$A) \{60\}$$

$$B) \{-60\}$$

$$C) \{120\}$$

$$D) \{-120\}$$

$$4) \frac{1}{4}x - \frac{3}{8}x = 4$$

$$A) \{-32\}$$

$$B) \{32\}$$

$$C) \{-28\}$$

$$D) \{28\}$$

$$5) \frac{x+1}{2} = \frac{x+2}{3}$$

$$A) \{1\}$$

$$B) \left\{ \frac{3}{5} \right\}$$

$$C) \left\{ \frac{3}{6} \right\}$$

$$D) \left\{ \frac{1}{6} \right\}$$

$$6) \frac{1}{4}(8x - 20) = \frac{1}{5}(25x - 10)$$

A) $\{-1\}$

B) $\{1\}$

C) $\left\{\frac{1}{10}\right\}$

D) $\{-10\}$

$$7) \frac{x - 4}{8} = \frac{x + 8}{4}$$

A) $\{-20\}$

B) $\left\{\frac{5}{2}\right\}$

C) $\{20\}$

D) $\left\{\frac{1}{2}\right\}$

$$8) \frac{3x + 2}{2} + \frac{9x + 3}{4} = 3$$

A) $\left\{\frac{1}{3}\right\}$

B) $\left\{-\frac{11}{30}\right\}$

C) $\left\{\frac{19}{15}\right\}$

D) $\left\{\frac{11}{15}\right\}$

6 Tech: Approximate Solution to Equation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the intersection-of-graphs method to approximate the solution to the nearest hundredth.

$$1) 7(0.30x + \sqrt{10}) = 3\sqrt{17}x - 10$$

A) $\{68.19\}$

B) $\{1500.15\}$

C) $\{-68.19\}$

D) \emptyset

$$2) 6\pi x - 3\sqrt{7} = 0.30\pi x + \sqrt{15}$$

A) $\{0.32\}$

B) $\{7.11\}$

C) $\{-0.32\}$

D) \emptyset

$$3) 2(0.46x + \sqrt{5}) = 3\sqrt{12}x - 5$$

A) $\{6.92\}$

B) $\{152.17\}$

C) $\{-6.92\}$

D) \emptyset

$$4) 7\pi x - 3\sqrt{6} = 0.01\pi x + \sqrt{30}$$

A) $\{0.33\}$

B) $\{7.31\}$

C) $\{-0.33\}$

D) \emptyset

$$5) 0.83(\sqrt{17} + 6x) + 0.61(\pi x - 5.9) = -17$$

A) $\{-2.44\}$

B) $\{2.44\}$

C) $\{-1.22\}$

D) \emptyset

$$6) -0.54(\sqrt{10} + 5x) - 0.45(\pi x - 4.1) = -4$$

A) $\{1.01\}$

B) $\{-1.01\}$

C) $\{0.50\}$

D) $\{-0.50\}$

$$7) -8.5(4 + \sqrt{11}x) - 0.5(5\pi x + 1.5) = -6$$

A) $\{-0.80\}$

B) $\{0.80\}$

C) $\{-1.25\}$

D) $\{1.25\}$

$$8) 4.6(11 + \sqrt{8}x) + 5.1(6\pi x - 2.4) = -9$$

A) $\{-0.43\}$

B) $\{0.43\}$

C) $\{-2.30\}$

D) $\{2.30\}$

$$9) -4.06(6 + 3\sqrt{3.04}x) - 2(\pi^2 x + 3\sqrt{3.09}) = -2x - 10$$

A) $\{-0.73\}$

B) $\{0.73\}$

C) $\{-1.31\}$

D) $\{1.31\}$

$$10) 1.81(5 + 3\sqrt{0.85}x) - 9(\pi^2 x + 3\sqrt{7.72}) = -10x - 1$$

A) $\{-0.10\}$

B) $\{0.10\}$

C) $\{-0.38\}$

D) $\{0.38\}$

7 Determine Whether Eqn is Identity, Contradiction, or Conditional

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Classify the equation as a contradiction, an identity, or a conditional equation.

1) $3(4x - 13) = 12x - 39$

A) Identity

B) Contradiction

C) Conditional

2) $3(2x - 40) - 6x + 120 = 0$

A) Identity

B) Contradiction

C) Conditional

3) $12x + 77 = 3(4x + 24)$

A) Contradiction

B) Identity

C) Conditional

4) $-8x - 192 + 4(2x + 50) = 0$

A) Contradiction

B) Identity

C) Conditional

5) $2(x + 6) - 6(x + 6) = -4x - 24$

A) Identity

B) Contradiction

C) Conditional

6) $9x - (3 - x) = 8[4 - (5 + 7x - 7)]$

A) Conditional

B) Contradiction

C) Identity

7) $2(x + 6) - 5(x + 6) = -3x + 42$

A) Contradiction

B) Identity

C) Conditional

8) $-[x - (4x + 1)] = 5 - (-9x + 8)$

A) Conditional

B) Contradiction

C) Identity

9) $8[8 - (4 + 4x)] - 4x = 14 + 2(4 - 18x)$

A) Contradiction

B) Identity

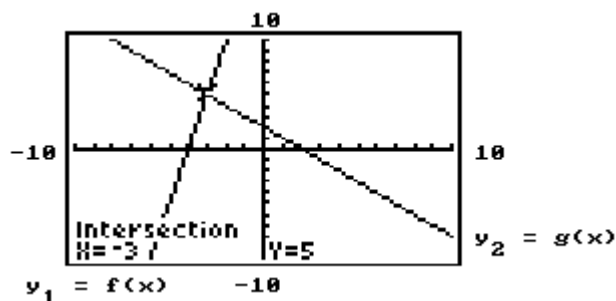
C) Conditional

8 Tech: Solve Linear Eqn or Inequality Given Graph

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Refer to the graph of the linear function defined by $y = f(x)$ or the graph of the linear functions defined by $y_1 = f(x)$ and $y_2 = g(x)$ to solve the equation or inequality.

1)



$y_2 - y_1 = 0$

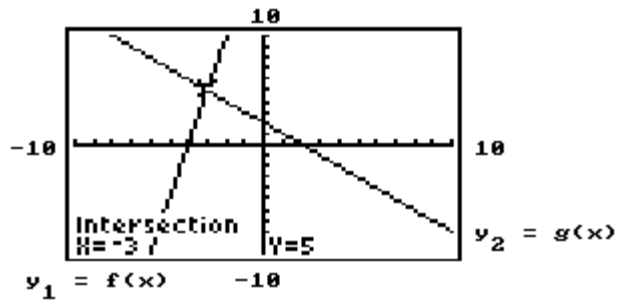
A) $\{-3\}$

B) $\{5\}$

C) $\{-4\}$

D) $\{2\}$

2)



$$y_1 \leq y_2$$

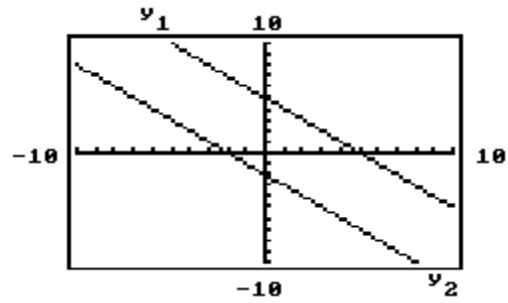
A) $(-\infty, -3]$

B) $(-3, \infty)$

C) $[-3, \infty)$

D) $(-\infty, -3)$

3)



$$y_1 > y_2$$

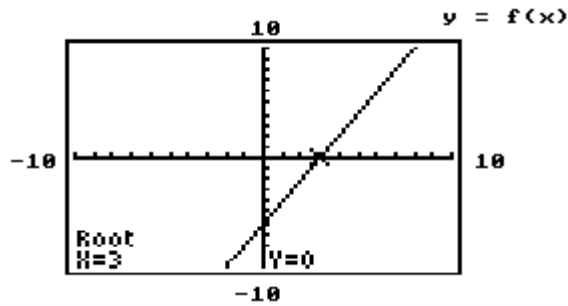
A) $(-\infty, \infty)$

B) \emptyset

C) $(5, \infty)$

D) $(-2, \infty)$

4)



$$f(x) \leq 0$$

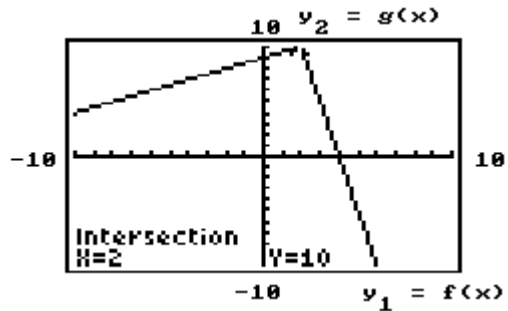
A) $(-\infty, 3]$

B) $[3, \infty)$

C) $(-\infty, -6]$

D) $[-6, \infty)$

5)



$$g(x) \leq f(x)$$

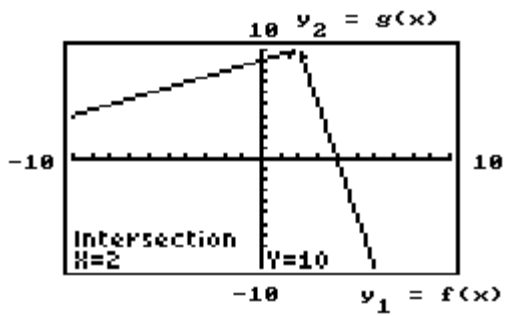
A) $(-\infty, 2]$

B) $[2, \infty)$

C) $[10, \infty)$

D) $(-\infty, 10]$

6)



$$g(x) - f(x) = 0$$

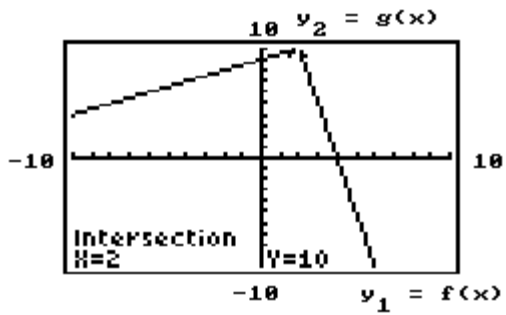
A) {2}

B) {5}

C) {9}

D) {4}

7)



$$y_1 - y_2 \geq 0$$

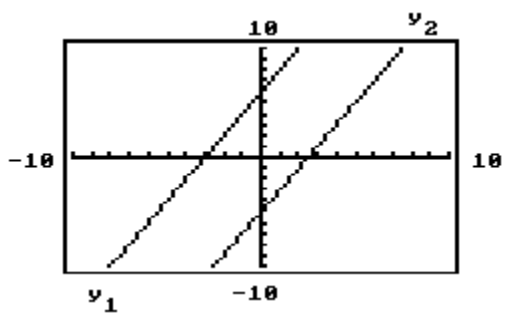
A) $(-\infty, 2]$

B) $[2, \infty)$

C) $[10, \infty)$

D) $(-\infty, 10]$

8)



$$y_1 \geq y_2$$

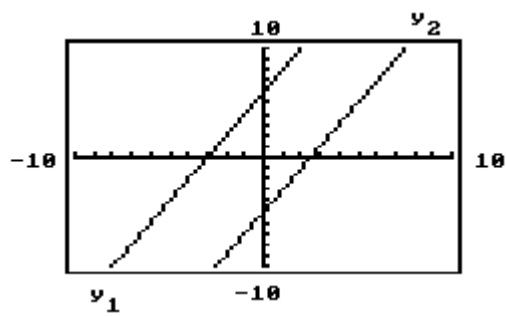
A) $(-\infty, \infty)$

B) \emptyset

C) $(6, \infty)$

D) $(-5, \infty)$

9)



$$y_1 \leq y_2$$

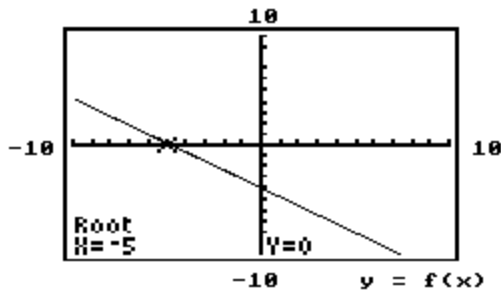
A) \emptyset

B) $(-\infty, \infty)$

C) $(-\infty, -3)$

D) $(3, \infty)$

10)



$$f(x) < 0$$

A) $(-5, \infty)$

B) $(-\infty, -5)$

C) $(-4, \infty)$

D) $(-\infty, -4)$

9 Solve Linear Inequality

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the inequality analytically, writing the solution set in interval notation.

1) $x - 8 < 4$

A) $(-\infty, 12)$

B) $(12, \infty)$

C) $(-\infty, 12]$

D) $[12, \infty)$

2) $-11y + 4 > -12y - 6$

A) $(-10, \infty)$

B) $(-\infty, -2)$

C) $(-2, \infty)$

D) $(-\infty, -10)$

3) $8x - 3 \leq 7x - 1$

A) $(-\infty, 2]$

B) $[2, \infty)$

C) $(-\infty, 8)$

D) $(8, \infty)$

4) $8x + 1 \geq 7x - 2$

A) $[-3, \infty)$

B) $(-\infty, 8)$

C) $(8, \infty)$

D) $(-\infty, -3]$

5) $-7x - 9 \geq -6x - 17$

A) $(-\infty, 8]$

B) $(-\infty, -7]$

C) $(-7, \infty)$

D) $[-8, \infty)$

6) $4 - 11x - 3 \geq -12x - 4$

A) $[-5, \infty)$

B) $(-\infty, -11)$

C) $(-11, \infty)$

D) $(-\infty, -5]$

7) $20x + 15 > 5(3x + 4)$

A) $(1, \infty)$

B) $(-\infty, 20)$

C) $(20, \infty)$

D) $(-\infty, 1)$

8) $-5(6x - 3) < -35x + 40$

A) $(-\infty, 5)$

B) $(5, \infty)$

C) $(-\infty, -35)$

D) $(-35, \infty)$

9) $\frac{5x - 8}{3} < \frac{23}{5}$

A) $\left(-\infty, \frac{109}{25}\right)$

B) $\left(-\infty, \frac{23}{5}\right)$

C) $\left(\frac{23}{5}, \infty\right)$

D) $\left(\frac{109}{25}, \infty\right)$

10) $\frac{5x - 6}{-9} < -\frac{39}{5}$

A) $\left(\frac{381}{25}, \infty\right)$

B) $\left(\frac{381}{5}, \infty\right)$

C) $\left(-\infty, -\frac{39}{5}\right)$

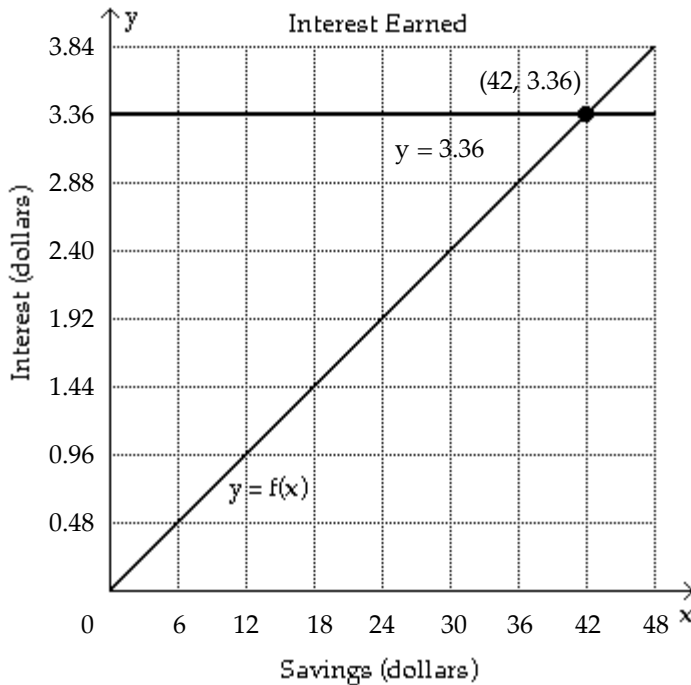
D) $\left(-\frac{39}{25}, \infty\right)$

10 Solve Apps: Linear Equations and Inequalities

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1)



The function f computes the annual interest paid on savings of x dollars with an interest rate of 8%. The graph of f and the horizontal line $y = 3.36$ are shown in the figure. Determine the savings amounts that result in (i) an annual interest less than \$3.36 and (ii) an annual interest of \$3.36 or more.

- A) Between \$0 and \$42; \$42 or more B) Between \$6 and \$42; \$42 or more
C) \$42 or less; between \$42 and \$48 D) \$42 or more; \$42
- 2) A retailer knows that n games can be sold in a month if the price is $30 - 0.3n$ dollars per game. If he buys each game for \$9, and if he wishes to make a profit of at least \$360 per month on sales of this game, how many games must he sell each month?
- A) $30 \leq n \leq 40$ B) $20 \leq n \leq 30$ C) $30 \leq n \leq 70$ D) $20 \leq n \leq 35$
- 3) A salesperson has two job offers. Company A offers a weekly salary of \$120 plus commission of 8% of sales. Company B offers a weekly salary of \$240 plus commission of 4% of sales. What is the amount of sales above which Company A's offer is the better of the two?
- A) \$3000 B) \$1500 C) \$6000 D) \$3100
- 4) A car rental company has two rental rates. Rate 1 is \$48 per day plus \$.16 per mile. Rate 2 is \$96 per day plus \$.08 per mile. If you plan to rent for one day, how many miles would you need to drive to pay less by taking Rate 2?
- A) More than 600 miles B) More than 300 miles
C) More than 1200 miles D) More than 700 miles

11 Solve Three-Part Inequality

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the inequality analytically, writing the solution set in interval notation.

1) $-20 < -4x \leq -4$

A) $[1, 5)$

B) $(-5, -1]$

C) $[1, 5]$

D) $(1, 5)$

2) $-13 < 4x + 3 \leq 3$

A) $(-4, 0]$

B) $(-4, 0)$

C) $[-4, 0]$

D) $[-4, 0)$

3) $-7 < -3x + 2 \leq 5$

A) $[-1, 3)$

B) $(-3, 1]$

C) $(-1, 3]$

D) $[-3, 1)$

4) $4 < \frac{13x - 3}{4} < 6$

A) $\left(\frac{19}{13}, \frac{27}{13}\right)$

C) $\left(-\frac{19}{13}, \frac{27}{13}\right)$

B) $\left(-\infty, \frac{19}{13}\right) \cup \left(\frac{27}{13}, \infty\right)$

D) $\left(-\frac{27}{13}, \frac{19}{13}\right)$

5) $-4 < \frac{10 - 3x}{2} \leq 7$

A) $\left[-\frac{4}{3}, 6\right)$

C) $\left[\frac{4}{3}, 6\right)$

B) $\left[-\frac{4}{3}, 6\right]$

D) $\left(-\infty, -\frac{4}{3}\right] \cup [6, \infty)$

6) $-4 < 2x + 4 \leq 4$

A) $(-4, 0]$

B) $(-4, 0)$

C) $[-4, 0]$

D) $[-4, 0)$

12 *Know Concepts: Linear Equations and Inequalities

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

- 1) Explain how the equality $4x + 10x + 3 = 14x + 3$ is supported by the graphs $Y_1 = 4x + 10x + 3$ and $Y_2 = 14x + 3$ in a standard viewing window
- 2) When using the intersection-of-graphs method of graphical solution, explain the significance of the x value at the bottom of the graphing calculator display.
- 3) When using the intersection-of-graphs method of graphical solution, explain the significance of the y value at the bottom of the graphing calculator display.
- 4) When using the intersection-of-graphs method of graphical solution, explain the significance of obtaining only a single line in an appropriate viewing window.
- 5) When using the x-intercept method of graphical solution for a linear equation that has no solutions, what would be the appearance of the graphical display?
- 6) When using the x-intercept method of graphical solution for a linear equation that has infinitely many solutions, what would be the appearance of the graphical display?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 7) The functions $f(x)$ and $g(x)$ are linear, and the solution set for $f(x) \geq g(x)$ is $[-7, \infty)$. Furthermore, $f(-7) = g(-7) = 3$. What can you say about $f(x)$ and $g(x)$ for $(-\infty, -7]$?
- A) $f(x) \leq g(x)$
 - B) $f(x) > g(x)$
 - C) $f(x) \geq g(x)$
 - D) Nothing about the relationship between $f(x)$ and $g(x)$ can be determined.
- 8) Consider two linear functions $Y_1 = f(x)$ and $Y_2 = g(x)$. One student claims that $f(x) > g(x)$ on the interval $(3, \infty)$. Another student claims that $g(x) > f(x)$ on the interval $(-\infty, 3)$. What can you say is true for the two functions at $x = 3$?
- A) $f(x) = g(x)$
 - B) $f(x) < g(x)$
 - C) $f(x) > g(x)$
 - D) Nothing about the relationship between $f(x)$ and $g(x)$ can be determined.
- 9) Given two horizontal lines $Y_1 = a$ and $Y_2 = b$ with $a > b$, what is the solution set for $Y_1 > Y_2$?
- A) $(-\infty, \infty)$
 - B) $[b, a]$
 - C) $(-\infty, b]$
 - D) Cannot be determined

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 10) Given the linear functions $Y_1 = x$ and $Y_2 = 2x$, name the regions where $Y_1 > Y_2$, $Y_1 = Y_2$, and $Y_1 < Y_2$.
- 11) Given the linear functions $Y_1 = ax$, $Y_2 = -ax$, and $Y_3 = bx$ with $a > b$, give the relationship between the functions at $x = 0$, $x > 0$, and $x < 0$.

1.6 Applications of Linear Functions

1 Solve Apps: Geometry (Rectangles)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) Find the length of a rectangular lot with a perimeter of 88 meters if the length is 4 meters more than the width.
- A) 24 m
 - B) 20 m
 - C) 48 m
 - D) 44 m
- 2) The length of a rectangle is 8 inches more than the width. The perimeter of the rectangle is 116 inches. Find the width of the rectangle.
- A) 25 in.
 - B) 8 in.
 - C) 33 in.
 - D) 29 in.
- 3) A square plywood platform has a perimeter which is 7 times the length of a side, decreased by 6. Find the length of a side.
- A) 2 units
 - B) 3 units
 - C) 5 units
 - D) 1 unit
- 4) A rectangular Persian carpet has a perimeter of 208 inches. The length of the carpet is 20 in. more than the width. What are the dimensions of the carpet?
- A) Width: 42 in.; length: 62 in.
 - B) Width: 84 in.; length: 104 in.
 - C) Width: 62 in.; length: 82 in.
 - D) Width: 94 in.; length: 114 in.
- 5) The length of a rectangular billboard is 9 inches more than the width. The perimeter of the billboard is 146 inches. Find the width of the billboard.
- A) 32 in.
 - B) 9 in.
 - C) 41 in.
 - D) 36 in.

- 6) The perimeter of a rectangle is 24 cm. One side is 6 cm longer than the other side. Find the lengths of the sides.
 A) Width: 3 cm; length: 9 cm
 B) Width: 3 cm; length: 6 cm
 C) Width: 6 cm; length: 12 cm
 D) Width: 5 cm; length: 11 cm
- 7) The perimeter of a rectangle is 74 m. If the width were doubled and the length were increased by 5 m, the perimeter would be 116 m. What are the length and width of the original rectangle?
 A) Width: 16 m; length: 21 m
 B) Width: 21 m; length: 16 m
 C) Width: 18 m; length: 18 m
 D) Width: 13 m; length: 18 m
- 8) The front face of a rectangular aquarium has length to width ratio of 5 to 7. The perimeter of the rectangle is 60 inches. Find the length of the rectangle.
 A) 12.5 in.
 B) 25 in.
 C) 185.5 in.
 D) 35 in.
- 9) The width of a rectangular stamp is 1.20 cm greater than the length. If the width and length are both increased by 1.0 cm, the stamp would have a perimeter equal to 18.40 cm. What are the actual dimensions of the stamp?
 A) 3.00 cm \times 4.20 cm
 B) 3.50 cm \times 4.10 cm
 C) 7.00 cm \times 8.20 cm
 D) 3.00 cm \times 8.40 cm
- 10) The aspect ratio (length to width) of an LCD computer monitor is 5 : 4. The LCD monitor of a Toshiba laptop computer has a perimeter of 32.4 inches. What is the diagonal measure of the screen. Round your answer to the nearest tenth of an inch?
 A) 11.5 in.
 B) 4.0 in.
 C) 16.2 in.
 D) 132.8 in.

2 Solve Apps: Mixtures

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) How many liters of a solution that is 10% alcohol must be mixed with 70 liters of a solution that is 30% alcohol to get a solution that is 20% alcohol?
 A) 70 L
 B) 7 L
 C) 140 L
 D) 14 L
- 2) In a chemistry class, 3 liters of a 4% silver iodide solution must be mixed with a 10% solution to get a 6% solution. How many liters of the 10% solution are needed?
 A) 1.5 L
 B) 0.5 L
 C) 2.5 L
 D) 3.0 L
- 3) For small jobs, a contractor mixes concrete from bags of pre-mix. How many bags with 4% cement should he mix with 3 bags of 24% cement to produce a mix containing 10% cement?
 A) 7 bags
 B) 10 bags
 C) 15 bags
 D) 9 bags
- 4) Anne and Nancy use a metal alloy that is 26.75% copper to make jewelry. How many ounces of an alloy that is 26% copper must be mixed with an alloy that is 27% copper to make 104 ounces of the desired alloy?
 A) 26 ounces
 B) 78 ounces
 C) 28 ounces
 D) 83 ounces

3 Solve Apps: Miscellaneous

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) The annual sales of a company's best-selling appliance can be modeled by the linear function
 $S(x) = 250x + 1900$,
 where $S(x)$ represents the number of appliances sold in year x , with $x = 0$ corresponding to 1982. Find the number of appliances sold in 1996.
 A) 5400 appliances
 B) 5150 appliances
 C) 10,800 appliances
 D) 10,550 appliances

- 2) The annual sales of a company's best-selling appliance can be modeled by a linear function. Suppose that the sales, in dollars, were 7500 in 1997 and 80,000 in 2002. Find a linear function for annual sales, $S(x)$, letting $x = 0$ represent 1997.
- A) $S(x) = 14,500x + 7500$ B) $S(x) = 14,500x + 80,000$
 C) $S(x) = 72,500x + 7500$ D) $S(x) = 72,500x + 80,000$
- 3) In his first year at a publishing company Stephen received a salary of \$13,000 and was given no bonus. At the start of his second year with the company, he was given a salary increase of 6%. At the end of the year he received a bonus of \$800. What was Stephen's total compensation in the second year?
- A) \$14,580 B) \$13,800 C) \$21,600 D) \$11,509
- 4) The function given by the equation $y = 3.785x$ will convert x gallons into approximately y liters. If a container can hold 33 gallons, how many liters can it hold? Round your answer to two decimal places.
- A) 124.91 L B) 125.05 L C) 124.21 L D) 125.48 L
- 5) An average score of 90 for 5 exams is needed for a final grade of A. John's first 4 exam grades are 79, 89, 97, and 95. Determine the minimum grade John needs on the fifth exam to get an A in the course.
- A) 90 B) 85 C) 100 D) 95
- 6) An average score of 70 for 6 exams is needed for a final grade of C. Jane's first 5 exam scores are 65, 70, 55, 82 and 87. Determine the minimum score Jane needs on the sixth exam to get a C in the course.
- A) 61 B) 60 C) 72 D) 85
- 7) A student earned scores of 85, 83, 90, 94, 88, and 84 on the first six tests in a biology class. What score is needed on the seventh test to result in an average score of 86?
- A) 78 B) 79 C) 80 D) 81
- 8) Jim has gotten scores of 87 and 79 on his first two tests. What score must he get on his third test to keep an average of 80 or greater?
- A) At least 74 B) At least 83 C) At least 82.0 D) At least 73

4 Solve Apps: Cost and Revenue Functions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) Mary, the owner of Vitallo's Pizza Parlor, had start-up costs of \$4000. The ingredients for each pizza cost \$3.75, and she sells each pizza for \$12. She has no other expenses. Express the cost C as a function of x , where x represents the number of pizzas sold.
- A) $C(x) = 3.75x + 4000$ B) $C(x) = 4000x + 3.75$ C) $C(x) = 3.75x + 12$ D) $C(x) = 3.75x + 4012$
- 2) Georgianna, the owner of Petrillo's Pizza, had start-up costs of \$5100. The ingredients for each pizza cost \$3.00, and she sells each pizza for \$8. Georgianna has no other expenses. Express the revenue R as a function of x , where x represents the number of pizzas sold.
- A) $R(x) = 8x$ B) $R(x) = 3.00x$ C) $R(x) = 11x$ D) $R(x) = 5100x$
- 3) Regrind, Inc. regrinds used typewriter platens. The cost to buy back each used platen is \$2.60. The fixed cost to run the grinding machine is \$279 per day. If the company sells the reground platens for \$5.60, how many must be reground daily to break even? (Assume that there are no unsold platens at the end of the day.)
- A) 93 platens B) 62 platens C) 107 platens D) 34 platens
- 4) George Higgendorf sells used books. He had start-up costs of \$2700 and pays \$3.25 for each book. He sells each book for \$6.25. Express the revenue R as a function of x , where x represents the number of books sold.
- A) $R(x) = 6.25x$ B) $R(x) = 3.25x$ C) $R(x) = 9.5x$ D) $R(x) = 2700x$

- 5) Northwest Molded molds plastic handles which cost \$0.10 per handle to mold. The fixed cost to run the molding machine is \$2009 per week. If the company sells the handles for \$1.10 each, how many handles must be molded weekly to break even? (Assume that there are no unsold handles at the end of the week.)
 A) 2009 handles B) 1339 handles C) 20,090 handles D) 1674 handles
- 6) Bill Monotone sells CDs for \$9.50 each. His initial cost to set up the business was \$6200, and each CD costs him \$3.50. Express the cost C as a function of x , where x represents the number of CDs sold.
 A) $C(x) = 3.50x + 6200$ B) $C(x) = 9.50x + 6200$ C) $C(x) = 6200x + 3.50$ D) $C(x) = 6200x + 9.50$
- 7) Jane Hightone sells CDs for \$8.25 each. Her initial cost to set up the business was \$9800, and each CD costs her \$3.25. Express the revenue R as a function of x , where x represents the number of CDs sold.
 A) $R(x) = 8.25x$ B) $R(x) = 3.25x$ C) $R(x) = 11.5x$ D) $R(x) = 3.25x + 9800$
- 8) Midtown Delivery Service delivers packages which cost \$1.00 per package to deliver. The fixed cost to run the delivery truck is \$108 per day. If the company charges \$7.00 per package, how many packages must be delivered daily to break even?
 A) 18 packages B) 12 packages C) 108 packages D) 13 packages
- 9) A lumber yard has fixed costs of \$3017.00 a day and marginal costs of \$0.76 per board-foot produced. The company gets \$1.76 per board-foot sold. How many board-feet must be produced (and sold) daily to break even?
 A) 3017 board-feet B) 2011 board-feet C) 3969 board-feet D) 1197 board-feet

5 Solve Apps: Proportion and Direct Variation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) How long is the shadow cast by a person 4 feet tall when a flagpole 20 feet tall casts a shadow 40 feet long?
 A) 8 ft B) 10 ft C) 5 ft D) 80 ft
- 2) A tree casts a shadow 35 m long. At the same time, the shadow cast by a 70-cm tall statue is 54 cm long. Find the height of the tree. Round your answer to the nearest meter, if necessary.
 A) 45 m B) 27 m C) 44 m D) 26 m
- 3) A church steeple casts a shadow 106 ft long, and at the same time a 8-ft post casts a shadow 7 ft long. How high is the steeple? Round your answer to the nearest foot, if necessary.
 A) 121 ft B) 93 ft C) 8 ft D) 107 ft
- 4) Maria and Charlie can deliver 70 papers in 2 hours. How long would it take them to deliver 168 papers?
 A) 4.8 hr B) 336 hr C) 0.8 hr D) 7.2 hr
- 5) Last season, a basketball player attempted 138 free-throws and made 116. This season his free-throw percentage is identical to last year's. If he has attempted 39 free throws this season, how many has he made? Round your answer to the nearest whole number.
 A) 33 free-throws B) 46 free-throws C) 26 free-throws D) 30 free-throws
- 6) The time T necessary to make an enlargement of a photo negative varies directly as the area A of the enlargement. If 75 seconds are required to make a 3-by-5 enlargement, find the time required for a 6-by-6 enlargement.
 A) 180 sec B) 216 sec C) 144 sec D) 252 sec

- 7) Hooke's Law for an elastic spring states that the distance a spring stretches varies directly as the force applied. If a force of 20 pounds stretches a certain spring 7 inches, then how much will a force of 60 pounds stretch the spring?
- A) 21 in. B) 2 in. C) 140 in. D) 3 in.
- 8) Hooke's Law for an elastic spring states that the distance a spring stretches varies directly as the force applied. If a spring stretches 0.4 m when a 2-kg weight is attached to it, how much will it stretch when a 7-kg weight is attached to it?
- A) 1.4 m B) 3.4 m C) 4.4 m D) 0.4 m
- 9) Find the constant of variation k. Assume that y is directly proportional to x.
- | | | | | |
|---|----|------|------|------|
| x | 5 | 6 | 7 | 9 |
| y | 16 | 19.2 | 22.4 | 28.8 |
- A) 3.2 B) -3.2 C) 0.3125 D) -0.3125

6 Solve Formula for Specified Variable

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the formula for the specified variable.

- 1) $A = \frac{1}{2}bh$ for h
- A) $h = \frac{2A}{b}$ B) $h = \frac{b}{2A}$ C) $h = \frac{Ab}{2}$ D) $h = \frac{A}{2b}$
- 2) $S = 2\pi rh + 2\pi r^2$ for h
- A) $h = \frac{S - 2\pi r^2}{2\pi r}$ B) $h = S - r$ C) $h = \frac{S}{2\pi r} - 1$ D) $h = 2\pi(S - r)$
- 3) $V = \frac{1}{3}Bh$ for B
- A) $B = \frac{3V}{h}$ B) $B = \frac{3h}{V}$ C) $B = \frac{V}{3h}$ D) $B = \frac{h}{3V}$
- 4) $I = \frac{nE}{nr + R}$ for n
- A) $n = \frac{-IR}{Ir - E}$ B) $n = \frac{IR}{Ir + E}$ C) $n = IR(Ir - E)$ D) $n = \frac{-R}{Ir - E}$
- 5) $P = s_1 + s_2 + s_3$ for s_3
- A) $s_3 = P - s_1 - s_2$ B) $s_3 = P + s_1 + s_2$ C) $s_3 = s_1 + s_2 - P$ D) $s_3 = s_1 + P - s_2$
- 6) $F = \frac{9}{5}C + 32$ for C
- A) $C = \frac{5}{9}(F - 32)$ B) $C = \frac{9}{5}(F - 32)$ C) $C = \frac{F - 32}{9}$ D) $C = \frac{5}{F - 32}$
- 7) $A = \frac{1}{2}h(b_1 + b_2)$ for b_1
- A) $b_1 = \frac{2A}{h} - b_2$ B) $b_1 = b_2 - \frac{2A}{h}$ C) $b_1 = \frac{2Ab_2}{h} - 1$ D) $b_1 = \frac{A - b_2h}{2h}$

8) $a + b = s + r$ for s

A) $s = a + b - r$

B) $s = \frac{a}{r} + b$

C) $s = \frac{a + b}{r}$

D) $s = r(a + b)$

9) $A = P(1 + nr)$ for r

A) $r = \frac{A - P}{Pn}$

B) $r = \frac{P - A}{Pn}$

C) $r = \frac{A}{n}$

D) $r = \frac{Pn}{A - P}$

7 Solve Apps: Investments

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) Mardi received an inheritance of \$50,000. She invested part at 10% and deposited the remainder in tax-free bonds at 12%. Her total annual income from the investments was \$5400. Find the amount invested at 10%.
 A) \$30,000 B) \$29,000 C) \$15,000 D) \$44,600
- 2) Walt made an extra \$8000 last year from a part-time job. He invested part of the money at 6% and the rest at 10%. He made a total of \$600 in interest. How much was invested at 10%?
 A) \$3000 B) \$4000 C) \$5000 D) \$6000
- 3) Roberto invested some money at 7%, and then invested \$2000 more than twice this amount at 9%. His total annual income from the two investments was \$3930. How much was invested at 9%?
 A) \$32,000 B) \$3200 C) \$6000 D) \$30,000

Ch. 1 Linear Functions, Equations, and Inequalities

Answer Key

1.1 Real Numbers and the Rectangular Coordinate System

1 List Elements in Specified Subset of Real Numbers

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

2 State Number Type

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

3 Graph Set of Numbers on Number Line

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

4 Identify Quadrant of Point

- 1) A
- 2) A
- 3) A
- 4) A
- 5) D
- 6) A
- 7) D

5 Name Possible Quadrants of Point Given Condition

- 1) A
- 2) A
- 3) A

6 Tech: Find Xmin, Xmax, Ymin, and Ymax From Xscl and Yscl

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

7 Tech: Find Approximation of Root or Power

- 1) A

- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

8 Tech: Approximate Expression

- 1) A
- 2) A
- 3) A
- 4) A

9 Find Length of Unknown Side of Right Triangle

- 1) A
- 2) A
- 3) A
- 4) A

10 Find Length and Midpoint of Segment Given Graph

- 1) A
- 2) A
- 3) A
- 4) A

11 Find Length and Midpoint of Segment Given Points

- 1) A
- 2) A

12 Find Coordinates of Endpoint of Segment

- 1) A
- 2) A

13 Solve Apps: Midpoint and Distance Formulas

- 1) A
- 2) A
- 3) A
- 4) A
- 5) B

14 Know Concepts: Real Numbers and the Coordinate System

- 1) A
- 2) A
- 3) D
- 4) A
- 5) A
- 6) A
- 7) A

1.2 Introduction to Relations and Functions

1 Graph Function

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

2 Convert Set-Builder Notation to Interval Notation

- 1) A
- 2) A

- 3) A
- 4) A
- 5) A
- 6) A
- 7) A

3 Graph Interval on Number Line

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

4 Convert Interval Notation or Graph to Set-Builder Notation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

5 Determine Domain and Range of Relation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

6 Determine if Relation is Function Given Set of Points

- 1) A
- 2) B
- 3) B
- 4) B
- 5) A
- 6) B
- 7) A
- 8) B
- 9) A
- 10) A

7 Determine if Relation is Function Given Table/Diagram

- 1) A
- 2) B
- 3) A
- 4) B
- 5) A
- 6) B
- 7) A
- 8) B

8 Determine if Relation is Function Given Graph

- 1) A
- 2) A
- 3) B
- 4) B
- 5) A
- 6) A
- 7) A
- 8) B

9) A

10) A

9 Find Function Value

1) A

2) A

3) A

10 Evaluate Function at Given Value of x

1) A

2) A

3) A

4) A

5) A

6) A

7) A

8) A

9) A

11 Use Graph of $y = f(x)$ to Find Function Value

1) A

2) A

12 Solve Apps: Functions

1) A

2) A

3) A

4) A

13 Know Concepts: Relations and Functions

1) A

2) A

3) A

4) A

5) A

6) D

1.3 Linear Functions

1 Graph Linear Function and Give Intercepts and Slope

1) A

2) A

3) A

4) A

2 Graph Linear Function and Give Domain and Range

1) A

2) A

3) A

4) A

5) A

6) A

3 Evaluate Linear Function at Given Value of x

1) A

2) A

3) A

4) A

5) A

6) A

4 Find Zero of Linear Function

1) A

2) A

3) A

4) A

5 Give Equation of Line Illustrated

1) A

2) A

6 Tech: Determine if Window Shows Comprehensive Graph

1) A

7 Find Slope of Line Given Two Points

1) A

2) A

3) A

4) A

5) A

8 Find Slope of Line Given Graph

1) A

2) A

3) A

4) D

9 Find Intercepts Given Graph

1) A

2) A

10 Graph Line Given Point and Slope

1) A

2) A

3) A

4) A

5) A

6) A

7) A

8) A

11 Solve Apps: Linear Functions

1) A

2) A

3) A

4) A

5) A

12 Know Concepts: Linear Functions

1) A

2) A

3) A

4) A

5) A

6) A

1.4 Equations of Lines and Linear Models

1 Find Slope-Intercept Form of Line Given Point and Slope

1) A

2) A

3) A

4) A

5) A

6) A

2 Find Slope-Intercept Form of Line Given Two Points

1) A

2) A

- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

3 Graph Linear Equation and Find Intercepts Given Formula

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A

4 Write Equation in Slope-Intercept Form

- 1) A
- 2) A
- 3) A
- 4) A

5 Find Lin Eqn Through Pt, Parallel/Perpendicular to Line

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

6 Solve Apps: Linear Equations

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

7 *Know Concepts: Equations of Lines

- 1) A
- 2) A
- 3) A
- 4) A horizontal line has slope 0. The line perpendicular to this is vertical with undefined slope.
- 5) A
- 6) Answers will vary. One possibility: The slope of the line through P_1 and P_2 is $-2/3$. The slope of the line through P_2 and P_3 is $3/2$. Therefore, since the product of these slopes is -1 , the lines are perpendicular and constitute a right angle in the triangle, making the triangle formed by these points a right triangle.

1.5 Linear Equations and Inequalities

1 Find Zero of Linear Equation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

2 Tech: Find Solution of $Y_1=Y_2$ by Intersection Method

- 1) A

- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

3 Tech: Find Solution of $Y_1=Y_2$ by x-Intercept Method

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

4 Solve Linear Equation (Ungrouped/Parentheses)

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

5 Solve Linear Equation (Decimals/Fractions)

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

6 Tech: Approximate Solution to Equation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

7 Determine Whether Eqn is Identity, Contradiction, or Conditional

- 1) A
- 2) A
- 3) A
- 4) A

- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

8 Tech: Solve Linear Eqn or Inequality Given Graph

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

9 Solve Linear Inequality

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

10 Solve Apps: Linear Equations and Inequalities

- 1) A
- 2) A
- 3) A
- 4) A

11 Solve Three-Part Inequality

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A

12 *Know Concepts: Linear Equations and Inequalities

- 1) The graphs would appear to coincide.
- 2) It is the x value at the point of intersection of the two lines, which is the solution to the linear equation.
- 3) It is the value of each side of a linear equation at the solution value.
- 4) It means the linear equation has infinitely many solutions.
- 5) There would be a horizontal line above or below the x-axis.
- 6) There would be a horizontal line that coincides with the x-axis.
- 7) A
- 8) A
- 9) A
- 10) $Y_1 > Y_2$ on $(-\infty, 0)$; $Y_1 = Y_2$ at $x = 0$; $Y_1 < Y_2$ on $(0, \infty)$.
- 11) On $(0, \infty)$, $Y_1 > Y_3 > Y_2$; at $x = 0$, $Y_1 = Y_2 = Y_3$; on $(-\infty, 0)$, $Y_1 < Y_3 < Y_2$.

1.6 Applications of Linear Functions

1 Solve Apps: Geometry (Rectangles)

- 1) A

- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A
- 10) A

2 Solve Apps: Mixtures

- 1) A
- 2) A
- 3) A
- 4) A

3 Solve Apps: Miscellaneous

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A

4 Solve Apps: Cost and Revenue Functions

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

5 Solve Apps: Proportion and Direct Variation

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

6 Solve Formula for Specified Variable

- 1) A
- 2) A
- 3) A
- 4) A
- 5) A
- 6) A
- 7) A
- 8) A
- 9) A

7 Solve Apps: Investments

- 1) A
- 2) A
- 3) A