

Chapter R

Prealgebra Review

Exercise Set R.1

RC2. A number that has more than two factors is called a composite number.

RC4. A number that has exactly two different factors, itself and 1, is called a prime number.

2. $36 = 1 \cdot 36$, $36 = 2 \cdot 18$, $36 = 3 \cdot 12$, $36 = 4 \cdot 9$, $36 = 6 \cdot 6$
The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36.

4. $81 = 1 \cdot 81$, $81 = 3 \cdot 27$, $81 = 9 \cdot 9$
The factors of 81 are 1, 3, 9, 27, and 81.

6. $3 \cdot 11$

8. $11 \cdot 11$

10. $2 \cdot 2 \cdot 2 \cdot 3$

12. $2 \cdot 2 \cdot 2 \cdot 7$

14. $2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$

16. $2 \cdot 3 \cdot 5 \cdot 11$

18. $11 \cdot 13$

20. $40 = 2 \cdot 2 \cdot 2 \cdot 5$
 $88 = 2 \cdot 2 \cdot 2 \cdot 11$
The GCF is $2 \cdot 2 \cdot 2$, or 8.

22. $14 = 2 \cdot 7$
 $42 = 2 \cdot 3 \cdot 7$
The GCF is $2 \cdot 7$, or 14.

24. $27 = 3 \cdot 3 \cdot 3$
 $40 = 2 \cdot 2 \cdot 2 \cdot 5$
The GCF is 1.

26. $40 = 2 \cdot 2 \cdot 2 \cdot 5$
 $220 = 2 \cdot 2 \cdot 5 \cdot 11$
The GCF is $2 \cdot 2 \cdot 5$, or 20.

28. $30 = 2 \cdot 3 \cdot 5$
 $135 = 3 \cdot 5 \cdot 9$
The GCF is $3 \cdot 5$, or 15.

30. $25 = 5 \cdot 5$
 $70 = 2 \cdot 5 \cdot 7$
 $125 = 5 \cdot 5 \cdot 5$
The GCF is 5.

32. $99 = 3 \cdot 3 \cdot 11$
 $110 = 2 \cdot 5 \cdot 11$
 $825 = 3 \cdot 5 \cdot 5 \cdot 11$
The GCF is 11.

34. $24 = 2 \cdot 2 \cdot 2 \cdot 3$
 $27 = 3 \cdot 3 \cdot 3$
LCM = $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3$, or 216

36. $20 = 2 \cdot 2 \cdot 5$
 $40 = 2 \cdot 2 \cdot 2 \cdot 5$
The LCM is $2 \cdot 2 \cdot 2 \cdot 5$, or 40.

38. $50 = 2 \cdot 5 \cdot 5$
 $60 = 2 \cdot 2 \cdot 3 \cdot 5$
The LCM is $2 \cdot 2 \cdot 3 \cdot 5 \cdot 5$, or 300.

40. 17 and 29 are prime numbers. The LCM is $17 \cdot 29$, or 493.

42. $45 = 3 \cdot 3 \cdot 5$
 $72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$
The LCM is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$, or 360.

44. $30 = 2 \cdot 3 \cdot 5$
 $50 = 2 \cdot 5 \cdot 5$
The LCM is $2 \cdot 3 \cdot 5 \cdot 5$, or 150.

46. $35 = 5 \cdot 7$
 $45 = 3 \cdot 3 \cdot 5$
The LCM is $3 \cdot 3 \cdot 5 \cdot 7$, or 315.

48. $8 = 2 \cdot 2 \cdot 2$
 $16 = 2 \cdot 2 \cdot 2 \cdot 2$
 $22 = 2 \cdot 11$
The LCM is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 11$, or 176.

50. $12 = 2 \cdot 2 \cdot 3$
 $18 = 2 \cdot 3 \cdot 3$
 $40 = 2 \cdot 2 \cdot 2 \cdot 5$
The LCM is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$, or 360.

52. $24 = 2 \cdot 2 \cdot 2 \cdot 3$
 $35 = 5 \cdot 7$
 $45 = 3 \cdot 3 \cdot 5$
The LCM is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 7$, or 2520.

54. Jupiter: $12 = 2 \cdot 2 \cdot 3$
Uranus: $84 = 2 \cdot 2 \cdot 3 \cdot 7$
The LCM is $2 \cdot 2 \cdot 3 \cdot 7$, or 84. Jupiter and Uranus will appear in the same direction in the night sky as seen from the earth every 84 years.

56. Jupiter: $12 = 2 \cdot 2 \cdot 3$
 Saturn: $30 = 2 \cdot 3 \cdot 5$
 Uranus: $84 = 2 \cdot 2 \cdot 3 \cdot 7$

The LCM is $2 \cdot 2 \cdot 3 \cdot 5 \cdot 7$, or 420. The three planets will appear in the same direction in the night sky as seen from the earth every 420 years.

58. The smallest number of strands that can be used is the LCM of 4, 6, and 8.

$$4 = 2 \cdot 2$$

$$6 = 2 \cdot 3$$

$$8 = 2 \cdot 2 \cdot 2$$

$$\text{LCM} = 2 \cdot 2 \cdot 2 \cdot 3 = 24 \text{ strands}$$

Exercise Set R.2

RC2. $\frac{6}{15} = \frac{2 \cdot 3}{3 \cdot 5} = \frac{3}{3} \cdot \frac{2}{5} = \frac{2}{5}$

We see that $\frac{6}{15}$ and $\frac{2}{5}$ are equivalent expressions, so the correct answer is (a).

RC4. $\frac{11}{10}$ and $\frac{10}{11}$ are reciprocals. The correct answer is (f).

RC6. $24 \cdot 1 = 24$ illustrates the identity property of 1. The correct answer is (b).

2. $\frac{5}{6} = \frac{5}{6} \cdot \frac{10}{10} = \frac{50}{60}$

4. $\frac{8}{9} = \frac{8}{9} \cdot \frac{4}{4} = \frac{32}{36}$

6. $\frac{13}{32} = \frac{13}{32} \cdot \frac{40}{40} = \frac{520}{1280}$

8. $\frac{5}{6} = \frac{5}{6} \cdot \frac{8}{8} = \frac{40}{48}$

10. $\frac{2}{9} = \frac{2}{9} \cdot \frac{6}{6} = \frac{12}{54}$

12. $\frac{15}{23} = \frac{15}{23} \cdot \frac{19}{19} = \frac{285}{437}$

14. $\frac{49}{56} = \frac{7 \cdot 7}{7 \cdot 8} = \frac{7}{8}$

16. $\frac{48}{27} = \frac{3 \cdot 16}{3 \cdot 9} = \frac{16}{9}$

18. $\frac{13}{104} = \frac{1 \cdot 13}{8 \cdot 13} = \frac{1}{8}$

20. $\frac{132}{11} = \frac{12 \cdot 11}{1 \cdot 11} = 12$

22. $\frac{17}{51} = \frac{1 \cdot 17}{3 \cdot 17} = \frac{1}{3}$

24. $\frac{150}{25} = \frac{6 \cdot 25}{1 \cdot 25} = 6$

26. $\frac{625}{325} = \frac{25 \cdot 25}{13 \cdot 25} = \frac{25}{13}$

28. $\frac{4800}{1600} = \frac{3 \cdot 1600}{1 \cdot 1600} = 3$

30. $\frac{13 \cdot v}{39 \cdot v} = \frac{1 \cdot 13 \cdot \cancel{v}}{3 \cdot 13 \cdot \cancel{v}} = \frac{1}{3}$

32. $\frac{15}{16} \cdot \frac{8}{5} = \frac{15 \cdot 8}{16 \cdot 5} = \frac{3 \cdot \cancel{5} \cdot 8}{2 \cdot \cancel{8} \cdot 5} = \frac{3}{5}$

34. $\frac{10}{11} \cdot \frac{11}{10} = \frac{10 \cdot 11}{11 \cdot 10} = 1$

36. $\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

38. $\frac{4}{5} + \frac{8}{15} = \frac{12}{15} + \frac{8}{15} = \frac{20}{15} = \frac{4 \cdot \cancel{5}}{3 \cdot \cancel{5}} = \frac{4}{3}$

40. $\frac{9}{8} + \frac{7}{12} = \frac{27}{24} + \frac{14}{24} = \frac{41}{24}$

42. $\frac{3}{16} - \frac{1}{18} = \frac{27}{144} - \frac{8}{144} = \frac{19}{144}$

44. $\frac{12}{5} - \frac{2}{5} = \frac{10}{5} = 2$

46. $\frac{15}{16} - \frac{5}{12} = \frac{45}{48} - \frac{20}{48} = \frac{25}{48}$

48. $\frac{15}{16} - \frac{2}{3} = \frac{45}{48} - \frac{32}{48} = \frac{13}{48}$

50. $\frac{4}{11} \cdot 9 = \frac{36}{11}$

52. $\frac{3}{4} \div \frac{3}{7} = \frac{3}{4} \cdot \frac{7}{3} = \frac{\cancel{3} \cdot 7}{4 \cdot \cancel{3}} = \frac{7}{4}$

54. $\frac{1}{20} \div \frac{1}{5} = \frac{1}{20} \cdot \frac{5}{1} = \frac{1 \cdot 5}{20 \cdot 1} = \frac{1 \cdot \cancel{5}}{4 \cdot \cancel{5} \cdot 1} = \frac{1}{4}$

56. $\frac{\frac{17}{6}}{\frac{3}{8}} = \frac{17}{6} \cdot \frac{8}{3} = \frac{17 \cdot 8}{6 \cdot 3} = \frac{17 \cdot \cancel{2} \cdot 4}{\cancel{2} \cdot 3 \cdot 3} = \frac{68}{9}$

58. $78 \div \frac{1}{6} = \frac{78}{1} \cdot \frac{6}{1} = 468$

60. $\frac{5}{6} \div 15 = \frac{5}{6} \cdot \frac{1}{15} = \frac{5 \cdot 1}{6 \cdot 15} = \frac{\cancel{5} \cdot 1}{6 \cdot \cancel{5} \cdot 3} = \frac{1}{18}$

62. $\frac{147}{50} - 2 = \frac{147}{50} - \frac{100}{50} = \frac{47}{50}$

64. $\frac{1}{30} \div 30 = \frac{1}{30} \cdot \frac{1}{30} = \frac{1}{900}$

66. $56 = 8 \cdot 7 = 2 \cdot 2 \cdot 2 \cdot 7$

68. $192 = 12 \cdot 16 = 2 \cdot 2 \cdot 3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$, or $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

70. $35 = 5 \cdot 7$
 $55 = 5 \cdot 11$

The GCF is 5.

72. $90 = 2 \cdot 3 \cdot 3 \cdot 5$
 $162 = 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

The GCF is $2 \cdot 3 \cdot 3$, or 18.

74. $28 = 2 \cdot 2 \cdot 7$
 $49 = 7 \cdot 7$
 $56 = 2 \cdot 2 \cdot 2 \cdot 7$

The LCM is $2 \cdot 2 \cdot 2 \cdot 7 \cdot 7$, or 392.

76. $25 = 5 \cdot 5$
 $75 = 3 \cdot 5 \cdot 5$
 $150 = 2 \cdot 3 \cdot 5 \cdot 5$

The LCM = $2 \cdot 3 \cdot 5 \cdot 5$, or 150.

(Note also that both 25 and 75 are factors of 150, so the LCM is 150.)

78. $\frac{p \cdot q}{r \cdot q} = \frac{p \cdot \cancel{q}}{r \cdot \cancel{q}} = \frac{p}{r}$

80. $\frac{4 \cdot 9 \cdot 24}{2 \cdot 8 \cdot 15} = \frac{\cancel{4} \cdot \cancel{3} \cdot 3 \cdot \cancel{2} \cdot \cancel{2} \cdot 6}{\cancel{2} \cdot \cancel{2} \cdot \cancel{4} \cdot \cancel{3} \cdot 5} = \frac{18}{5}$

82. $\frac{256 \cdot a \cdot b \cdot c \cdot d}{192 \cdot b \cdot c \cdot d} = \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2 \cdot a \cdot \cancel{b} \cdot \cancel{c} \cdot \cancel{d}}{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 3 \cdot \cancel{b} \cdot \cancel{c} \cdot \cancel{d}} = \frac{4 \cdot a}{3}$

Exercise Set R.3

RC2. Tenths

RC4. Ten-thousandths

RC6. Thousands

2. $\frac{27}{10}$

4. $\frac{93}{100}$

6. $\frac{40,008}{10,000}$

8. $\frac{11,223}{10}$

10. 0.01

12. 0.001

14. 0.0039

16. 0.00094

18.
$$\begin{array}{r} ^1 ^1 ^1 \\ 708.99 \\ + 75.48 \\ \hline 784.47 \end{array}$$

20.
$$\begin{array}{r} ^1 ^1 ^1 \\ 1345.12 \\ + 566.98 \\ \hline 1912.10 \end{array}$$

22.
$$\begin{array}{r} ^2 ^1 ^1 \\ 119. \\ 43.74 \\ + 18.876 \\ \hline 181.616 \end{array}$$

24.
$$\begin{array}{r} ^2 ^2 ^2 \\ 14.59 \\ 16.79 \\ + 19.95 \\ \hline 51.33 \end{array}$$

26.
$$\begin{array}{r} ^{13} ^{17} \\ ^8 ^9 ^7 ^{10} \\ \cancel{14.08} ^0 \\ - 9.199 \\ \hline 4.881 \end{array}$$

28.
$$\begin{array}{r} ^2 ^9 ^9 ^9 ^{10} \\ \cancel{30000} ^0 \\ - 24.677 \\ \hline 275.323 \end{array}$$

30.
$$\begin{array}{r} ^5 ^{10} \\ 2.60 \\ - 1.08 \\ \hline 1.52 \end{array}$$

32.
$$\begin{array}{r} ^4 ^9 ^9 ^9 ^{10} \\ \cancel{50000} \\ - 3.4051 \\ \hline 1.5949 \end{array}$$

34.
$$\begin{array}{r} ^1 ^1 \\ ^1 ^1 \\ 6.55 \\ \times 3.2 \\ \hline 1310 \\ 19650 \\ \hline 20960 \end{array}$$

36.
$$\begin{array}{r} ^5 \\ ^3 \\ ^7 \\ 0.028 \\ \times 7.409 \\ \hline 252 \\ 11200 \\ 196000 \\ \hline 0.207452 \end{array}$$

38.
$$\begin{array}{r} 18.94 \\ \times 0.1 \\ \hline 1.894 \end{array}$$

40.
$$\begin{array}{r} ^2 \\ 0.0024 \\ \times 0.015 \\ \hline 120 \\ 240 \\ \hline 0.000360 \end{array}$$

$$\begin{array}{r}
 42. \quad \begin{array}{r} ^6 ^5 ^3 \\ 287.4 \\ \times 1.08 \\ \hline 22992 \\ 287400 \\ \hline 310.392 \end{array}
 \end{array}$$

$$\begin{array}{r}
 44. \quad \begin{array}{r} ^8 ^5 \\ 5.2 \overline{) 44.20} \\ \underline{416} \\ 260 \\ \underline{260} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 46. \quad \begin{array}{r} ^9 ^3 \\ 7.8 \overline{) 72.54} \\ \underline{702} \\ 234 \\ \underline{234} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 48. \quad \begin{array}{r} ^9 ^5 \\ 100 \overline{) 950.0} \\ \underline{900} \\ 500 \\ \underline{500} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 50. \quad \begin{array}{r} ^4 ^6 ^8 ^7 ^5 \\ 1.6 \overline{) 75.0000} \\ \underline{640} \\ 110 \\ \underline{96} \\ 140 \\ \underline{128} \\ 120 \\ \underline{112} \\ 80 \\ \underline{80} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 52. \quad \begin{array}{r} ^0 ^1 ^6 \\ 25 \overline{) 4.00} \\ \underline{25} \\ 150 \\ \underline{150} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 54. \quad \begin{array}{r} ^0 ^2 ^6 \\ 0.47 \overline{) 0.1222} \\ \underline{94} \\ 282 \\ \underline{282} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 56. \quad \begin{array}{r} ^0 ^5 ^3 ^1 ^2 ^5 \\ 32 \overline{) 17.0000} \\ \underline{160} \\ 100 \\ \underline{96} \\ 40 \\ \underline{32} \\ 80 \\ \underline{64} \\ 160 \\ \underline{160} \\ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 58. \quad \begin{array}{r} ^1 ^4 ^1 ^6 ^6 \\ 12 \overline{) 17.0000} \\ \underline{12} \\ 50 \\ \underline{48} \\ 20 \\ \underline{12} \\ 80 \\ \underline{72} \\ 80 \\ \underline{72} \\ 8 \end{array}
 \end{array}$$

The number 8 repeats as a remainder, so the number 6 will repeat in the quotient. Therefore, $\frac{17}{12} = 1.4166\dots$, or $1.41\overline{6}$.

$$\begin{array}{r}
 60. \quad \begin{array}{r} ^0 ^8 ^3 ^3 \\ 6 \overline{) 5.000} \\ \underline{48} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}
 \end{array}$$

The number 2 repeats as a remainder, so the number 3 will repeat in the quotient. Therefore, $\frac{5}{6} = 0.833\dots$, or $0.8\overline{3}$.

$$\begin{array}{r}
 62. \quad \begin{array}{r} ^0 ^8 ^1 ^8 ^1 \\ 11 \overline{) 9.0000} \\ \underline{88} \\ 20 \\ \underline{11} \\ 90 \\ \underline{88} \\ 20 \\ \underline{11} \\ 9 \end{array}
 \end{array}$$

Since 9 and 2 keep alternating as remainders, the sequence of digits in the quotient repeats. Therefore, $\frac{9}{11} = 0.8181\dots$, or $0.8\overline{1}$.

64. 317.18565

Round to the nearest hundredth: The digit in the hundredths place is 8. The next digit to the right, 5, is 5 or higher, so we round up: 317.19

Round to the nearest tenth: The digit in the tenths place is 1. The next digit to the right, 8, is 5 or higher, so we round up: 317.2

Round to the nearest one: The digit in the ones place is 7. The next digit to the right, 1, is less than 5, so we round down: 317

Round to the nearest ten: The digit in the tens place is 1. The next digit to the right, 7, is 5 or higher, so we round up: 320

Round to the nearest hundred: The digit in the hundreds place is 3. The next digit to the right, 1, is less than 5, so we round down: 300

66. 840.15493

Round to the nearest hundredth: The digit in the hundredths place is 5. The next digit to the right, 4, is less than 5, so we round down: 840.15

Round to the nearest tenth: The digit in the tenths place is 1. The next digit to the right, 5, is 5 or higher, so we round up: 840.2

Round to the nearest one: The digit in the ones place is 0. The next digit to the right, 1, is less than 5, so we round down: 840

Round to the nearest ten: The digit in the tens place is 4. The next digit to the right, 0, is less than 5, so we round down: 840

Round to the nearest hundred: The digit in the hundreds place is 8. The next digit to the right, 4, is less than 5, so we round down: 800

68. \$20.492

Round to the nearest cent (nearest hundredth): The digit in the hundredths place is 9. The next digit to the right, 2, is less than 5, so we round down: \$20.49

Round to the nearest dollar (nearest one): The digit in the ones place is 0. The next digit to the right, 4, is less than 5, so we round down: \$20

70. \$4.718

Round to the nearest cent (nearest hundredth): The digit in the hundredths place is 1. The next digit to the right, 8, is 5 or higher, so we round up: \$4.72

Round to the nearest dollar (nearest one): The digit in the ones place is 4. The next digit to the right, 7, is 5 or higher, so we round up: \$5

72. \$17.50

The digit in the ones place is 7. The next digit to the right, 5, is 5 or higher, so we round up: \$18

74. \$567.24

The digit in the ones place is 7. The next digit to the right, 2, is less than 5, so we round down: \$567

$$\begin{array}{r}
 1.3\,5\,2\,9\,4 \\
 1\,7 \overline{) 2\,3.0\,0\,0\,0\,0} \\
 \underline{1\,7} \\
 6\,0 \\
 \underline{5\,1} \\
 9\,0 \\
 \underline{8\,5} \\
 5\,0 \\
 \underline{3\,4} \\
 1\,6\,0 \\
 \underline{1\,5\,3} \\
 7\,0 \\
 \underline{6\,8} \\
 2
 \end{array}$$

Ten-thousandth: 1.3529

Thousandth: 1.353

Hundredth: 1.35

Tenth: 1.4

One: 1

$$\begin{array}{r}
 1\,2\,3\,4\,5\,6\,7 \\
 8\,1 \overline{) 1\,0\,0\,0\,0\,0\,0\,0\,0} \\
 \underline{8\,1} \\
 1\,9\,0 \\
 \underline{1\,6\,2} \\
 2\,8\,0 \\
 \underline{2\,4\,3} \\
 3\,7\,0 \\
 \underline{3\,2\,4} \\
 4\,6\,0 \\
 \underline{4\,0\,5} \\
 5\,5\,0 \\
 \underline{4\,8\,6} \\
 6\,4\,0 \\
 \underline{5\,6\,7} \\
 7\,3
 \end{array}$$

Ten-thousandth: 12.3457

Thousandth: 12.346

Hundredth: 12.35

Tenth: 12.3

One: 12

$$80. \frac{15}{16} - \frac{11}{12} = \frac{45}{48} - \frac{44}{48} = \frac{1}{48}$$

$$82. \frac{15}{32} \div \frac{3}{8} = \frac{15}{32} \cdot \frac{8}{3} = \frac{15 \cdot 8}{32 \cdot 3} = \frac{\cancel{3} \cdot 5 \cdot \cancel{8}}{4 \cdot \cancel{8} \cdot \cancel{3}} = \frac{5}{4}$$

$$84. \frac{11}{21} + \frac{13}{16} = \frac{176}{336} + \frac{273}{336} = \frac{449}{336}$$

$$86. \frac{1}{7} + \frac{4}{21} + \frac{9}{10} = \frac{30}{210} + \frac{40}{210} + \frac{189}{210} = \frac{259}{210} = \frac{7 \cdot 37}{7 \cdot 30} = \frac{37}{30}$$

$$88. 2560 = 10 \cdot 256 = 2 \cdot 5 \cdot 4 \cdot 64 = 2 \cdot 5 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2, \text{ or } 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5$$

$$90. 100 = 2 \cdot 2 \cdot 5 \cdot 5$$

$$1000 = 2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 5$$

The GCF is $2 \cdot 2 \cdot 5 \cdot 5$, or 100.

$$\begin{array}{r}
 92. \quad \begin{array}{r} 0.615384 \\ 13 \overline{)8.000000} \\ \underline{78} \\ 20 \\ \underline{13} \\ 70 \\ \underline{65} \\ 50 \\ \underline{39} \\ 110 \\ \underline{104} \\ 60 \\ \underline{52} \\ 8 \end{array}
 \end{array}$$

The number 8 reappears, so the sequence of digits 615384 will repeat. Thus, $\frac{8}{13}$ is $0.\overline{615384}$.

94. When we divide 6 by 17, we get a sequence of sixteen repeating numbers. We have

$$\frac{6}{17} = 0.3529411764705882.$$

Exercise Set R.4

RC2. $5\% = \frac{5}{100} = \frac{1}{20}$, the correct answer is (f).

RC4. $0.0005 = 0.05\%$; the correct answer is (b).

RC6. $0.5\% = \frac{0.5}{100} = \frac{5}{1000} = \frac{1}{200}$; the correct answer is (e).

RC8. $0.001 = \frac{1}{1000}$; the correct answer is (a).

2. 0.24

4. 0.044; 0.13

6. 0.64

8. 0.346

10. 1

12. 1.25

14. 0.0073

16. 0.023

18. $\frac{23}{100}$; $\frac{9}{100}$; $\frac{6}{100}$

20. $\frac{71}{100}$

22. $\frac{31}{100}$

24. $\frac{40}{100}$

26. $37.5\% = \frac{37.5}{100} = \frac{37.5}{100} \cdot \frac{10}{10} = \frac{375}{1000}$

28. $\frac{120}{100}$

30. $0.68\% = \frac{0.68}{100} = \frac{0.68}{100} \cdot \frac{100}{100} = \frac{68}{10,000}$

32. $3.2\% = \frac{3.2}{100} = \frac{3.2}{100} \cdot \frac{10}{10} = \frac{32}{1000}$

34. $12.557\% = \frac{12.557}{100} = \frac{12.557}{100} \cdot \frac{1000}{1000} = \frac{12,557}{100,000}$

36. 91.2%; 27%

38. 21%

40. 83%

42. 856%

44. 200%

46. 134%

48. 1.3%

50. 67.5%

52. $\frac{1}{5} = 0.2 = 20\%$

54. $\frac{14}{25} = 0.56 = 56\%$

56. $\frac{123}{100} = 123\%$

58. $\frac{7}{10} = 0.7 = 70\%$

60. $\frac{17}{50} = 0.34 = 34\%$

62. $\frac{7}{8} = 0.875 = 87.5\%$, or $87\frac{1}{2}\%$

64. $\frac{3}{8} = 0.375 = 37.5\%$, or $37\frac{1}{2}\%$

66. $\frac{99.4}{100} = 99.4\%$

68. $\frac{11}{50} = \frac{22}{100} = 22\%$

70.
$$\begin{array}{r}
 1.5454 \\
 11 \overline{)17.0000} \\
 \underline{11} \\
 60 \\
 \underline{55} \\
 50 \\
 \underline{44} \\
 60 \\
 \underline{55} \\
 50 \\
 \underline{44} \\
 6
 \end{array}$$

$\frac{17}{11} = 1.\overline{54}$

$$\begin{array}{r}
 72. \quad \begin{array}{r} 5 \ 6.4 \ 3 \\ 7 \ 8 \overline{) 4 \ 4 \ 0.1 \wedge 5 \ 4} \\ \underline{3 \ 9 \ 0} \\ 5 \ 0 \ 1 \\ \underline{4 \ 6 \ 8} \\ 3 \ 3 \ 5 \\ \underline{3 \ 1 \ 2} \\ 2 \ 3 \ 4 \\ \underline{2 \ 3 \ 4} \\ 0 \end{array}
 \end{array}$$

$$74. \frac{507}{100}$$

$$76. \frac{35}{420} = \frac{\cancel{5} \cdot 7 \cdot 1}{2 \cdot \cancel{5} \cdot 6 \cdot 7} = \frac{1}{12}$$

$$78. 0.10$$

$$80. 80\% = \frac{80}{100} = \frac{4 \cdot 20}{5 \cdot 20} = \frac{4}{5}$$

$$82. 84\% - 12\% = 0.84 - 0.12 = 0.72 = 72\%$$

$$84. 50\% - 0.5\% = 0.5 - 0.005 = 0.495 = 49.5\%$$

$$86. 42\% - (1 - 58\%) = 0.42 - (1 - 0.58) = 0.42 - 0.42 = 0 = 0\%$$

$$88. 7(1\% + 13\%) = 7(0.01 + 0.13) = 7(0.14) = 0.98 = 98\%$$

$$90. \frac{3}{4} + 20\% = 0.75 + 0.2 = 0.95 = 95\%$$

$$28. 14 + 6 \times 6 = 14 + 36 = 50$$

$$30. 30(5) + 2(2) = 150 + 4 = 154$$

$$32. 14 - 2 \times 6 + 7 = 14 - 12 + 7 = 2 + 7 = 9$$

$$34. 32 - 8 \div 4 - 2 = 32 - 2 - 2 = 30 - 2 = 28$$

$$36. (5 \cdot 4)^2 = 20^2 = 400$$

$$38. 3 \cdot 2^3 = 3 \cdot 8 = 24$$

$$40. (5 - 2)^2 = 3^2 = 9$$

$$42. 10 - 3^2 = 10 - 9 = 1$$

$$44. 20 + 4^3 \div 8 - 4 = 20 + 64 \div 8 - 4 = 20 + 8 - 4 = 28 - 4 = 24$$

$$46. 7 \times 3^4 + 18 = 7 \times 81 + 18 = 567 + 18 = 585$$

$$48. 8[(13 + 6) - 11] = 8[19 - 11] = 8[8] = 64$$

$$50. (8 + 7) + 9 = 15 + 9 = 24$$

$$52. 15 \cdot 4 + 15 \cdot 2 = 60 + 30 = 90$$

$$54. (12 - 8) - 4 = 4 - 4 = 0$$

$$56. 256 \div 32 \div 4 = 8 \div 4 = 2$$

$$58. 400 \times 0.64 \div 3.2 = 256 \div 3.2 = 80$$

$$60. 84 \div 12 \cdot 10 \div 35 \cdot 8 \cdot 2 \div 16 = 7 \cdot 10 \div 35 \cdot 8 \cdot 2 \div 16 = 70 \div 35 \cdot 8 \cdot 2 \div 16 = 2 \cdot 8 \cdot 2 \div 16 = 16 \cdot 2 \div 16 = 32 \div 16 = 2$$

$$62. 20 \cdot 45 \div 15 \div 15 \cdot 60 \div 12 = 900 \div 15 \div 15 \cdot 60 \div 12 = 60 \div 15 \cdot 60 \div 12 = 4 \cdot 60 \div 12 = 240 \div 12 = 20$$

$$64. \frac{5^2 + 4^3 - 3}{9^2 - 2^2 + 1^5} = \frac{25 + 64 - 3}{81 - 4 + 1} = \frac{86}{78} = \frac{43}{39}$$

$$66. \frac{20(8 - 3) - 4(10 - 3)}{10(6 + 2) + 2(5 + 2)} = \frac{20 \cdot 5 - 4 \cdot 7}{10 \cdot 8 + 2 \cdot 7} = \frac{100 - 28}{80 + 14} =$$

$$\frac{72}{94} = \frac{36}{47}$$

$$68. 95 - 2^3 \cdot 5 \div (24 - 4) = 95 - 2^3 \cdot 5 \div 20 = 95 - 8 \cdot 5 \div 20 = 95 - 40 \div 20 = 95 - 2 = 93$$

$$70. \frac{11}{6} = 1.8\bar{3} = 183.\bar{3}\%, \text{ or } 183\frac{1}{3}\%$$

$$72. \frac{2005}{3640} = \frac{\cancel{5} \cdot 401}{\cancel{5} \cdot 728} = \frac{401}{728}$$

$$74. \begin{aligned} 12 &= 2 \cdot 2 \cdot 3 \\ 24 &= 2 \cdot 2 \cdot 2 \cdot 3 \\ 56 &= 2 \cdot 2 \cdot 2 \cdot 7 \end{aligned}$$

The LCM is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 7$, or 168.

$$76. \frac{10^7}{10^2} = \frac{10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10}{10 \cdot 10} = 10^5$$

Exercise Set R.5

RC2. Division

RC4. Subtraction

$$2. 3^5$$

$$4. 1^3$$

$$6. 18^2$$

$$8. 64$$

$$10. 20,736$$

$$12. 1$$

$$14. 3.24$$

$$16. 0.001$$

$$18. 219.04$$

$$20. \frac{16}{25}$$

$$22. 16$$

$$24. \frac{125}{27}$$

$$26. 2000 \times (1.06)^2 = 2000 \times 1.1236 = 2247.2$$

$$78. \frac{2^8}{8^2} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{8 \cdot 8} =$$

$$\frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2}} = 2 \cdot 2 = 2^2$$

Chapter R Vocabulary Reinforcement

1. In the expression 8^2 , 8 is called the base.
2. The LCM of 15 and 40 is 120.
3. To factor a number means to express the number as a product.
4. For the fraction $\frac{4}{13}$, 4 is called the numerator.
5. $417 \cdot 1 = 417$ illustrates the identity property of 1.
6. If a natural number, other than 1, is not prime, it is called a composite number.
7. The fraction expression $\frac{2}{13}$ is equivalent to the fraction expression $\frac{14}{91}$.
8. $24 + 0 = 24$ illustrates the identity property of 0.
9. A natural number that has exactly two different factors, itself and 1, is called a prime number.
10. The GCF of 15 and 40 is 5.
11. $\frac{11}{3}$ is the reciprocal of $\frac{3}{11}$.
12. In the expression 7^5 , 5 is called the exponent.

Chapter R Concept Reinforcement

1. The least common multiple of two numbers is a multiple of both numbers, so the LCM is always equal to or larger than the larger number. The given statement is true.
2. The statement is false. To convert from decimal notation to percent notation, we move the decimal point two places to the *right* and write the percent symbol.
3. The statement is true. The number 1 is not prime, because it does not have two *different* factors.
4. The statement is false. For example, the GCF of 8 and 16 is 8 which is not smaller than 8.
5. $100\% = 1$, so a percent that is greater than 100% is greater than 1. The given statement is true.
6. The statement is false. Since a composite number is not a prime number, the prime factorization of a composite number cannot contain that number.

Chapter R Review Exercises

1. We begin by factoring 92 in any way that we can and continue factoring until each factor is prime.
 $92 = 2 \cdot 46 = 2 \cdot 2 \cdot 23$
2. We begin by factoring 1400 in any way that we can and continue factoring until each factor is prime.
 $1400 = 14 \cdot 100 = 2 \cdot 7 \cdot 4 \cdot 25 = 2 \cdot 7 \cdot 2 \cdot 2 \cdot 5 \cdot 5$, or $2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 7$
3. We first find the prime factorization of each number.
 $20 = 2 \cdot 2 \cdot 5$
 $50 = 2 \cdot 5 \cdot 5$
 Each number has one factor of 2 and one factor of 5. The GCF is $2 \cdot 5$, or 10.
4. We first find the prime factorization of each number.
 $18 = 2 \cdot 3 \cdot 3$
 $45 = 3 \cdot 3 \cdot 5$
 $900 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5$
 Each number has two factors of 3. The GCF is $3 \cdot 3$, or 9.
5. $13 = 13$ (13 is prime.)
 $32 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
 The LCM is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 13$, or 416.
6. $5 = 5$ (5 is prime.)
 $18 = 2 \cdot 3 \cdot 3$
 $45 = 3 \cdot 3 \cdot 5$
 The LCM is $2 \cdot 3 \cdot 3 \cdot 5$, or 90.
7. $\frac{2}{5} = \frac{2}{5} \cdot 1 = \frac{2}{5} \cdot \frac{6}{6} = \frac{12}{30}$
8. $\frac{12}{23} = \frac{12}{23} \cdot 1 = \frac{12}{23} \cdot \frac{8}{8} = \frac{96}{184}$
9. We will use $\frac{8}{8}$ for 1 since $64 = 8 \cdot 8$.
 $\frac{5}{8} = \frac{5}{8} \cdot 1 = \frac{5}{8} \cdot \frac{8}{8} = \frac{40}{64}$
10. We will use $\frac{7}{7}$ for 1 since $84 = 12 \cdot 7$.
 $\frac{13}{12} = \frac{13}{12} \cdot 1 = \frac{13}{12} \cdot \frac{7}{7} = \frac{91}{84}$
11. $\frac{20}{48} = \frac{4 \cdot 5}{4 \cdot 12} = \frac{4}{4} \cdot \frac{5}{12} = 1 \cdot \frac{5}{12} = \frac{5}{12}$
12. $\frac{1020}{1820} = \frac{2 \cdot 2 \cdot 3 \cdot 5 \cdot 17}{2 \cdot 2 \cdot 5 \cdot 7 \cdot 13}$
 $= \frac{\cancel{2} \cdot \cancel{2} \cdot 3 \cdot \cancel{5} \cdot 17}{\cancel{2} \cdot \cancel{2} \cdot \cancel{5} \cdot 7 \cdot 13}$
 $= \frac{3 \cdot 17}{7 \cdot 13}$
 $= \frac{51}{91}$

13. The LCD is 36.

$$\begin{aligned}\frac{4}{9} + \frac{5}{12} &= \frac{4}{9} \cdot \frac{4}{4} + \frac{5}{12} \cdot \frac{3}{3} \\ &= \frac{16}{36} + \frac{15}{36} \\ &= \frac{31}{36}\end{aligned}$$

$$14. \frac{3}{4} \div 3 = \frac{3}{4} \cdot \frac{1}{3} = \frac{\cancel{3} \cdot 1}{4 \cdot \cancel{3}} = \frac{1}{4}$$

15. The LCD is 15.

$$\begin{aligned}\frac{2}{3} - \frac{1}{15} &= \frac{2}{3} \cdot \frac{5}{5} - \frac{1}{15} \\ &= \frac{10}{15} - \frac{1}{15} = \frac{9}{15} \\ &= \frac{\cancel{3} \cdot 3}{\cancel{3} \cdot 5} = \frac{3}{5}\end{aligned}$$

$$16. \frac{9}{10} \cdot \frac{16}{5} = \frac{9 \cdot 16}{10 \cdot 5} = \frac{9 \cdot \cancel{2} \cdot 8}{\cancel{2} \cdot 5 \cdot 5} = \frac{72}{25}$$

17. The LCD is 144.

$$\begin{aligned}\frac{11}{18} + \frac{13}{16} &= \frac{11}{18} \cdot \frac{8}{8} + \frac{13}{16} \cdot \frac{9}{9} \\ &= \frac{88}{144} + \frac{117}{144} \\ &= \frac{205}{144}\end{aligned}$$

18. The LCD is 72.

$$\begin{aligned}\frac{35}{36} + \frac{23}{24} &= \frac{35}{36} \cdot \frac{2}{2} + \frac{23}{24} \cdot \frac{3}{3} \\ &= \frac{70}{72} + \frac{69}{72} \\ &= \frac{139}{72}\end{aligned}$$

19. The LCD is 54.

$$\begin{aligned}\frac{25}{27} + \frac{17}{18} &= \frac{25}{27} \cdot \frac{2}{2} + \frac{17}{18} \cdot \frac{3}{3} \\ &= \frac{50}{54} + \frac{51}{54} \\ &= \frac{101}{54}\end{aligned}$$

20. The LCD is 84.

$$\begin{aligned}\frac{29}{42} + \frac{17}{28} &= \frac{29}{42} \cdot \frac{2}{2} + \frac{17}{28} \cdot \frac{3}{3} \\ &= \frac{58}{84} + \frac{51}{84} \\ &= \frac{109}{84}\end{aligned}$$

21. The LCD is 72.

$$\begin{aligned}\frac{35}{36} - \frac{19}{24} &= \frac{35}{36} \cdot \frac{2}{2} - \frac{19}{24} \cdot \frac{3}{3} \\ &= \frac{70}{72} - \frac{57}{72} \\ &= \frac{13}{72}\end{aligned}$$

22. The LCD is 144.

$$\begin{aligned}\frac{13}{16} - \frac{11}{18} &= \frac{13}{16} \cdot \frac{9}{9} - \frac{11}{18} \cdot \frac{8}{8} \\ &= \frac{117}{144} - \frac{88}{144} \\ &= \frac{29}{144}\end{aligned}$$

23. The LCD is 84.

$$\begin{aligned}\frac{29}{42} - \frac{17}{28} &= \frac{29}{42} \cdot \frac{2}{2} - \frac{17}{28} \cdot \frac{3}{3} \\ &= \frac{58}{84} - \frac{51}{84} = \frac{7}{84} \\ &= \frac{7 \cdot 1}{7 \cdot 12} = \frac{1}{12}\end{aligned}$$

24. The LCD is 180.

$$\begin{aligned}\frac{11}{36} - \frac{1}{20} &= \frac{11}{36} \cdot \frac{5}{5} - \frac{1}{20} \cdot \frac{9}{9} \\ &= \frac{55}{180} - \frac{9}{180} = \frac{46}{180} \\ &= \frac{\cancel{2} \cdot 23}{\cancel{2} \cdot 90} = \frac{23}{90}\end{aligned}$$

$$25. \begin{array}{r} 17.97. \\ \quad \uparrow \\ \quad \boxed{} \\ 2 \text{ places} \end{array} \quad 17.97 = \frac{1797}{100} \quad \begin{array}{c} \uparrow \\ 2 \text{ zeros} \end{array}$$

$$26. \begin{array}{r} 2337 \\ 10,000 \\ \uparrow \\ 4 \text{ zeros} \end{array} \quad 0.2337. \quad \begin{array}{r} \uparrow \quad \boxed{} \\ 4 \text{ places} \end{array} \quad \frac{2337}{10,000} = 0.2337$$

$$27. \begin{array}{r} ^1 ^1 ^1 \\ 2 3 4 4 5 6 \\ + 9 8 3 4 5 \\ \hline 2 4 4 2 9 0 5 \end{array}$$

$$28. \begin{array}{r} ^1 ^1 ^1 \\ 6 0 4 \\ 7 8. \\ + 1 9 8 9 8 \\ \hline 8 6 0 2 9 8 \end{array}$$

$$29. \begin{array}{r} ^1 ^{10} ^3 ^9 ^{10} \\ \cancel{2} \cancel{0} \cancel{4} \cancel{0} \\ - 1 1 0 5 8 \\ \hline 9 3 4 2 \end{array}$$

$$30. \begin{array}{r} ^8 ^9 ^2 ^{12} \\ 7 8 \cancel{9} \cancel{0} \cancel{3} \cancel{2} \\ - 6 5 5 7 6 8 \\ \hline 1 3 3 2 6 4 \end{array}$$

$$31. \begin{array}{r} 1 7 9 5 \\ \times 2 4 \\ \hline 7 1 8 0 \\ 3 5 9 0 0 \\ \hline 4 3 0 8 0 \end{array}$$

$$\begin{aligned}
 50. \quad & 8^2 \cdot 2^4 \div 2^2 \cdot 8 \div 48 \div 12 \cdot 18 \\
 &= 64 \cdot 16 \div 4 \cdot 8 \div 48 \div 12 \cdot 18 \\
 &= 1024 \div 4 \cdot 8 \div 48 \div 12 \cdot 18 \\
 &= 256 \cdot 8 \div 48 \div 12 \cdot 18 \\
 &= 2048 \div 48 \div 12 \cdot 18 \\
 &= \frac{2048}{48} \div 12 \cdot 18 \\
 &= \frac{2048}{48} \cdot \frac{1}{12} \cdot 18 \\
 &= \frac{2048 \cdot 1}{48 \cdot 12} \cdot 18 \\
 &= \frac{2048 \cdot 18}{48 \cdot 12} \\
 &= \frac{\cancel{4} \cdot \cancel{16} \cdot 32 \cdot 2 \cdot \cancel{3} \cdot \cancel{3}}{\cancel{3} \cdot \cancel{16} \cdot \cancel{3} \cdot \cancel{4} \cdot 1} \\
 &= 64
 \end{aligned}$$

$$\begin{aligned}
 51. \quad & \frac{4(18-8)+7 \cdot 9}{9^2-8^2} = \frac{4(10)+7 \cdot 9}{81-64} \\
 &= \frac{40+63}{17} \\
 &= \frac{103}{17}
 \end{aligned}$$

Chapter R Discussion and Writing Exercises

1. Canceling is possible only when the numerator and denominator of a fraction have common factors.
2. The parentheses are not necessary. Using the rules for order of operations, the multiplication will be performed first regardless of whether it is in parentheses.
3. One approach would be to express 0.1 as $\frac{1}{10}$ and divide as follows:
 $5.367 \div \frac{1}{10} = 5.367 \cdot 10 = 53.67$

Chapter R Test

1. We begin by factoring 300 in any way that we can and continue factoring until each factor is prime.
 $300 = 3 \cdot 100 = 3 \cdot 10 \cdot 10 = 3 \cdot 2 \cdot 5 \cdot 2 \cdot 5$, or $2 \cdot 2 \cdot 3 \cdot 5 \cdot 5$
2. We first find the prime factorization of each number.
 $42 = 2 \cdot 3 \cdot 7$
 $56 = 2 \cdot 2 \cdot 2 \cdot 7$
 $140 = 2 \cdot 2 \cdot 5 \cdot 7$
Each number has one factor of 2 and one factor of 7. The GCF is $2 \cdot 7$, or 14.
3. $15 = 3 \cdot 5$
 $24 = 2 \cdot 2 \cdot 2 \cdot 3$
 $60 = 2 \cdot 2 \cdot 3 \cdot 5$
The LCM is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$, or 120.

$$4. \quad \frac{3}{7} = \frac{3}{7} \cdot 1 = \frac{3}{7} \cdot \frac{7}{7} = \frac{21}{49}$$

$$5. \quad \text{We will use } \frac{3}{3} \text{ for 1 since } 48 = 16 \cdot 3.$$

$$\frac{11}{16} = \frac{11}{16} \cdot 1 = \frac{11}{16} \cdot \frac{3}{3} = \frac{33}{48}$$

$$6. \quad \frac{16}{24} = \frac{2 \cdot 8}{3 \cdot 8} = \frac{2}{3} \cdot \frac{8}{8} = \frac{2}{3} \cdot 1 = \frac{2}{3}$$

$$7. \quad \frac{925}{1525} = \frac{25 \cdot 37}{25 \cdot 61} = \frac{25}{25} \cdot \frac{37}{61} = 1 \cdot \frac{37}{61} = \frac{37}{61}$$

$$8. \quad \frac{10}{27} \div \frac{8}{3} = \frac{10}{27} \cdot \frac{3}{8} = \frac{10 \cdot 3}{27 \cdot 8} = \frac{\cancel{2} \cdot 5 \cdot \cancel{3}}{\cancel{3} \cdot 9 \cdot \cancel{2} \cdot 4} = \frac{5}{9 \cdot 4} = \frac{5}{36}$$

$$9. \quad \text{The LCD is 40.}$$

$$\frac{9}{10} - \frac{5}{8} = \frac{9}{10} \cdot \frac{4}{4} - \frac{5}{8} \cdot \frac{5}{5} = \frac{36}{40} - \frac{25}{40} = \frac{11}{40}$$

$$10. \quad \text{The LCD is 36.}$$

$$\frac{11}{12} + \frac{17}{18} = \frac{11}{12} \cdot \frac{3}{3} + \frac{17}{18} \cdot \frac{2}{2} = \frac{33}{36} + \frac{34}{36} = \frac{67}{36}$$

$$11. \quad \frac{10}{27} \cdot \frac{3}{8} = \frac{10 \cdot 3}{27 \cdot 8} = \frac{\cancel{2} \cdot 5 \cdot \cancel{3}}{\cancel{3} \cdot 9 \cdot \cancel{2} \cdot 4} = \frac{5}{36}$$

$$12. \quad \begin{array}{r} 6.78. \quad 6.78 = \frac{678}{100} \\ \quad \quad \quad \uparrow \\ \quad \quad \quad 2 \text{ places} \quad \quad 2 \text{ zeros} \end{array}$$

$$13. \quad \begin{array}{r} \frac{1895}{1000} \quad 1.895. \quad \frac{1895}{1000} = 1.895 \\ \quad \quad \quad \uparrow \quad \quad \quad \uparrow \\ \quad \quad \quad 3 \text{ zeros} \quad \quad 3 \text{ places} \end{array}$$

$$14. \quad \begin{array}{r} \quad \quad 1 \quad 1 \quad 1 \\ \quad \quad 7.14 \\ \quad \quad 8.9. \\ + \quad 2.8787 \\ \hline \quad 99.0187 \end{array}$$

$$15. \quad \begin{array}{r} \quad \quad 7 \quad 9 \quad 9 \quad 9 \quad 10 \\ \quad 1-8-0-0-0 \\ - \quad \quad 3.42 \\ \hline \quad 1796.58 \end{array}$$

$$16. \quad \begin{array}{r} \quad \quad 1 \quad 2 \quad 3.6 \\ \times \quad 3.52 \\ \hline \quad \quad 2 \quad 4 \quad 7 \quad 2 \\ \quad \quad 6 \quad 1 \quad 8 \quad 0 \quad 0 \\ \quad \quad 3 \quad 7 \quad 0 \quad 8 \quad 0 \quad 0 \\ \hline \quad 4 \quad 3 \quad 5. \quad 0 \quad 7 \quad 2 \end{array}$$

$$17. \quad \begin{array}{r} \quad \quad \quad 1.6 \\ 7.2 \overline{) 11.52} \\ \underline{72} \quad \quad \\ \quad 432 \\ \underline{432} \quad \quad \\ \quad \quad 0 \end{array}$$

$$\begin{array}{r}
 2.0\ 9 \\
 11 \overline{) 23.0\ 0} \\
 \underline{2\ 2} \\
 10\ 0 \\
 \underline{9\ 9} \\
 1
 \end{array}$$

The number 1 repeats as a remainder, so the sequence of digits following the decimal point in the quotient repeats.

Thus, decimal notation for $\frac{23}{11}$ is $2.0909\dots$, or $2.\overline{09}$.

19. Round 234.7284 to the nearest tenth. The digit in the tenths place is 7. The next digit to the right, 2, is less than 5, so we round down: 234.7.

20. Round 234.7284 to the nearest thousandth. The digit in the thousandths place is 8. The next digit to the right, 4, is less than 5, so we round down: 234.728.

$$\begin{array}{r}
 0.7\% \quad 0.00.7 \\
 \quad \uparrow \square
 \end{array}$$

Move the decimal point 2 places to the left.

$$0.7\% = 0.007$$

$$22. \quad 91\% = 91 \times \frac{1}{100} = \frac{91}{100}$$

$$23. \quad \frac{11}{25} = 0.44 = 44\%$$

$$24. \quad 5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = 625$$

$$25. \quad (1.2)^2 = 1.2 \cdot 1.2 = 1.44$$

$$\begin{aligned}
 26. \quad 200 - 2^3 + 5 \times 10 &= 200 - 8 + 5 \times 10 \\
 &= 200 - 8 + 50 \\
 &= 192 + 50 \\
 &= 242
 \end{aligned}$$

$$27. \quad 8000 \div 0.16 \div 2.5 = 50,000 \div 2.5 = 20,000$$

$$\begin{array}{r}
 5.4\% \quad 0.05.4 \\
 \quad \uparrow \square
 \end{array}$$

Move the decimal point two places to the left.

$$5.4\% = 0.054$$

$$29. \quad \frac{12}{1000} = 0.012 = 1.2\%$$

$$30. \quad \frac{38xy}{2x} = \frac{\cancel{2} \cdot 19 \cdot \cancel{x} \cdot y}{\cancel{2} \cdot \cancel{x} \cdot 1} = 19y$$