

Grade 5 Math Workbook

18 lessons · printable · answer key at the back

Name _____

Date _____

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Decimal Place Value

WORKED EXAMPLE

 $44.\underline{8}15 \rightarrow \underline{0.8}$

1. Decimal place value

Write the value of the highlighted digit.

- | | | | | | |
|----|-------------------------|----|-------------------------|----|-------------------------|
| 1 | 23.55 <u>6</u> → _____ | 2 | 5. <u>9</u> 59 → _____ | 3 | 57. <u>3</u> 89 → _____ |
| 4 | 10.1 <u>3</u> 7 → _____ | 5 | 12.16 <u>5</u> → _____ | 6 | 45.50 <u>2</u> → _____ |
| 7 | 24. <u>8</u> 56 → _____ | 8 | 17.8 <u>6</u> 7 → _____ | 9 | 80.4 <u>6</u> 7 → _____ |
| 10 | 16.7 <u>8</u> 8 → _____ | 11 | 47.0 <u>3</u> 8 → _____ | 12 | 28.00 <u>8</u> → _____ |
| 13 | 19. <u>7</u> 02 → _____ | 14 | 36.79 <u>5</u> → _____ | 15 | 4.8 <u>1</u> 0 → _____ |
| 16 | 30. <u>8</u> 01 → _____ | 17 | 45.6 <u>1</u> 4 → _____ | 18 | 24.96 <u>5</u> → _____ |
| 19 | 4. <u>7</u> 28 → _____ | 20 | 49.74 <u>8</u> → _____ | 21 | 27.67 <u>3</u> → _____ |
| 22 | 79. <u>8</u> 85 → _____ | 23 | 0.28 <u>6</u> → _____ | 24 | 39. <u>3</u> 07 → _____ |
| 25 | 4.7 <u>4</u> 8 → _____ | 26 | 15.9 <u>6</u> 8 → _____ | 27 | 49. <u>5</u> 88 → _____ |
| 28 | 29.71 <u>9</u> → _____ | 29 | 16. <u>2</u> 50 → _____ | 30 | 47.53 <u>8</u> → _____ |
| 31 | 10.1 <u>2</u> 0 → _____ | 32 | 77.3 <u>8</u> 4 → _____ | 33 | 25.1 <u>1</u> 6 → _____ |
| 34 | 30.7 <u>9</u> 7 → _____ | 35 | 31.05 <u>9</u> → _____ | 36 | 15. <u>5</u> 03 → _____ |
| 37 | 28.89 <u>9</u> → _____ | 38 | 42. <u>5</u> 20 → _____ | 39 | 4. <u>1</u> 13 → _____ |
| 40 | 34.2 <u>2</u> 2 → _____ | 41 | 14. <u>3</u> 70 → _____ | 42 | 86.01 <u>4</u> → _____ |
| 43 | 20.4 <u>5</u> 2 → _____ | 44 | 1. <u>4</u> 92 → _____ | 45 | 65.83 <u>6</u> → _____ |
| 46 | 28.35 <u>3</u> → _____ | 47 | 16. <u>7</u> 03 → _____ | 48 | 44. <u>8</u> 03 → _____ |
| 49 | 21.11 <u>7</u> → _____ | 50 | 24.6 <u>5</u> 4 → _____ | | |

Comparing Decimals

WORKED EXAMPLE

$$0.8 \boxed{<} 7.5$$

2. Compare decimals

Write $>$, $=$, or $<$ between each pair of decimals.

- | | | | |
|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|
| 1 $4.1 \boxed{} 0.39$ | 2 $3.5 \boxed{} 2.7$ | 3 $8.2 \boxed{} 7.21$ | 4 $4.8 \boxed{} 1.4$ |
| 5 $2.4 \boxed{} 2.9$ | 6 $9.4 \boxed{} 3.01$ | 7 $1.2 \boxed{} 3.3$ | 8 $7.33 \boxed{} 5.59$ |
| 9 $4.5 \boxed{} 8.55$ | 10 $0.8 \boxed{} 5.4$ | 11 $6.2 \boxed{} 1.8$ | 12 $0.10 \boxed{} 7.92$ |
| 13 $0.7 \boxed{} 4.6$ | 14 $8.5 \boxed{} 6.1$ | 15 $3.6 \boxed{} 9.7$ | 16 $6.62 \boxed{} 2.81$ |
| 17 $0.9 \boxed{} 1.5$ | 18 $9.6 \boxed{} 7.4$ | 19 $0.36 \boxed{} 0.6$ | 20 $5.1 \boxed{} 2.83$ |
| 21 $9.6 \boxed{} 6.2$ | 22 $3.4 \boxed{} 4.2$ | 23 $0.7 \boxed{} 2.12$ | 24 $6.2 \boxed{} 4.1$ |
| 25 $5.9 \boxed{} 4.1$ | 26 $9.09 \boxed{} 7.6$ | 27 $4.3 \boxed{} 7.08$ | 28 $1.26 \boxed{} 9.88$ |
| 29 $2.8 \boxed{} 8.37$ | 30 $1.2 \boxed{} 6.01$ | 31 $0.81 \boxed{} 5.6$ | 32 $4.0 \boxed{} 2.84$ |
| 33 $3.43 \boxed{} 8.53$ | 34 $1.4 \boxed{} 0.90$ | 35 $6.8 \boxed{} 9.2$ | 36 $0.30 \boxed{} 8.0$ |
| 37 $9.5 \boxed{} 8.1$ | 38 $1.3 \boxed{} 1.9$ | 39 $3.1 \boxed{} 1.80$ | 40 $2.28 \boxed{} 7.9$ |
| 41 $0.3 \boxed{} 0.8$ | 42 $9.56 \boxed{} 3.6$ | 43 $2.1 \boxed{} 9.60$ | 44 $6.7 \boxed{} 7.95$ |
| 45 $5.1 \boxed{} 5.10$ | 46 $3.4 \boxed{} 9.01$ | 47 $6.3 \boxed{} 3.44$ | 48 $0.7 \boxed{} 7.0$ |
| 49 $4.82 \boxed{} 1.84$ | 50 $0.29 \boxed{} 2.32$ | | |

Multiplying and Dividing by 10, 100 and 1000

WORKED EXAMPLE

$$8.5 \times 10 = \underline{85}$$

3. Multiply and divide by 10, 100, 1000

Multiply or divide by moving the decimal point.

- | | | |
|------------------------------|------------------------------|-------------------------------|
| 1 $0.29 \div 10 =$ _____ | 2 $3.4 \div 1000 =$ _____ | 3 $6.54 \div 100 =$ _____ |
| 4 $4.3 \div 1000 =$ _____ | 5 $1.3 \div 1000 =$ _____ | 6 $1.57 \div 100 =$ _____ |
| 7 $1.6 \div 10 =$ _____ | 8 $7.87 \times 10 =$ _____ | 9 $8.6 \div 100 =$ _____ |
| 10 $1.6 \times 100 =$ _____ | 11 $6.8 \div 100 =$ _____ | 12 $2.4 \div 100 =$ _____ |
| 13 $2.43 \div 10 =$ _____ | 14 $0.3 \div 1000 =$ _____ | 15 $3.76 \times 1000 =$ _____ |
| 16 $9.3 \div 10 =$ _____ | 17 $4.94 \times 100 =$ _____ | 18 $2.9 \div 10 =$ _____ |
| 19 $8.1 \div 10 =$ _____ | 20 $1.89 \div 10 =$ _____ | 21 $1.4 \div 1000 =$ _____ |
| 22 $7.78 \times 100 =$ _____ | 23 $1.3 \times 10 =$ _____ | 24 $3.68 \div 10 =$ _____ |
| 25 $0.7 \div 10 =$ _____ | 26 $0.2 \times 100 =$ _____ | 27 $9.8 \times 10 =$ _____ |
| 28 $0.15 \times 100 =$ _____ | 29 $8.24 \times 10 =$ _____ | 30 $0.25 \div 10 =$ _____ |
| 31 $4.8 \times 100 =$ _____ | 32 $7.8 \div 1000 =$ _____ | 33 $4.44 \div 10 =$ _____ |
| 34 $2.2 \div 1000 =$ _____ | 35 $1.1 \times 1000 =$ _____ | 36 $4.9 \times 10 =$ _____ |
| 37 $1.3 \times 100 =$ _____ | 38 $0.58 \div 1000 =$ _____ | 39 $0.04 \times 1000 =$ _____ |
| 40 $4.22 \div 1000 =$ _____ | 41 $4.4 \times 10 =$ _____ | 42 $7.36 \times 100 =$ _____ |
| 43 $0.1 \div 100 =$ _____ | 44 $1.75 \div 10 =$ _____ | 45 $0.5 \times 100 =$ _____ |
| 46 $1.1 \div 10 =$ _____ | 47 $4.06 \times 10 =$ _____ | 48 $2.6 \times 1000 =$ _____ |
| 49 $0.84 \div 1000 =$ _____ | 50 $0.44 \div 10 =$ _____ | |

Adding and Subtracting Decimals

WORKED EXAMPLE

$$\begin{array}{r} 0.14 \\ 14.13 \\ - 9.01 \\ \hline 5.12 \end{array}$$

4. Add and subtract decimals

Add or subtract the decimals.

$$\begin{array}{r} 1 \quad 18.74 \\ - 15.87 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \quad 3.24 \\ + 6.02 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \quad 6.67 \\ - 3.81 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \quad 17.30 \\ - 10.67 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \quad 3.08 \\ + 18.49 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \quad 0.38 \\ + 4.29 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \quad 9.02 \\ + 6.64 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \quad 18.57 \\ - 10.78 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \quad 2.77 \\ + 2.94 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \quad 1.92 \\ + 7.76 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \quad 15.07 \\ - 11.29 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \quad 17.52 \\ + 1.17 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \quad 9.87 \\ - 3.68 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \quad 6.95 \\ + 8.11 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \quad 3.43 \\ - 1.09 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \quad 7.74 \\ - 0.75 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \quad 9.48 \\ + 7.06 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \quad 14.59 \\ - 6.63 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \quad 15.05 \\ + 3.60 \\ \hline \end{array}$$

$$\begin{array}{r} 20 \quad 10.00 \\ - 0.02 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \quad 12.88 \\ - 6.76 \\ \hline \end{array}$$

$$\begin{array}{r} 22 \quad 6.08 \\ - 5.20 \\ \hline \end{array}$$

$$\begin{array}{r} 23 \quad 14.48 \\ - 5.00 \\ \hline \end{array}$$

Multiplying Decimals

WORKED EXAMPLE

$$7.1 \times 11 = \underline{78.1}$$

5. Multiply and divide decimals

Multiply the decimals.

- | | | |
|-------------------------------|-------------------------------|-------------------------------|
| 1 $8.9 \times 3 =$ _____ | 2 $1.91 \times 8.1 =$ _____ | 3 $5.1 \times 3.6 =$ _____ |
| 4 $11.0 \times 4 =$ _____ | 5 $4.94 \times 4.70 =$ _____ | 6 $1.3 \times 0.71 =$ _____ |
| 7 $9.03 \times 7 =$ _____ | 8 $7.8 \times 6 =$ _____ | 9 $4.56 \times 0.2 =$ _____ |
| 10 $7.18 \times 6 =$ _____ | 11 $11.8 \times 11 =$ _____ | 12 $5.04 \times 7.8 =$ _____ |
| 13 $1.1 \times 5.38 =$ _____ | 14 $5.5 \times 1.1 =$ _____ | 15 $1.4 \times 10 =$ _____ |
| 16 $7.2 \times 2.13 =$ _____ | 17 $7.30 \times 7.08 =$ _____ | 18 $2.9 \times 0.12 =$ _____ |
| 19 $7.5 \times 9 =$ _____ | 20 $1.90 \times 4.1 =$ _____ | 21 $0.6 \times 8.1 =$ _____ |
| 22 $5.57 \times 1.47 =$ _____ | 23 $4.89 \times 1.5 =$ _____ | 24 $0.67 \times 6 =$ _____ |
| 25 $0.16 \times 7.0 =$ _____ | 26 $6.9 \times 3.25 =$ _____ | 27 $5.41 \times 4 =$ _____ |
| 28 $0.60 \times 3 =$ _____ | 29 $9.1 \times 6 =$ _____ | 30 $3.31 \times 2.8 =$ _____ |
| 31 $0.47 \times 3.92 =$ _____ | 32 $1.7 \times 11 =$ _____ | 33 $1.95 \times 12 =$ _____ |
| 34 $2.16 \times 5 =$ _____ | 35 $0.3 \times 10 =$ _____ | 36 $5.85 \times 1.50 =$ _____ |
| 37 $6.82 \times 3 =$ _____ | 38 $5.5 \times 7 =$ _____ | 39 $6.9 \times 0.25 =$ _____ |
| 40 $0.37 \times 5.6 =$ _____ | 41 $8.81 \times 8.7 =$ _____ | 42 $8.51 \times 2 =$ _____ |
| 43 $0.7 \times 5.51 =$ _____ | 44 $0.41 \times 3 =$ _____ | |

Multiplying Three Digits by Two

WORKED EXAMPLE

$$\begin{array}{r}
 216 \\
 \times 32 \\
 \hline
 432 \\
 6480 \\
 \hline
 6912
 \end{array}$$

6. Multiply multi-digit numbers

Multiply. Show your working.

$$\begin{array}{r}
 1 \quad 320 \\
 \times 18 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 2 \quad 240 \\
 \times 98 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 3 \quad 150 \\
 \times 11 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 4 \quad 646 \\
 \times 24 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 5 \quad 933 \\
 \times 75 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6 \quad 442 \\
 \times 19 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7 \quad 451 \\
 \times 41 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8 \quad 107 \\
 \times 96 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 9 \quad 258 \\
 \times 82 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 10 \quad 211 \\
 \times 14 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 11 \quad 664 \\
 \times 61 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 12 \quad 228 \\
 \times 59 \\
 \hline
 \end{array}$$

Long Division

WORKED EXAMPLE

$$\begin{array}{r} 30 \\ 67 \overline{)2010} \\ \underline{201} \\ 0 \end{array}$$

7. Long division

Divide. Show your working.

1

$$47 \overline{)3431}$$

2

$$52 \overline{)4628}$$

3

$$17 \overline{)2839}$$

4

$$27 \overline{)3051}$$

5

$$40 \overline{)9120}$$

6

$$25 \overline{)5875}$$

7

$$48 \overline{)3456}$$

8

$$32 \overline{)1472}$$

Long Division with Remainders

WORKED EXAMPLE

$$\begin{array}{r} 40 \\ 26 \overline{)1064} \\ \underline{104} \\ 24 \end{array}$$

8. Long division with remainders

Divide. Give the quotient and the remainder.

$$\begin{array}{l} 1 \quad \quad \quad \quad \quad \quad \quad 2 \quad \quad \quad \quad \quad \quad \quad 3 \quad \quad \quad \quad \quad \quad \quad 4 \quad \quad \quad \quad \quad \quad \quad 5 \quad \quad \quad \quad \quad \quad \quad \\ \begin{array}{r} \text{R } \\ 91 \overline{)3319} \end{array} \quad \begin{array}{r} \text{R } \\ 65 \overline{)5639} \end{array} \quad \begin{array}{r} \text{R } \\ 98 \overline{)1196} \end{array} \quad \begin{array}{r} \text{R } \\ 66 \overline{)9554} \end{array} \quad \begin{array}{r} \text{R } \\ 89 \overline{)2325} \end{array} \end{array}$$

$$\begin{array}{l} 6 \quad \quad \quad \quad \quad \quad \quad 7 \quad \quad \quad \quad \quad \quad \quad 8 \quad \quad \quad \quad \quad \quad \quad \\ \begin{array}{r} \text{R } \\ 83 \overline{)6795} \end{array} \quad \begin{array}{r} \text{R } \\ 38 \overline{)2835} \end{array} \quad \begin{array}{r} \text{R } \\ 28 \overline{)9570} \end{array} \end{array}$$

Equivalent Fractions

WORKED EXAMPLE

$$\frac{3}{4} = \frac{6}{8}$$

9. Equivalent fractions

Write the missing number that makes the fractions equal.

$$1 \quad \frac{1}{2} = \frac{\quad}{4}$$

$$2 \quad \frac{1}{2} = \frac{\quad}{8}$$

$$3 \quad \frac{1}{3} = \frac{\quad}{6}$$

$$4 \quad \frac{2}{3} = \frac{\quad}{6}$$

$$5 \quad \frac{1}{4} = \frac{\quad}{8}$$

$$6 \quad \frac{1}{2} = \frac{\quad}{6}$$

Multiplying Fractions

WORKED EXAMPLE

$$\frac{5}{6} \times \frac{5}{8} = \frac{25}{48}$$

10. Multiplying fractions

Multiply. Write each answer in simplest form.

1 $\frac{4}{6} \times \frac{2}{4} = \text{—}$

2 $\frac{4}{6} \times \frac{2}{7} = \text{—}$

3 $\frac{7}{8} \times \frac{1}{8} = \text{—}$

4 $\frac{7}{8} \times \frac{1}{7} = \text{—}$

5 $\frac{1}{7} \times \frac{7}{8} = \text{—}$

6 $\frac{7}{8} \times \frac{2}{8} = \text{—}$

7 $\frac{6}{8} \times \frac{5}{7} = \text{—}$

8 $\frac{3}{5} \times \frac{7}{8} = \text{—}$

9 $\frac{1}{3} \times \frac{4}{6} = \text{—}$

10 $\frac{4}{5} \times \frac{5}{7} = \text{—}$

11 $\frac{2}{7} \times \frac{2}{6} = \text{—}$

12 $\frac{4}{7} \times \frac{3}{6} = \text{—}$

13 $\frac{3}{7} \times \frac{1}{8} = \text{—}$

14 $\frac{2}{5} \times \frac{5}{8} = \text{—}$

15 $\frac{6}{8} \times \frac{6}{7} = \text{—}$

16 $\frac{5}{7} \times \frac{3}{7} = \text{—}$

Mixed Numbers

WORKED EXAMPLE

$$2\frac{2}{5} + 5\frac{2}{5} = 7\frac{4}{5}$$

11. Adding mixed numbers

Add. Write each answer as a mixed number in simplest form.

1 $2\frac{3}{8} + 3\frac{1}{8} = \underline{\hspace{1cm}}$

4 $2\frac{4}{7} + 1\frac{4}{7} = \underline{\hspace{1cm}}$

7 $5\frac{4}{5} + 1\frac{2}{5} = \underline{\hspace{1cm}}$

10 $2\frac{3}{5} + 1\frac{1}{5} = \underline{\hspace{1cm}}$

13 $1\frac{4}{5} + 1\frac{2}{5} = \underline{\hspace{1cm}}$

16 $5\frac{1}{7} + 2\frac{4}{7} = \underline{\hspace{1cm}}$

19 $5\frac{7}{8} + 5\frac{3}{8} = \underline{\hspace{1cm}}$

22 $4\frac{1}{7} + 3\frac{4}{7} = \underline{\hspace{1cm}}$

25 $5\frac{6}{7} + 1\frac{2}{7} = \underline{\hspace{1cm}}$

28 $4\frac{2}{7} + 2\frac{2}{7} = \underline{\hspace{1cm}}$

31 $4\frac{3}{7} + 5\frac{5}{7} = \underline{\hspace{1cm}}$

34 $3\frac{1}{6} + 1\frac{1}{6} = \underline{\hspace{1cm}}$

37 $2\frac{1}{5} + 4\frac{3}{5} = \underline{\hspace{1cm}}$

40 $3\frac{5}{8} + 5\frac{5}{8} = \underline{\hspace{1cm}}$

43 $5\frac{4}{7} + 5\frac{2}{7} = \underline{\hspace{1cm}}$

2 $2\frac{3}{7} + 4\frac{4}{7} = \underline{\hspace{1cm}}$

5 $1\frac{1}{3} + 4\frac{1}{3} = \underline{\hspace{1cm}}$

8 $3\frac{2}{7} + 1\frac{4}{7} = \underline{\hspace{1cm}}$

11 $5\frac{5}{6} + 5\frac{5}{6} = \underline{\hspace{1cm}}$

14 $5\frac{3}{8} + 1\frac{1}{8} = \underline{\hspace{1cm}}$

17 $3\frac{3}{5} + 2\frac{2}{5} = \underline{\hspace{1cm}}$

20 $4\frac{1}{4} + 4\frac{1}{4} = \underline{\hspace{1cm}}$

23 $5\frac{2}{5} + 2\frac{4}{5} = \underline{\hspace{1cm}}$

26 $5\frac{3}{5} + 5\frac{1}{5} = \underline{\hspace{1cm}}$

29 $2\frac{5}{6} + 1\frac{1}{6} = \underline{\hspace{1cm}}$

32 $1\frac{4}{7} + 1\frac{1}{7} = \underline{\hspace{1cm}}$

35 $4\frac{4}{5} + 5\frac{2}{5} = \underline{\hspace{1cm}}$

38 $2\frac{4}{5} + 1\frac{2}{5} = \underline{\hspace{1cm}}$

41 $1\frac{1}{5} + 5\frac{3}{5} = \underline{\hspace{1cm}}$

3 $5\frac{1}{8} + 3\frac{1}{8} = \underline{\hspace{1cm}}$

6 $1\frac{2}{7} + 5\frac{2}{7} = \underline{\hspace{1cm}}$

9 $3\frac{5}{6} + 3\frac{5}{6} = \underline{\hspace{1cm}}$

12 $5\frac{2}{5} + 2\frac{1}{5} = \underline{\hspace{1cm}}$

15 $3\frac{6}{7} + 4\frac{1}{7} = \underline{\hspace{1cm}}$

18 $1\frac{5}{8} + 2\frac{1}{8} = \underline{\hspace{1cm}}$

21 $5\frac{6}{7} + 5\frac{5}{7} = \underline{\hspace{1cm}}$

24 $1\frac{4}{7} + 5\frac{1}{7} = \underline{\hspace{1cm}}$

27 $2\frac{6}{7} + 2\frac{3}{7} = \underline{\hspace{1cm}}$

30 $3\frac{3}{7} + 1\frac{1}{7} = \underline{\hspace{1cm}}$

33 $2\frac{3}{4} + 5\frac{3}{4} = \underline{\hspace{1cm}}$

36 $4\frac{1}{5} + 2\frac{3}{5} = \underline{\hspace{1cm}}$

39 $1\frac{1}{4} + 5\frac{1}{4} = \underline{\hspace{1cm}}$

42 $5\frac{6}{7} + 4\frac{5}{7} = \underline{\hspace{1cm}}$

Decimals as Fractions

WORKED EXAMPLE

$$0.4 \rightarrow \frac{2}{5}$$

12. Decimals as fractions

Write each decimal as a fraction in simplest form.

$$1 \quad 0.75 \rightarrow \text{—}$$

$$2 \quad 0.375 \rightarrow \text{—}$$

$$3 \quad 0.6 \rightarrow \text{—}$$

$$4 \quad 0.625 \rightarrow \text{—}$$

$$5 \quad 0.25 \rightarrow \text{—}$$

$$6 \quad 0.125 \rightarrow \text{—}$$

$$7 \quad 0.2 \rightarrow \text{—}$$

$$8 \quad 0.875 \rightarrow \text{—}$$

$$9 \quad 0.8 \rightarrow \text{—}$$

$$10 \quad 0.5 \rightarrow \text{—}$$

Adding Unlike Fractions

WORKED EXAMPLE

$$\frac{3}{5} + \frac{4}{6} = \frac{19}{15}$$

13. Add and subtract fractions

Add or subtract. Write each answer in simplest form.

1 $\frac{4}{5} + \frac{6}{7} = \text{—}$

4 $\frac{1}{6} + \frac{5}{7} = \text{—}$

7 $\frac{2}{3} - \frac{3}{5} = \text{—}$

10 $\frac{2}{7} - \frac{2}{8} = \text{—}$

13 $\frac{1}{4} + \frac{5}{7} = \text{—}$

16 $\frac{4}{5} - \frac{3}{7} = \text{—}$

19 $\frac{4}{7} - \frac{1}{3} = \text{—}$

22 $\frac{1}{3} + \frac{2}{6} = \text{—}$

25 $\frac{2}{3} + \frac{1}{2} = \text{—}$

28 $\frac{3}{4} - \frac{2}{5} = \text{—}$

31 $\frac{3}{6} - \frac{1}{4} = \text{—}$

34 $\frac{3}{8} - \frac{1}{4} = \text{—}$

37 $\frac{6}{8} + \frac{1}{2} = \text{—}$

40 $\frac{2}{7} + \frac{5}{8} = \text{—}$

43 $\frac{6}{8} - \frac{5}{7} = \text{—}$

2 $\frac{2}{4} - \frac{1}{3} = \text{—}$

5 $\frac{3}{7} - \frac{1}{8} = \text{—}$

8 $\frac{3}{8} - \frac{1}{7} = \text{—}$

11 $\frac{4}{7} + \frac{3}{8} = \text{—}$

14 $\frac{6}{7} - \frac{4}{5} = \text{—}$

17 $\frac{4}{7} - \frac{3}{6} = \text{—}$

20 $\frac{2}{7} + \frac{3}{5} = \text{—}$

23 $\frac{5}{7} - \frac{1}{3} = \text{—}$

26 $\frac{2}{4} - \frac{1}{8} = \text{—}$

29 $\frac{7}{8} - \frac{5}{6} = \text{—}$

32 $\frac{6}{8} + \frac{1}{5} = \text{—}$

35 $\frac{4}{5} + \frac{5}{8} = \text{—}$

38 $\frac{3}{5} - \frac{4}{8} = \text{—}$

41 $\frac{2}{3} - \frac{2}{6} = \text{—}$

3 $\frac{4}{7} + \frac{4}{5} = \text{—}$

6 $\frac{5}{7} + \frac{6}{8} = \text{—}$

9 $\frac{3}{5} + \frac{2}{4} = \text{—}$

12 $\frac{6}{8} - \frac{2}{3} = \text{—}$

15 $\frac{3}{4} + \frac{6}{8} = \text{—}$

18 $\frac{5}{6} + \frac{2}{3} = \text{—}$

21 $\frac{5}{7} - \frac{2}{8} = \text{—}$

24 $\frac{1}{3} - \frac{1}{4} = \text{—}$

27 $\frac{2}{7} + \frac{2}{5} = \text{—}$

30 $\frac{4}{5} + \frac{5}{6} = \text{—}$

33 $\frac{2}{5} - \frac{1}{8} = \text{—}$

36 $\frac{2}{5} - \frac{1}{4} = \text{—}$

39 $\frac{1}{2} - \frac{3}{8} = \text{—}$

42 $\frac{1}{6} + \frac{6}{7} = \text{—}$

Comparing Fractions

WORKED EXAMPLE

$$\frac{3}{7} < \frac{4}{8}$$

14. Comparing fractions

Write $>$, $=$, or $<$ between each pair of fractions.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 1 $\frac{1}{6} \bigcirc \frac{3}{4}$ | 2 $\frac{1}{5} \bigcirc \frac{3}{6}$ | 3 $\frac{2}{4} \bigcirc \frac{1}{4}$ | 4 $\frac{3}{5} \bigcirc \frac{2}{5}$ | 5 $\frac{1}{2} \bigcirc \frac{2}{5}$ |
| 6 $\frac{4}{5} \bigcirc \frac{1}{2}$ | 7 $\frac{2}{8} \bigcirc \frac{1}{7}$ | 8 $\frac{2}{5} \bigcirc \frac{4}{8}$ | 9 $\frac{3}{5} \bigcirc \frac{3}{6}$ | 10 $\frac{2}{6} \bigcirc \frac{1}{4}$ |
| 11 $\frac{3}{5} \bigcirc \frac{3}{5}$ | 12 $\frac{1}{6} \bigcirc \frac{4}{7}$ | 13 $\frac{6}{8} \bigcirc \frac{1}{2}$ | 14 $\frac{1}{5} \bigcirc \frac{2}{8}$ | 15 $\frac{4}{5} \bigcirc \frac{2}{5}$ |
| 16 $\frac{1}{4} \bigcirc \frac{2}{8}$ | 17 $\frac{2}{7} \bigcirc \frac{2}{7}$ | 18 $\frac{2}{6} \bigcirc \frac{2}{3}$ | 19 $\frac{3}{4} \bigcirc \frac{6}{7}$ | 20 $\frac{3}{8} \bigcirc \frac{2}{4}$ |
| 21 $\frac{2}{4} \bigcirc \frac{2}{3}$ | 22 $\frac{2}{5} \bigcirc \frac{2}{6}$ | 23 $\frac{1}{2} \bigcirc \frac{7}{8}$ | 24 $\frac{4}{6} \bigcirc \frac{7}{8}$ | 25 $\frac{5}{7} \bigcirc \frac{2}{5}$ |
| 26 $\frac{6}{7} \bigcirc \frac{5}{8}$ | 27 $\frac{5}{8} \bigcirc \frac{1}{5}$ | 28 $\frac{5}{6} \bigcirc \frac{6}{7}$ | 29 $\frac{3}{4} \bigcirc \frac{5}{8}$ | 30 $\frac{2}{3} \bigcirc \frac{2}{6}$ |
| 31 $\frac{3}{4} \bigcirc \frac{4}{5}$ | 32 $\frac{3}{5} \bigcirc \frac{7}{8}$ | 33 $\frac{7}{8} \bigcirc \frac{4}{7}$ | 34 $\frac{2}{7} \bigcirc \frac{1}{7}$ | 35 $\frac{5}{8} \bigcirc \frac{4}{8}$ |
| 36 $\frac{1}{8} \bigcirc \frac{2}{8}$ | 37 $\frac{1}{3} \bigcirc \frac{6}{8}$ | 38 $\frac{2}{4} \bigcirc \frac{4}{6}$ | 39 $\frac{7}{8} \bigcirc \frac{3}{8}$ | 40 $\frac{1}{3} \bigcirc \frac{2}{8}$ |
| 41 $\frac{3}{4} \bigcirc \frac{2}{5}$ | 42 $\frac{3}{7} \bigcirc \frac{2}{4}$ | 43 $\frac{5}{6} \bigcirc \frac{4}{7}$ | 44 $\frac{6}{7} \bigcirc \frac{1}{6}$ | 45 $\frac{6}{8} \bigcirc \frac{2}{6}$ |
| 46 $\frac{4}{8} \bigcirc \frac{3}{7}$ | 47 $\frac{2}{4} \bigcirc \frac{4}{5}$ | 48 $\frac{3}{7} \bigcirc \frac{1}{6}$ | 49 $\frac{3}{4} \bigcirc \frac{4}{7}$ | 50 $\frac{1}{6} \bigcirc \frac{2}{7}$ |

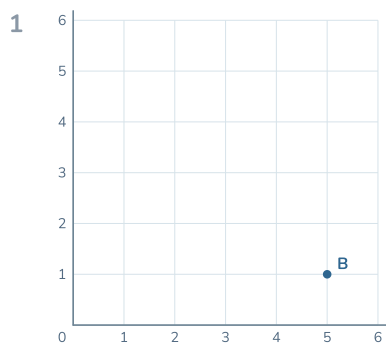
The Coordinate Plane

WORKED EXAMPLE

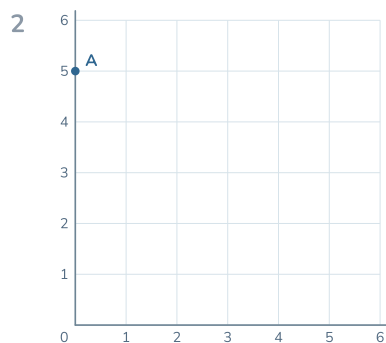
$A = (5, 2)$

15. Points on a coordinate grid

Write the ordered pair for each marked point.



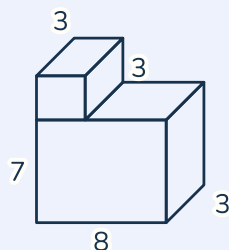
B = _____



A = _____

Volume of Prisms

WORKED EXAMPLE

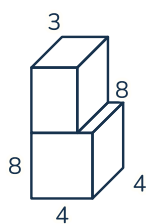


195 cm³

16. Volume of a rectangular prism

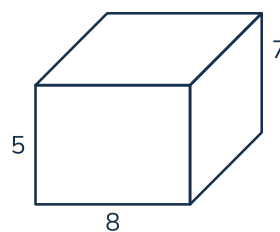
Find the volume of each box. All lengths are in centimeters.

1



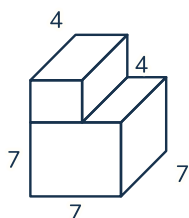
_____ cm³

2



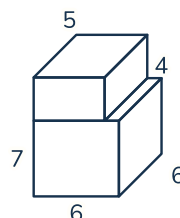
_____ cm³

3



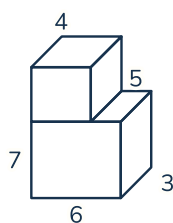
_____ cm³

4



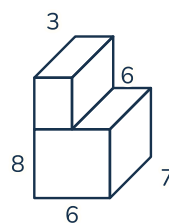
_____ cm³

5



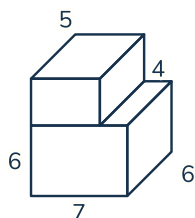
_____ cm³

6



_____ cm³

7



_____ cm³

Order of Operations

WORKED EXAMPLE

$$2 \times (73 - 11) = \underline{124}$$

17. Order of operations

Follow the order of operations to solve each problem.

- | | | |
|---|---|---|
| 1 $(74 + 94) \times 3 = \underline{\hspace{2cm}}$ | 2 $(79 - 78) \times 8 = \underline{\hspace{2cm}}$ | 3 $9 \times (77 + 61) = \underline{\hspace{2cm}}$ |
| 4 $9 \times (40 + 31) = \underline{\hspace{2cm}}$ | 5 $11 \times (15 + 85) = \underline{\hspace{2cm}}$ | 6 $4 \times (27 + 24) = \underline{\hspace{2cm}}$ |
| 7 $9 \times (17 + 23) = \underline{\hspace{2cm}}$ | 8 $9 \times (80 + 29) = \underline{\hspace{2cm}}$ | 9 $(62 + 69) \times 12 = \underline{\hspace{2cm}}$ |
| 10 $11 \times (93 - 61) = \underline{\hspace{2cm}}$ | 11 $(95 + 59) \times 5 = \underline{\hspace{2cm}}$ | 12 $4 \times (81 - 71) = \underline{\hspace{2cm}}$ |
| 13 $9 \times (52 + 33) = \underline{\hspace{2cm}}$ | 14 $(71 + 64) \times 3 = \underline{\hspace{2cm}}$ | 15 $11 \times (78 + 80) = \underline{\hspace{2cm}}$ |
| 16 $(26 + 27) \times 12 = \underline{\hspace{2cm}}$ | 17 $(14 + 67) \times 9 = \underline{\hspace{2cm}}$ | 18 $(92 - 49) \times 3 = \underline{\hspace{2cm}}$ |
| 19 $(92 + 85) \times 9 = \underline{\hspace{2cm}}$ | 20 $12 \times (95 - 71) = \underline{\hspace{2cm}}$ | 21 $12 \times (63 + 63) = \underline{\hspace{2cm}}$ |
| 22 $9 \times (76 + 58) = \underline{\hspace{2cm}}$ | 23 $(12 + 36) \times 11 = \underline{\hspace{2cm}}$ | 24 $8 \times (53 + 52) = \underline{\hspace{2cm}}$ |

Two Patterns Together

WORKED EXAMPLE

ADD 5

5	10	15	20
---	----	----	----

ADD 10

10	20	30	40
----	----	----	----

18. Two rules, two patterns

Follow both rules and fill in the missing number.

1

ADD 4	4		12	16
ADD 16	16	32	48	64

3

ADD 4	4	8		16
ADD 20	20	40	60	80

5

ADD 4	4	8	12	16
ADD 20	20	40		80

7

ADD 5	5	10	15	20
ADD 30	30	60		120

9

ADD 6	6	12	18	
ADD 18	18	36	54	72

2

ADD 4	4		12	16
ADD 8	8	16	24	32

4

ADD 3	3	6	9	12
ADD 12	12	24		48

6

ADD 6	6	12		24
ADD 18	18	36	54	72

8

ADD 3	3	6		12
ADD 9	9	18	27	36

10

ADD 3	3	6	9	12
ADD 15	15	30	45	

Answer Key (1 of 6)

Decimal Place Value

Decimal place value

1. 23.556 (6) $\rightarrow$ 0.006
2. 5.959 (9) $\rightarrow$ 0.9
3. 57.389 (3) $\rightarrow$ 0.3
4. 10.137 (3) $\rightarrow$ 0.03
5. 12.165 (5) $\rightarrow$ 0.005
6. 45.502 (2) $\rightarrow$ 0.002
7. 24.856 (8) $\rightarrow$ 0.8
8. 17.867 (6) $\rightarrow$ 0.06
9. 80.467 (6) $\rightarrow$ 0.06
10. 16.788 (8) $\rightarrow$ 0.08
11. 47.038 (3) $\rightarrow$ 0.03
12. 28.008 (8) $\rightarrow$ 0.008
13. 19.702 (7) $\rightarrow$ 0.7
14. 36.795 (5) $\rightarrow$ 0.005
15. 4.810 (1) $\rightarrow$ 0.01
16. 30.801 (8) $\rightarrow$ 0.8
17. 45.614 (1) $\rightarrow$ 0.01
18. 24.965 (5) $\rightarrow$ 0.005
19. 4.728 (7) $\rightarrow$ 0.7
20. 49.748 (8) $\rightarrow$ 0.008
21. 27.673 (3) $\rightarrow$ 0.003
22. 79.885 (8) $\rightarrow$ 0.8
23. 0.286 (6) $\rightarrow$ 0.006
24. 39.307 (3) $\rightarrow$ 0.3
25. 4.748 (4) $\rightarrow$ 0.04
26. 15.968 (6) $\rightarrow$ 0.06
27. 49.588 (5) $\rightarrow$ 0.5
28. 29.719 (9) $\rightarrow$ 0.009
29. 16.250 (2) $\rightarrow$ 0.2
30. 47.538 (8) $\rightarrow$ 0.008
31. 10.120 (2) $\rightarrow$ 0.02
32. 77.384 (8) $\rightarrow$ 0.08
33. 25.116 (1) $\rightarrow$ 0.01
34. 30.797 (9) $\rightarrow$ 0.09
35. 31.059 (9) $\rightarrow$ 0.009
36. 15.503 (5) $\rightarrow$ 0.5
37. 28.899 (9) $\rightarrow$ 0.009
38. 42.520 (5) $\rightarrow$ 0.5
39. 4.113 (1) $\rightarrow$ 0.1
40. 34.222 (2) $\rightarrow$ 0.02
41. 14.370 (3) $\rightarrow$ 0.3
42. 86.014 (4) $\rightarrow$ 0.004
43. 20.452 (5) $\rightarrow$ 0.05
44. 1.492 (4) $\rightarrow$ 0.4
45. 65.836 (6) $\rightarrow$ 0.006

Decimal Place Value (continued)

Decimal place value (continued)

46. 28.353 (3) $\rightarrow$ 0.003
47. 16.703 (7) $\rightarrow$ 0.7
48. 44.803 (8) $\rightarrow$ 0.8
49. 21.117 (7) $\rightarrow$ 0.007
50. 24.654 (5) $\rightarrow$ 0.05

Comparing Decimals

Compare decimals

1. $4.1 > 0.39$
2. $3.5 > 2.7$
3. $8.2 > 7.21$
4. $4.8 > 1.4$
5. $2.4 < 2.9$
6. $9.4 > 3.01$
7. $1.2 < 3.3$
8. $7.33 > 5.59$
9. $4.5 < 8.55$
10. $0.8 < 5.4$
11. $6.2 > 1.8$
12. $0.10 < 7.92$
13. $0.7 < 4.6$
14. $8.5 > 6.1$
15. $3.6 < 9.7$
16. $6.62 > 2.81$
17. $0.9 < 1.5$
18. $9.6 > 7.4$
19. $0.36 < 0.6$
20. $5.1 > 2.83$
21. $9.6 > 6.2$
22. $3.4 < 4.2$
23. $0.7 < 2.12$
24. $6.2 > 4.1$
25. $5.9 > 4.1$
26. $9.09 > 7.6$
27. $4.3 < 7.08$
28. $1.26 < 9.88$
29. $2.8 < 8.37$
30. $1.2 < 6.01$
31. $0.81 < 5.6$
32. $4.0 > 2.84$
33. $3.43 < 8.53$
34. $1.4 > 0.90$
35. $6.8 < 9.2$
36. $0.30 < 8.0$
37. $9.5 > 8.1$

Answer Key (2 of 6)

Comparing Decimals (continued)

Compare decimals (continued)

38. $1.3 < 1.9$
39. $3.1 > 1.80$
40. $2.28 < 7.9$
41. $0.3 < 0.8$
42. $9.56 > 3.6$
43. $2.1 < 9.60$
44. $6.7 < 7.95$
45. $5.1 = 5.10$
46. $3.4 < 9.01$
47. $6.3 > 3.44$
48. $0.7 < 7.0$
49. $4.82 > 1.84$
50. $0.29 < 2.32$

Multiplying and Dividing by 10, 100 and 1000

Multiply and divide by 10, 100, 1000

1. $0.29 \div 10 = 0.029$
2. $3.4 \div 1000 = 0.0034$
3. $6.54 \div 100 = 0.0654$
4. $4.3 \div 1000 = 0.0043$
5. $1.3 \div 1000 = 0.0013$
6. $1.57 \div 100 = 0.0157$
7. $1.6 \div 10 = 0.16$
8. $7.87 \times 10 = 78.7$
9. $8.6 \div 100 = 0.086$
10. $1.6 \times 100 = 160$
11. $6.8 \div 100 = 0.068$
12. $2.4 \div 100 = 0.024$
13. $2.43 \div 10 = 0.243$
14. $0.3 \div 1000 = 0.0003$
15. $3.76 \times 1000 = 3760$
16. $9.3 \div 10 = 0.93$
17. $4.94 \times 100 = 494$
18. $2.9 \div 10 = 0.29$
19. $8.1 \div 10 = 0.81$
20. $1.89 \div 10 = 0.189$
21. $1.4 \div 1000 = 0.0014$
22. $7.78 \times 100 = 778$
23. $1.3 \times 10 = 13$
24. $3.68 \div 10 = 0.368$
25. $0.7 \div 10 = 0.07$
26. $0.2 \times 100 = 20$
27. $9.8 \times 10 = 98$
28. $0.15 \times 100 = 15$
29. $8.24 \times 10 = 82.4$

Multiplying and Dividing by 10, 100 and 1000 (continued)

Multiply and divide by 10, 100, 1000 (continued)

30. $0.25 \div 10 = 0.025$
31. $4.8 \times 100 = 480$
32. $7.8 \div 1000 = 0.0078$
33. $4.44 \div 10 = 0.444$
34. $2.2 \div 1000 = 0.0022$
35. $1.1 \times 1000 = 1100$
36. $4.9 \times 10 = 49$
37. $1.3 \times 100 = 130$
38. $0.58 \div 1000 = 0.00058$
39. $0.04 \times 1000 = 40$
40. $4.22 \div 1000 = 0.00422$
41. $4.4 \times 10 = 44$
42. $7.36 \times 100 = 736$
43. $0.1 \div 100 = 0.001$
44. $1.75 \div 10 = 0.175$
45. $0.5 \times 100 = 50$
46. $1.1 \div 10 = 0.11$
47. $4.06 \times 10 = 40.6$
48. $2.6 \times 1000 = 2600$
49. $0.84 \div 1000 = 0.00084$
50. $0.44 \div 10 = 0.044$

Adding and Subtracting Decimals

Add and subtract decimals

1. $18.74 - 15.87 = 2.87$
2. $3.24 + 6.02 = 9.26$
3. $6.67 - 3.81 = 2.86$
4. $17.30 - 10.67 = 6.63$
5. $3.08 + 18.49 = 21.57$
6. $0.38 + 4.29 = 4.67$
7. $9.02 + 6.64 = 15.66$
8. $18.57 - 10.78 = 7.79$
9. $2.77 + 2.94 = 5.71$
10. $1.92 + 7.76 = 9.68$
11. $15.07 - 11.29 = 3.78$
12. $17.52 + 1.17 = 18.69$
13. $9.87 - 3.68 = 6.19$
14. $6.95 + 8.11 = 15.06$
15. $3.43 - 1.09 = 2.34$
16. $7.74 - 0.75 = 6.99$
17. $9.48 + 7.06 = 16.54$
18. $14.59 - 6.63 = 7.96$
19. $15.05 + 3.60 = 18.65$
20. $10.00 - 0.02 = 9.98$
21. $12.88 - 6.76 = 6.12$

Answer Key (3 of 6)

Adding and Subtracting Decimals (continued)

Add and subtract decimals (continued)

- 22. $6.08 - 5.20 = 0.88$
- 23. $14.48 - 5.00 = 9.48$

Multiplying Decimals

Multiply and divide decimals

- 1. $8.9 \times 3 = 26.7$
- 2. $1.91 \times 8.1 = 15.471$
- 3. $5.1 \times 3.6 = 18.36$
- 4. $11.0 \times 4 = 44.0$
- 5. $4.94 \times 4.70 = 23.2180$
- 6. $1.3 \times 0.71 = 0.923$
- 7. $9.03 \times 7 = 63.21$
- 8. $7.8 \times 6 = 46.8$
- 9. $4.56 \times 0.2 = 0.912$
- 10. $7.18 \times 6 = 43.08$
- 11. $11.8 \times 11 = 129.8$
- 12. $5.04 \times 7.8 = 39.312$
- 13. $1.1 \times 5.38 = 5.918$
- 14. $5.5 \times 1.1 = 6.05$
- 15. $1.4 \times 10 = 14.0$
- 16. $7.2 \times 2.13 = 15.336$
- 17. $7.30 \times 7.08 = 51.6840$
- 18. $2.9 \times 0.12 = 0.348$
- 19. $7.5 \times 9 = 67.5$
- 20. $1.90 \times 4.1 = 7.790$
- 21. $0.6 \times 8.1 = 4.86$
- 22. $5.57 \times 1.47 = 8.1879$
- 23. $4.89 \times 1.5 = 7.335$
- 24. $0.67 \times 6 = 4.02$
- 25. $0.16 \times 7.0 = 1.120$
- 26. $6.9 \times 3.25 = 22.425$
- 27. $5.41 \times 4 = 21.64$
- 28. $0.60 \times 3 = 1.80$
- 29. $9.1 \times 6 = 54.6$
- 30. $3.31 \times 2.8 = 9.268$
- 31. $0.47 \times 3.92 = 1.8424$
- 32. $1.7 \times 11 = 18.7$
- 33. $1.95 \times 12 = 23.40$
- 34. $2.16 \times 5 = 10.80$
- 35. $0.3 \times 10 = 3.0$
- 36. $5.85 \times 1.50 = 8.7750$
- 37. $6.82 \times 3 = 20.46$
- 38. $5.5 \times 7 = 38.5$
- 39. $6.9 \times 0.25 = 1.725$
- 40. $0.37 \times 5.6 = 2.072$

Multiplying Decimals (continued)

Multiply and divide decimals (continued)

- 41. $8.81 \times 8.7 = 76.647$
- 42. $8.51 \times 2 = 17.02$
- 43. $0.7 \times 5.51 = 3.857$
- 44. $0.41 \times 3 = 1.23$

Multiplying Three Digits by Two

Multiply multi-digit numbers

- 1. $320 \times 18 = 5760$
- 2. $240 \times 98 = 23520$
- 3. $150 \times 11 = 1650$
- 4. $646 \times 24 = 15504$
- 5. $933 \times 75 = 69975$
- 6. $442 \times 19 = 8398$
- 7. $451 \times 41 = 18491$
- 8. $107 \times 96 = 10272$
- 9. $258 \times 82 = 21156$
- 10. $211 \times 14 = 2954$
- 11. $664 \times 61 = 40504$
- 12. $228 \times 59 = 13452$

Long Division

Long division

- 1. $3431 \div 47 = 73$
- 2. $4628 \div 52 = 89$
- 3. $2839 \div 17 = 167$
- 4. $3051 \div 27 = 113$
- 5. $9120 \div 40 = 228$
- 6. $5875 \div 25 = 235$
- 7. $3456 \div 48 = 72$
- 8. $1472 \div 32 = 46$

Long Division with Remainders

Long division with remainders

- 1. $3319 \div 91 = 36 \text{ R } 43$
- 2. $5639 \div 65 = 86 \text{ R } 49$
- 3. $1196 \div 98 = 12 \text{ R } 20$
- 4. $9554 \div 66 = 144 \text{ R } 50$
- 5. $2325 \div 89 = 26 \text{ R } 11$
- 6. $6795 \div 83 = 81 \text{ R } 72$
- 7. $2835 \div 38 = 74 \text{ R } 23$
- 8. $9570 \div 28 = 341 \text{ R } 22$

Equivalent Fractions

Equivalent fractions

- 1. $\frac{1}{2} = \frac{2}{4}$
- 2. $\frac{1}{2} = \frac{4}{8}$

Answer Key (4 of 6)

Equivalent Fractions (continued)

Equivalent fractions (continued)

3. $\frac{1}{3} = \frac{2}{6}$
4. $\frac{2}{3} = \frac{4}{6}$
5. $\frac{1}{4} = \frac{2}{8}$
6. $\frac{1}{2} = \frac{3}{6}$

Multiplying Fractions

Multiplying fractions

1. $\frac{4}{6} \times \frac{2}{4} = \frac{1}{3}$
2. $\frac{4}{6} \times \frac{2}{7} = \frac{4}{21}$
3. $\frac{7}{8} \times \frac{1}{8} = \frac{7}{64}$
4. $\frac{7}{8} \times \frac{1}{7} = \frac{1}{8}$
5. $\frac{1}{7} \times \frac{7}{8} = \frac{1}{8}$
6. $\frac{7}{8} \times \frac{2}{8} = \frac{7}{32}$
7. $\frac{6}{8} \times \frac{5}{7} = \frac{15}{28}$
8. $\frac{3}{5} \times \frac{7}{8} = \frac{21}{40}$
9. $\frac{1}{3} \times \frac{4}{6} = \frac{2}{9}$
10. $\frac{4}{5} \times \frac{5}{7} = \frac{4}{7}$
11. $\frac{2}{7} \times \frac{2}{6} = \frac{2}{21}$
12. $\frac{4}{7} \times \frac{3}{6} = \frac{2}{7}$
13. $\frac{3}{7} \times \frac{1}{8} = \frac{3}{56}$
14. $\frac{2}{5} \times \frac{5}{8} = \frac{1}{4}$
15. $\frac{6}{8} \times \frac{6}{7} = \frac{9}{14}$
16. $\frac{5}{7} \times \frac{3}{7} = \frac{15}{49}$

Mixed Numbers

Adding mixed numbers

1. $2\frac{3}{8} + 3\frac{1}{8} = 5\frac{1}{2}$
2. $2\frac{3}{7} + 4\frac{4}{7} = 7$
3. $5\frac{1}{8} + 3\frac{1}{8} = 8\frac{1}{4}$
4. $2\frac{4}{7} + 1\frac{4}{7} = 4\frac{1}{7}$
5. $1\frac{1}{3} + 4\frac{1}{3} = 5\frac{2}{3}$
6. $1\frac{2}{7} + 5\frac{2}{7} = 6\frac{4}{7}$
7. $5\frac{4}{5} + 1\frac{2}{5} = 7\frac{1}{5}$
8. $3\frac{2}{7} + 1\frac{4}{7} = 4\frac{6}{7}$
9. $3\frac{5}{6} + 3\frac{5}{6} = 7\frac{2}{3}$
10. $2\frac{3}{5} + 1\frac{1}{5} = 3\frac{4}{5}$
11. $5\frac{5}{6} + 5\frac{5}{6} = 11\frac{2}{3}$
12. $5\frac{2}{5} + 2\frac{1}{5} = 7\frac{3}{5}$
13. $1\frac{4}{5} + 1\frac{2}{5} = 3\frac{1}{5}$
14. $5\frac{3}{8} + 1\frac{1}{8} = 6\frac{1}{2}$
15. $3\frac{6}{7} + 4\frac{1}{7} = 8$
16. $5\frac{1}{7} + 2\frac{4}{7} = 7\frac{5}{7}$
17. $3\frac{3}{5} + 2\frac{2}{5} = 6$
18. $1\frac{5}{8} + 2\frac{1}{8} = 3\frac{3}{4}$
19. $5\frac{7}{8} + 5\frac{3}{8} = 11\frac{1}{4}$

Mixed Numbers (continued)

Adding mixed numbers (continued)

20. $4\frac{1}{4} + 4\frac{1}{4} = 8\frac{1}{2}$
21. $5\frac{6}{7} + 5\frac{5}{7} = 11\frac{4}{7}$
22. $4\frac{1}{7} + 3\frac{4}{7} = 7\frac{5}{7}$
23. $5\frac{2}{5} + 2\frac{4}{5} = 8\frac{1}{5}$
24. $1\frac{4}{7} + 5\frac{1}{7} = 6\frac{5}{7}$
25. $5\frac{6}{7} + 1\frac{2}{7} = 7\frac{1}{7}$
26. $5\frac{3}{5} + 5\frac{1}{5} = 10\frac{4}{5}$
27. $2\frac{6}{7} + 2\frac{3}{7} = 5\frac{2}{7}$
28. $4\frac{2}{7} + 2\frac{2}{7} = 6\frac{4}{7}$
29. $2\frac{5}{6} + 1\frac{1}{6} = 4$
30. $3\frac{3}{7} + 1\frac{1}{7} = 4\frac{4}{7}$
31. $4\frac{3}{7} + 5\frac{5}{7} = 10\frac{1}{7}$
32. $1\frac{4}{7} + 1\frac{1}{7} = 2\frac{5}{7}$
33. $2\frac{3}{4} + 5\frac{3}{4} = 8\frac{1}{2}$
34. $3\frac{1}{6} + 1\frac{1}{6} = 4\frac{1}{3}$
35. $4\frac{4}{5} + 5\frac{2}{5} = 10\frac{1}{5}$
36. $4\frac{1}{5} + 2\frac{3}{5} = 6\frac{4}{5}$
37. $2\frac{1}{5} + 4\frac{3}{5} = 6\frac{4}{5}$
38. $2\frac{4}{5} + 1\frac{2}{5} = 4\frac{1}{5}$
39. $1\frac{1}{4} + 5\frac{1}{4} = 6\frac{1}{2}$
40. $3\frac{5}{8} + 5\frac{5}{8} = 9\frac{1}{4}$
41. $1\frac{1}{5} + 5\frac{3}{5} = 6\frac{4}{5}$
42. $5\frac{6}{7} + 4\frac{5}{7} = 10\frac{4}{7}$
43. $5\frac{4}{7} + 5\frac{2}{7} = 10\frac{6}{7}$

Decimals as Fractions

Decimals as fractions

1. $0.75 = \frac{3}{4}$
2. $0.375 = \frac{3}{8}$
3. $0.6 = \frac{3}{5}$
4. $0.625 = \frac{5}{8}$
5. $0.25 = \frac{1}{4}$
6. $0.125 = \frac{1}{8}$
7. $0.2 = \frac{1}{5}$
8. $0.875 = \frac{7}{8}$
9. $0.8 = \frac{4}{5}$
10. $0.5 = \frac{1}{2}$

Adding Unlike Fractions

Add and subtract fractions

1. $\frac{4}{5} + \frac{6}{7} = \frac{58}{35}$
2. $\frac{2}{4} - \frac{1}{3} = \frac{1}{6}$
3. $\frac{4}{7} + \frac{4}{5} = \frac{48}{35}$
4. $\frac{1}{6} + \frac{5}{7} = \frac{37}{42}$
5. $\frac{3}{7} - \frac{1}{8} = \frac{17}{56}$

Answer Key (5 of 6)

Adding Unlike Fractions (continued)

Add and subtract fractions (continued)

6. $\frac{5}{7} + \frac{6}{8} = \frac{41}{28}$
7. $\frac{2}{3} - \frac{3}{5} = \frac{1}{15}$
8. $\frac{3}{8} - \frac{1}{7} = \frac{13}{56}$
9. $\frac{3}{5} + \frac{2}{4} = \frac{11}{10}$
10. $\frac{2}{7} - \frac{2}{8} = \frac{1}{28}$
11. $\frac{4}{7} + \frac{3}{8} = \frac{53}{56}$
12. $\frac{6}{8} - \frac{2}{3} = \frac{1}{12}$
13. $\frac{1}{4} + \frac{5}{7} = \frac{27}{28}$
14. $\frac{6}{7} - \frac{4}{5} = \frac{2}{35}$
15. $\frac{3}{4} + \frac{6}{8} = \frac{3}{2}$
16. $\frac{4}{5} - \frac{3}{7} = \frac{13}{35}$
17. $\frac{4}{7} - \frac{3}{6} = \frac{1}{14}$
18. $\frac{5}{6} + \frac{2}{3} = \frac{3}{2}$
19. $\frac{4}{7} - \frac{1}{3} = \frac{5}{21}$
20. $\frac{2}{7} + \frac{3}{5} = \frac{31}{35}$
21. $\frac{5}{7} - \frac{2}{8} = \frac{13}{28}$
22. $\frac{1}{3} + \frac{2}{6} = \frac{2}{3}$
23. $\frac{5}{7} - \frac{1}{3} = \frac{8}{21}$
24. $\frac{1}{3} - \frac{1}{4} = \frac{1}{12}$
25. $\frac{2}{3} + \frac{1}{2} = \frac{7}{6}$
26. $\frac{2}{4} - \frac{1}{8} = \frac{3}{8}$
27. $\frac{2}{7} + \frac{2}{5} = \frac{24}{35}$
28. $\frac{3}{4} - \frac{2}{5} = \frac{7}{20}$
29. $\frac{7}{8} - \frac{5}{6} = \frac{1}{24}$
30. $\frac{4}{5} + \frac{5}{6} = \frac{49}{30}$
31. $\frac{3}{6} - \frac{1}{4} = \frac{1}{4}$
32. $\frac{6}{8} + \frac{1}{5} = \frac{19}{20}$
33. $\frac{2}{5} - \frac{1}{8} = \frac{11}{40}$
34. $\frac{3}{8} - \frac{1}{4} = \frac{1}{8}$
35. $\frac{4}{5} + \frac{5}{8} = \frac{57}{40}$
36. $\frac{2}{5} - \frac{1}{4} = \frac{3}{20}$
37. $\frac{6}{8} + \frac{1}{2} = \frac{5}{4}$
38. $\frac{3}{5} - \frac{4}{8} = \frac{1}{10}$
39. $\frac{1}{2} - \frac{3}{8} = \frac{1}{8}$
40. $\frac{2}{7} + \frac{5}{8} = \frac{51}{56}$
41. $\frac{2}{3} - \frac{2}{6} = \frac{1}{3}$
42. $\frac{1}{6} + \frac{6}{7} = \frac{43}{42}$
43. $\frac{6}{8} - \frac{5}{7} = \frac{1}{28}$

Comparing Fractions

Comparing fractions

1. $\frac{1}{6} < \frac{3}{4}$
2. $\frac{1}{5} < \frac{3}{6}$
3. $\frac{2}{4} > \frac{1}{4}$
4. $\frac{3}{5} > \frac{2}{5}$

Comparing Fractions (continued)

Comparing fractions (continued)

5. $\frac{1}{2} > \frac{2}{5}$
6. $\frac{4}{5} > \frac{1}{2}$
7. $\frac{2}{8} > \frac{1}{7}$
8. $\frac{2}{5} < \frac{4}{8}$
9. $\frac{3}{5} > \frac{3}{6}$
10. $\frac{2}{6} > \frac{1}{4}$
11. $\frac{3}{5} = \frac{3}{5}$
12. $\frac{1}{6} < \frac{4}{7}$
13. $\frac{6}{8} > \frac{1}{2}$
14. $\frac{1}{5} < \frac{2}{8}$
15. $\frac{4}{5} > \frac{2}{5}$
16. $\frac{1}{4} = \frac{2}{8}$
17. $\frac{2}{7} = \frac{2}{7}$
18. $\frac{2}{6} < \frac{2}{3}$
19. $\frac{3}{4} < \frac{6}{7}$
20. $\frac{3}{8} < \frac{2}{4}$
21. $\frac{2}{4} < \frac{2}{3}$
22. $\frac{2}{5} > \frac{2}{6}$
23. $\frac{1}{2} < \frac{7}{8}$
24. $\frac{4}{6} < \frac{7}{8}$
25. $\frac{5}{7} > \frac{2}{5}$
26. $\frac{6}{7} > \frac{5}{8}$
27. $\frac{5}{8} > \frac{1}{5}$
28. $\frac{5}{6} < \frac{6}{7}$
29. $\frac{3}{4} > \frac{5}{8}$
30. $\frac{2}{3} > \frac{2}{6}$
31. $\frac{3}{4} < \frac{4}{5}$
32. $\frac{3}{5} < \frac{7}{8}$
33. $\frac{7}{8} > \frac{4}{7}$
34. $\frac{2}{7} > \frac{1}{7}$
35. $\frac{5}{8} > \frac{4}{8}$
36. $\frac{1}{8} < \frac{2}{8}$
37. $\frac{1}{3} < \frac{6}{8}$
38. $\frac{2}{4} < \frac{4}{6}$
39. $\frac{7}{8} > \frac{3}{8}$
40. $\frac{1}{3} > \frac{2}{8}$
41. $\frac{3}{4} > \frac{2}{5}$
42. $\frac{3}{7} < \frac{2}{4}$
43. $\frac{5}{6} > \frac{4}{7}$
44. $\frac{6}{7} > \frac{1}{6}$
45. $\frac{6}{8} > \frac{2}{6}$
46. $\frac{4}{8} > \frac{3}{7}$
47. $\frac{2}{4} < \frac{4}{5}$
48. $\frac{3}{7} > \frac{1}{6}$
49. $\frac{3}{4} > \frac{4}{7}$

Answer Key (6 of 6)

Comparing Fractions (continued)

Comparing fractions (continued)

50. $\frac{1}{6} < \frac{2}{7}$

The Coordinate Plane

Points on a coordinate grid

1. B = (5, 1)
2. A = (0, 5)

Volume of Prisms

Volume of a rectangular prism

1. $4 \times 4 \times 8 + 3 \times 4 \times 8$: 224 cm³
2. $8 \times 7 \times 5$: 280 cm³
3. $7 \times 7 \times 7 + 4 \times 7 \times 4$: 455 cm³
4. $6 \times 6 \times 7 + 5 \times 6 \times 4$: 372 cm³
5. $6 \times 3 \times 7 + 4 \times 3 \times 5$: 186 cm³
6. $6 \times 7 \times 8 + 3 \times 7 \times 6$: 462 cm³
7. $7 \times 6 \times 6 + 5 \times 6 \times 4$: 372 cm³

Order of Operations

Order of operations

1. $(74 + 94) \times 3 = 504$
2. $(79 - 78) \times 8 = 8$
3. $9 \times (77 + 61) = 1242$
4. $9 \times (40 + 31) = 639$
5. $11 \times (15 + 85) = 1100$
6. $4 \times (27 + 24) = 204$
7. $9 \times (17 + 23) = 360$
8. $9 \times (80 + 29) = 981$
9. $(62 + 69) \times 12 = 1572$
10. $11 \times (93 - 61) = 352$
11. $(95 + 59) \times 5 = 770$
12. $4 \times (81 - 71) = 40$
13. $9 \times (52 + 33) = 765$
14. $(71 + 64) \times 3 = 405$
15. $11 \times (78 + 80) = 1738$
16. $(26 + 27) \times 12 = 636$
17. $(14 + 67) \times 9 = 729$
18. $(92 - 49) \times 3 = 129$
19. $(92 + 85) \times 9 = 1593$
20. $12 \times (95 - 71) = 288$
21. $12 \times (63 + 63) = 1512$
22. $9 \times (76 + 58) = 1206$
23. $(12 + 36) \times 11 = 528$
24. $8 \times (53 + 52) = 840$

Two Patterns Together

Two rules, two patterns

1. Add 4 and add 16 → top row, term 2 = 8
2. Add 4 and add 8 → top row, term 2 = 8
3. Add 4 and add 20 → top row, term 3 = 12
4. Add 3 and add 12 → bottom row, term 3 = 36
5. Add 4 and add 20 → bottom row, term 3 = 60
6. Add 6 and add 18 → top row, term 3 = 18
7. Add 5 and add 30 → bottom row, term 3 = 90
8. Add 3 and add 9 → top row, term 3 = 9
9. Add 6 and add 18 → top row, term 4 = 24
10. Add 3 and add 15 → bottom row, term 4 = 60

Solutions (1 of 12)

Decimal Place Value

Decimal place value

1. $23.55\textcolor{red}{6} \rightarrow \underline{\hspace{2cm}}$

number: 2 3 . 5 5 $\textcolor{blue}{6}$
 6 $\rightarrow$ $\textcolor{blue}{0.006}$

The places do not mirror each other around the point — there is no "oneths". Going right they are tenths, hundredths, thousandths: each one ten times SMALLER than the last.

Count in from the point: the 6 sits in the thousandths.

Its VALUE is what it is worth there, not the digit itself: 6 in the thousandths is 0.006. That gap between "6" and "0.006" is the whole of this topic.

2. $5.\textcolor{red}{9}59 \rightarrow \underline{\hspace{2cm}}$

number: 5 . $\textcolor{blue}{9}$ 5 9
 9 $\rightarrow$ $\textcolor{blue}{0.9}$

The places do not mirror each other around the point — there is no "oneths". Going right they are tenths, hundredths, thousandths: each one ten times SMALLER than the last.

Count in from the point: the 9 sits in the tenths.

Its VALUE is what it is worth there, not the digit itself: 9 in the tenths is 0.9. That gap between "9" and "0.9" is the whole of this topic.

Comparing Decimals

Compare decimals

1. $4.1 \boxed{} 0.39$

4.10 ? 0.39
410 hundredths $\textcolor{blue}{>}$
39 hundredths
4.1 $\textcolor{blue}{>}$ 0.39

These count different sized pieces — one is in bigger pieces and the other is not. Longer does NOT mean bigger with decimals, so the first job is to make the pieces match.

Write a zero on the end of the shorter one. 4.1 is the same amount as 4.10 — a zero on the END of a decimal changes nothing.

Now they are both hundredths: 410 against 39. 410 is more. So $4.1 > 0.39$.

Solutions (2 of 12)

Comparing Decimals (continued)

Compare decimals (continued)

2. $3.5 \square 2.7$

$$\begin{array}{ccc} 3.5 & ? & 2.7 \\ 35 \text{ tenths} & > & 27 \text{ tenths} \\ 3.5 & > & 2.7 \end{array}$$

Both have 1 figure after the point already, so they are counting the same sized pieces.

Now they are both tenths: 35 against 27. 35 is more. So $3.5 > 2.7$.

Multiplying and Dividing by 10, 100 and 1000

Multiply and divide by 10, 100, 1000

1. $0.29 \div 10 = \underline{\hspace{2cm}}$

$$\begin{array}{ccc} 0.29 & \div & 10 \\ & & 0.029 \end{array}$$

10 is a single ten, so there is one move to make.

$\div 10$ — every digit is worth a tenth as much, so the point steps one place left: 0.029. The digits never changed — only where the point sits. $0.29 \div 10 = 0.029$.

2. $3.4 \div 1000 = \underline{\hspace{2cm}}$

$$\begin{array}{ccc} 3.4 & \div & 1000 \\ & & 0.34 \\ & & 0.034 \\ & & 0.0034 \end{array}$$

1000 is $10 \times 10 \times 10$, so there are 3 moves to make — one for each ten.

$\div 10$ — every digit is worth a tenth as much, so the point steps one place left: 0.34.

And $\div 10$ again — every digit is worth a tenth as much, so the point steps one place left: 0.034.

And $\div 10$ again — every digit is worth a tenth as much, so the point steps one place left: 0.0034. The digits never changed — only where the point sits. $3.4 \div 1000 = 0.0034$.

Solutions (3 of 12)

Adding and Subtracting Decimals

Add and subtract decimals

1.

$$\begin{array}{r}
 7 16 14 \\
 1\cancel{8}.\cancel{7}\cancel{4} \\
 15.87 \\
 \hline
 2.87
 \end{array}$$

$18.74 - 15.87$. Line the POINTS up under each other — not the right-hand ends. Right-aligning is what turns $12.5 + 3.75$ into a tidy-looking wrong answer.

4 is too small to take 7 from, so a ten comes across from the left: this column now holds 14. $14 - 7 = 7$.

7 is too small to take 8 from, so a ten comes across from the left: this column now holds 16. $16 - 8 = 8$.

This column gave a ten to the right, so it is now 7, not 8. $7 - 5 = 2$.

1 take away 1 leaves nothing — and a nothing at the front is not written, so the answer starts one place along.

The point in the answer comes straight down from the ones above it — it was never moved, only lined up. $18.74 - 15.87 = 2.87$.

2.

$$\begin{array}{r}
 3.24 \\
 6.02 \\
 \hline
 9.26
 \end{array}$$

$3.24 + 6.02$. Line the POINTS up under each other — not the right-hand ends. Right-aligning is what turns $12.5 + 3.75$ into a tidy-looking wrong answer.

4 plus 2 makes 6. Write 6.

2 plus 0 makes 2. Write 2.

3 plus 6 makes 9. Write 9.

The point in the answer comes straight down from the ones above it — it was never moved, only lined up. $3.24 + 6.02 = 9.26$.

Solutions (4 of 12)

Multiplying Decimals

Multiply and divide decimals

1. $8.9 \times 3 = \underline{\hspace{2cm}}$

$$\begin{array}{r} 8.9 \times 3 \\ 89 \times 3 = 267 \\ 8.9 \rightarrow 1 \text{ figure} \\ 3 \rightarrow 0 \text{ figures} \\ 267 \quad 1 \text{ from the right} \\ 8.9 \times 3 = 26.7 \end{array}$$

Do NOT line the points up — that is for adding. For a multiply, take the points off and do it as whole numbers first.

$89 \times 3 = 267$. Ordinary times-tables, nothing decimal about it.

Now count the figures after the points in the QUESTION: 1 figure in 8.9 and 0 figures in 3 — 1 altogether.

So the answer gets 1 too. Count 1 in from the right of 267 and put the point there: 26.7.

2. $1.91 \times 8.1 = \underline{\hspace{2cm}}$

$$\begin{array}{r} 1.91 \times 8.1 \\ 191 \times 81 = 15471 \\ 1.91 \rightarrow 2 \text{ figures} \\ 8.1 \rightarrow 1 \text{ figure} \\ 15471 \quad 3 \text{ from the right} \\ 1.91 \times 8.1 = 15.471 \end{array}$$

Do NOT line the points up — that is for adding. For a multiply, take the points off and do it as whole numbers first.

$191 \times 81 = 15471$. Ordinary times-tables, nothing decimal about it.

Now count the figures after the points in the QUESTION: 2 figures in 1.91 and 1 figure in 8.1 — 3 altogether.

So the answer gets 3 too. Count 3 in from the right of 15471 and put the point there: 15.471.

Multiplying Three Digits by Two

Multiply multi-digit numbers

1.

$$\begin{array}{r} 320 \\ \times 18 \\ \hline 2560 \\ 3200 \\ \hline 5760 \end{array}$$

320×18 , set out in columns. Split the 18 by place value and take one piece at a time.

The 8 is in the ones, so it is just 8: $320 \times 8 = 2560$.

The 1 is in the tens, so it is worth 10 — not 1. That is why this row is $320 \times 10 = 3200$, and why it ends in 0.

Now add the pieces: $2560 + 3200 = 5760$.

Solutions (5 of 12)

Multiplying Three Digits by Two (continued)

Multiply multi-digit numbers (continued)

2.

$$\begin{array}{r} 240 \\ \times 98 \\ \hline 1920 \\ 21600 \\ \hline 23520 \end{array}$$

240×98 , set out in columns. Split the 98 by place value and take one piece at a time.

The 8 is in the ones, so it is just 8: $240 \times 8 = 1920$.

The 9 is in the tens, so it is worth 90 — not 9. That is why this row is $240 \times 90 = 21600$, and why it ends in 0.

Now add the pieces: $1920 + 21600 = 23520$.

Long Division

Long division

1.

$$\begin{array}{r} 73 \\ 47 \overline{)3431} \\ \underline{329} \\ 141 \\ \underline{141} \\ 0 \end{array}$$

3431 shared into groups of 47. Long division starts at the LEFT — the other way round from adding.

Start at the left. How many 47s fit into 343? 7 of them — write the 7 on top. $7 \times 47 = 329$, and $343 - 329$ leaves 14. Bring down the 1, which makes 141.

How many 47s fit into 141? 3 — write it on top. $3 \times 47 = 141$, and $141 - 141$ leaves 0.

Nothing is left to bring down and nothing is left over. $3431 \div 47 = 73$.

2.

$$\begin{array}{r} 89 \\ 52 \overline{)4628} \\ \underline{416} \\ 468 \\ \underline{468} \\ 0 \end{array}$$

4628 shared into groups of 52. Long division starts at the LEFT — the other way round from adding.

Start at the left. How many 52s fit into 462? 8 of them — write the 8 on top. $8 \times 52 = 416$, and $462 - 416$ leaves 46. Bring down the 8, which makes 468.

How many 52s fit into 468? 9 — write it on top. $9 \times 52 = 468$, and $468 - 468$ leaves 0.

Nothing is left to bring down and nothing is left over. $4628 \div 52 = 89$.

Solutions (6 of 12)

Long Division with Remainders

Long division with remainders

1.

$$\begin{array}{r} 36 \\ 91 \overline{) 3319} \\ \underline{273} \\ 589 \\ \underline{546} \\ 43 \end{array}$$

3319 shared into groups of 91. Long division starts at the LEFT — the other way round from adding.

Start at the left. How many 91s fit into 331? 3 of them — write the 3 on top. $3 \times 91 = 273$, and $331 - 273$ leaves 58. Bring down the 9, which makes 589.

How many 91s fit into 589? 6 — write it on top. $6 \times 91 = 546$, and $589 - 546$ leaves 43.

Nothing is left to bring down, and 43 is too small to divide again — so that is the remainder. $3319 \div 91 = 36$ remainder 43.

2.

$$\begin{array}{r} 86 \\ 65 \overline{) 5639} \\ \underline{520} \\ 439 \\ \underline{390} \\ 49 \end{array}$$

5639 shared into groups of 65. Long division starts at the LEFT — the other way round from adding.

Start at the left. How many 65s fit into 563? 8 of them — write the 8 on top. $8 \times 65 = 520$, and $563 - 520$ leaves 43. Bring down the 9, which makes 439.

How many 65s fit into 439? 6 — write it on top. $6 \times 65 = 390$, and $439 - 390$ leaves 49.

Nothing is left to bring down, and 49 is too small to divide again — so that is the remainder. $5639 \div 65 = 86$ remainder 49.

Equivalent Fractions

Equivalent fractions

1. $\frac{1}{2} = \frac{\quad}{4}$

$$\begin{array}{rclcl} \frac{1}{2} & = & \frac{?}{4} \\ 2 \times 2 & = & 4 \\ 1 \times 2 & = & 2 \\ \frac{1}{2} & = & \frac{2}{4} \end{array}$$

$1/2$ and the answer have to be the SAME amount — so nothing may be added to either half of it. The one move that leaves a fraction's value alone is cutting every piece into the same number of smaller pieces.

Halves into quarters: $4 \div 2 = 2$, so each piece is being cut into 2. There are 2 times as many pieces, and each is 2 times smaller.

The top is a COUNT of those pieces, so it is cut the same way: $1 \times 2 = 2$. $1/2 = 2/4$ — the same amount of cake, cut differently.

Solutions (7 of 12)

Equivalent Fractions (continued)

Equivalent fractions (continued)

2. $\frac{1}{2} = \frac{\quad}{8}$

$$\begin{array}{rclcl} \frac{1}{2} & = & \frac{?}{8} \\ 2 \times 4 & = & 8 \\ 1 \times 4 & = & 4 \\ \frac{1}{2} & = & \frac{4}{8} \end{array}$$

$1/2$ and the answer have to be the SAME amount — so nothing may be added to either half of it. The one move that leaves a fraction's value alone is cutting every piece into the same number of smaller pieces.

Halves into eighths: $8 \div 2 = 4$, so each piece is being cut into 4. There are 4 times as many pieces, and each is 4 times smaller.

The top is a COUNT of those pieces, so it is cut the same way: $1 \times 4 = 4$. $1/2 = 4/8$ — the same amount of cake, cut differently.

Multiplying Fractions

Multiplying fractions

1. $\frac{4}{6} \times \frac{2}{4} = \text{—}$

$$\begin{array}{l} \frac{4}{6} \times \frac{2}{4} \\ \text{top: } 4 \times 2 = 8 \\ \frac{4}{6} \times \frac{2}{4} = \frac{8}{24} \\ \frac{8}{24} = \frac{1}{3} \end{array}$$

Multiplying, not adding — so no common denominator, and nothing has to be cut into matching pieces first. Tops with tops, bottoms with bottoms.

Multiply the two top numbers: $4 \times 2 = 8$.

Multiply the two bottom numbers: $6 \times 4 = 24$.

$8/24$ simplifies to $1/3$.

2. $\frac{4}{6} \times \frac{2}{7} = \text{—}$

$$\begin{array}{l} \frac{4}{6} \times \frac{2}{7} \\ \text{top: } 4 \times 2 = 8 \\ \frac{4}{6} \times \frac{2}{7} = \frac{8}{42} \\ \frac{8}{42} = \frac{4}{21} \end{array}$$

Multiplying, not adding — so no common denominator, and nothing has to be cut into matching pieces first. Tops with tops, bottoms with bottoms.

Multiply the two top numbers: $4 \times 2 = 8$.

Multiply the two bottom numbers: $6 \times 7 = 42$.

$8/42$ simplifies to $4/21$.

Solutions (8 of 12)

Mixed Numbers

Adding mixed numbers

1. $2\frac{3}{8} + 3\frac{1}{8} = \underline{\quad} \underline{\quad}$

$$\begin{array}{rclcl} \frac{3}{8} & + & \frac{1}{8} & = & \frac{4}{8} \\ 2 & + & 3 & = & 5 \\ & & & = & 5\frac{1}{2} \end{array}$$

A mixed number is a whole and a fraction stuck together. Deal with them separately — wholes with wholes, eighths with eighths.

The fractions go together first: $\frac{3}{8} + \frac{1}{8} = \frac{4}{8}$.

Then the wholes: $2 + 3 = 5$.

$\frac{4}{8}$ is the same amount as $\frac{1}{2}$ written in bigger pieces.

So the answer is $5\frac{1}{2}$.

2. $2\frac{3}{7} + 4\frac{4}{7} = \underline{\quad} \underline{\quad}$

$$\begin{array}{rclcl} \frac{3}{7} & + & \frac{4}{7} & = & \frac{7}{7} \\ 2 & + & 4 & = & 6 \\ & & & = & 7 \end{array}$$

A mixed number is a whole and a fraction stuck together. Deal with them separately — wholes with wholes, sevenths with sevenths.

The fractions go together first: $\frac{3}{7} + \frac{4}{7} = \frac{7}{7}$.

Then the wholes: $2 + 4 = 6$.

But $\frac{7}{7}$ is exactly one whole — $\frac{7}{7}$ is 1 — so nothing is left over as a fraction: $6 + 1 = 7$.

So the answer is 7.

Decimals as Fractions

Decimals as fractions

1. $0.75 \rightarrow \underline{\quad}$

$$\begin{array}{rclcl} 0.75 & = & \frac{75}{100} \\ 75 & \div & 25 & = & 3 \\ 100 & \div & 25 & = & 4 \\ \frac{75}{100} & = & \frac{3}{4} \end{array}$$

A decimal already IS a fraction — 0.75 is 75 hundredths. That is what the places after the point mean.

25 goes into both 75 and 100, so take it off both: $75 \div 25 = 3$ and $100 \div 25 = 4$. $\frac{75}{100}$ and $\frac{3}{4}$ are the same amount, and 4 is as far down as it goes.

Solutions (9 of 12)

Decimals as Fractions (continued)

Decimals as fractions (continued)

2. $0.375 \rightarrow \text{—}$

$$0.375 = \frac{375}{1000}$$

$$375 \div 125 = 3$$

$$1000 \div 125 = 8$$

$$\frac{375}{1000} = \frac{3}{8}$$

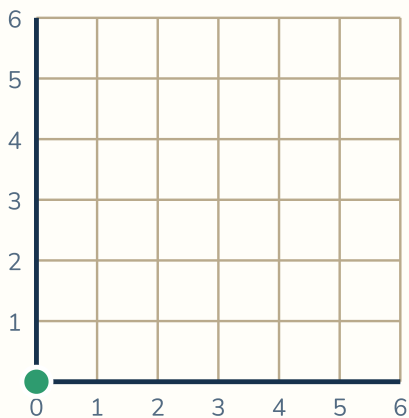
A decimal already IS a fraction — 0.375 is 375 thousandths. That is what the places after the point mean.

125 goes into both 375 and 1000, so take it off both: $375 \div 125 = 3$ and $1000 \div 125 = 8$. $375/1000$ and $3/8$ are the same amount, and 8 is as far down as it goes.

The Coordinate Plane

Points on a coordinate grid

1. $B = \text{—}$



Start at the corner where the two lines meet — that is (0, 0), and every reading begins there.

Along the bottom FIRST: count 5 across. Always this one before the other, because until you have gone along you do not know which line to go up.

Then up: count 1. Now the two numbers have been used in the order they are written.

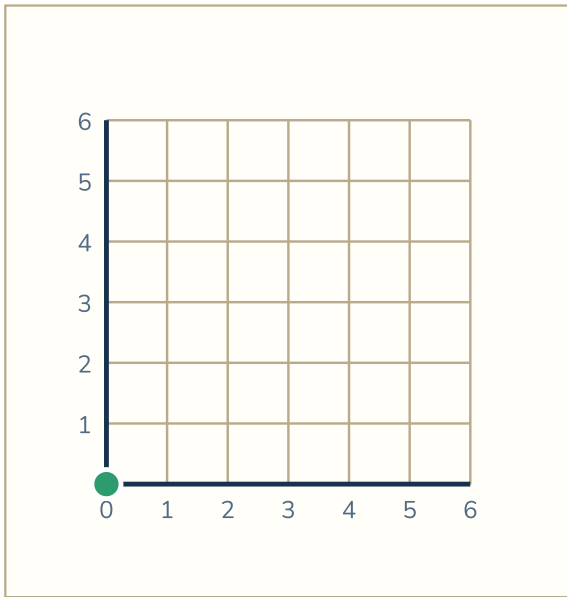
So point B is (5, 1) — 5 across, then 1 up. (1, 5) would be a different point altogether.

Solutions (10 of 12)

The Coordinate Plane (continued)

Points on a coordinate grid (continued)

2. A = _____



Start at the corner where the two lines meet — that is (0, 0), and every reading begins there.

Along the bottom FIRST: count 0 across. Always this one before the other, because until you have gone along you do not know which line to go up.

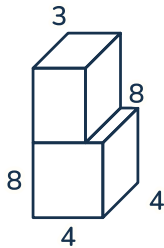
Then up: count 5. Now the two numbers have been used in the order they are written.

So point A is (0, 5). Swap the two round and you would be at (5, 0) — somewhere else entirely, which is why the order is the whole of this.

Volume of Prisms

Volume of a rectangular prism

1.



_____ cm³

filled box: 256

notch: 32

$$256 - 32 = 224 \text{ cubic cm}$$

A block standing on a slab. There is no formula for this shape — the job is to turn it into boxes, which do have one, and there is more than one way.

First way: cut it into the two boxes it already is. The slab underneath is $4 \times 4 \times 8 = 128$, and the block standing on it is $3 \times 4 \times 8 = 96$.

$$128 + 96 = 224 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $4 \times 4 \times 16 = 256$, and the notch taken back off is $1 \times 4 \times 8 = 32$.

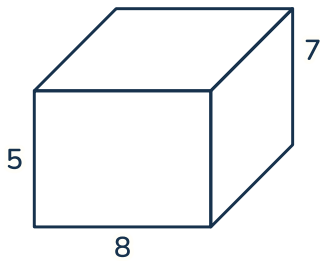
$256 - 32 = 224$ cubic cm. Two methods agreeing is how you know.

Solutions (11 of 12)

Volume of Prisms (continued)

Volume of a rectangular prism (continued)

2.



_____ cm³

$$\text{base: } 8 \times 7 = 56$$

$$56 \times 5 = \mathbf{280 \text{ cubic cm}}$$

Volume is always the same idea: work out the area of the BASE, then see how many of those stack up to the top. Three numbers multiplied is what that comes to, not a rule of its own.

The base is a 8 by 7 rectangle, so its area is 56 square cm — that is one layer.

Stack 5 of those layers: $56 \times 5 = 280$ cubic cm. Cubic, not square — a volume is three lengths multiplied, so the unit is cubed.

Order of Operations

Order of operations

1. $(74 + 94) \times 3 = \underline{\hspace{2cm}}$

$$\begin{array}{ccccccc} (& 74 & + & 94 &) & \times & 3 \\ & 168 & & \times & 3 & & \\ & & & 504 & & & \end{array}$$

Work inside the brackets first. $74 + 94 = 168$.

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $168 \times 3 = 504$.

Nothing is left to work out, so the answer is 504.

2. $(79 - 78) \times 8 = \underline{\hspace{2cm}}$

$$\begin{array}{ccccccc} (& 79 & - & 78 &) & \times & 8 \\ & 1 & & \times & 8 & & \\ & & & 8 & & & \end{array}$$

Work inside the brackets first. $79 - 78 = 1$.

$\times$ and $\div$ come before $+$ and $-$, so this goes first. $1 \times 8 = 8$.

Nothing is left to work out, so the answer is 8.

Solutions (12 of 12)

Two Patterns Together

Two rules, two patterns

1. **ADD 4**

ADD 16

4		12	16
16	32	48	64

row 1: 4 → 16
row 2: 8 → 32
row 3: 12 → 48
row 4: 16 → 64

Two patterns, and each column counts in its own step — so a gap CAN be filled by counting down its own column. But that is not what a table of pairs is for: the two sides are locked to each other, and the same link works on every row.

Read the link off a row with nothing missing. Row 1: 4 on the left, 16 on the right — that is $\times 4$.

The same link holds all the way down, so use it on the gap: $32 \div 4 = 8$.

Counting down the column gets there too — this is not a trick — but the link is what the two patterns were put next to each other to show.

2. **ADD 4**

ADD 8

4		12	16
8	16	24	32

row 1: 4 → 8
row 2: 8 → 16
row 3: 12 → 24
row 4: 16 → 32

Two patterns, and each column counts in its own step — so a gap CAN be filled by counting down its own column. But that is not what a table of pairs is for: the two sides are locked to each other, and the same link works on every row.

Read the link off a row with nothing missing. Row 1: 4 on the left, 8 on the right — that is $\times 2$.

The same link holds all the way down, so use it on the gap: $16 \div 2 = 8$.

Counting down the column gets there too — this is not a trick — but the link is what the two patterns were put next to each other to show.