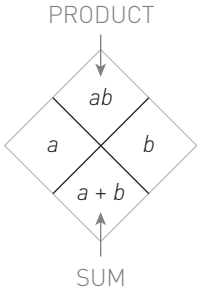
Diamond Problems

GUIDED SKILL SUPPORT

Overview

In every Diamond Problem, the product of the two side numbers (left and right) is the number on top, and their sum is the number on the bottom.



Diamond Problems are an excellent way to practice addition, subtraction, multiplication, and division of positive and negative integers, decimals, and fractions. They also prepare students for factoring binomials in algebra.

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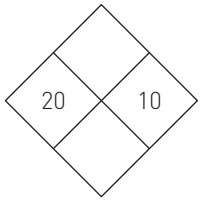
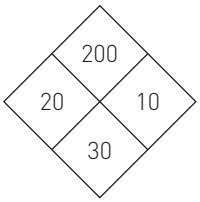
Examples

1.



The top number is the product of 20 and 10, so 20 · 10 = 200. The bottom number is the sum of 20 and 10, so, 20 + 10 = 30.



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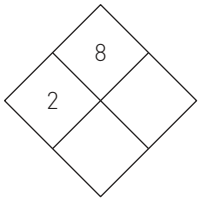
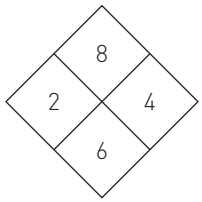


The product of the right-hand number and 2 is 8. 8 ÷ 2 = 4, so 4 is the right-hand number. The sum of 2 and 4 is 6, which is the bottom number.



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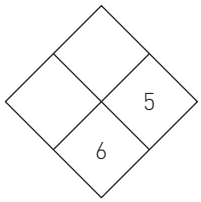
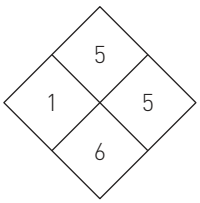


To get the left-hand number, subtract 5 from 6: 6 – 5 = 1. The product of 1 and 5 is 5, the top number.



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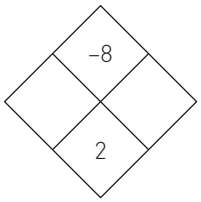
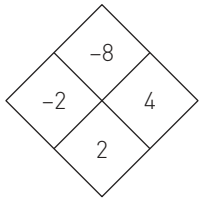


One way to figure out the side numbers in a situation like this one is to look at all the pairs of factors of –8. They are –1 and 8, –2 and 4, –4 and 2, and –8 and 1.

Only one of these pairs has a sum of 2: –2 and 4. Thus, the side numbers are –2 and 4. Each of these can be on either side.



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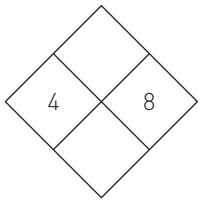
Practice

Complete each of the following Diamond Problems.

1.



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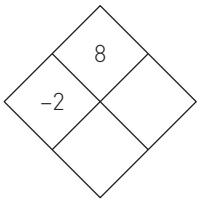

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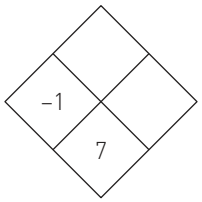

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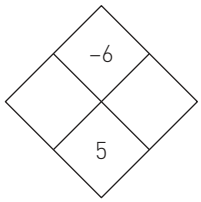

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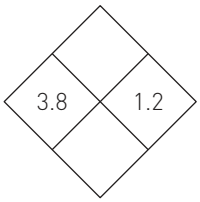

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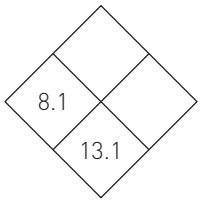

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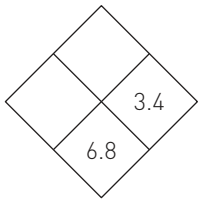

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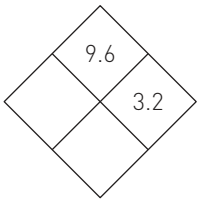

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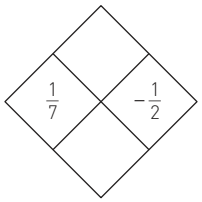

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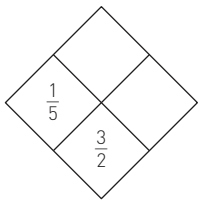

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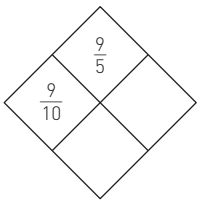

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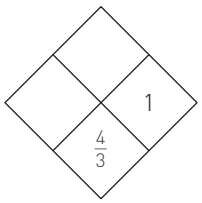

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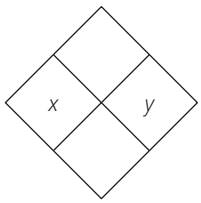

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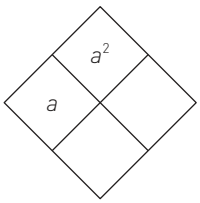

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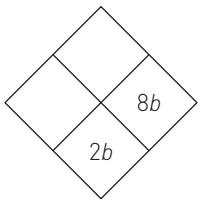

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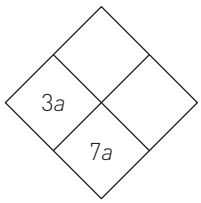

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Answers

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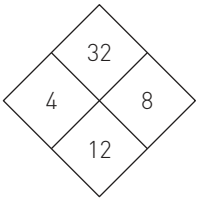

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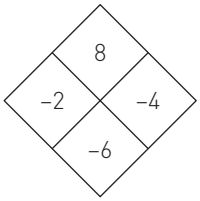

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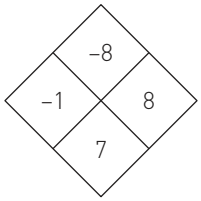

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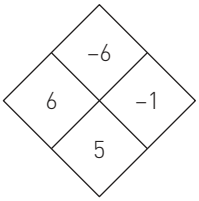

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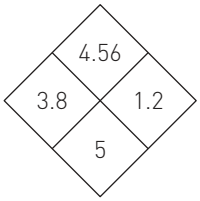

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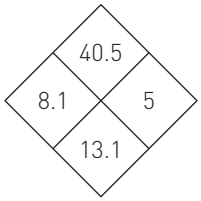

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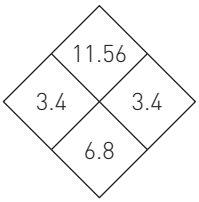

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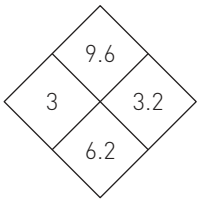

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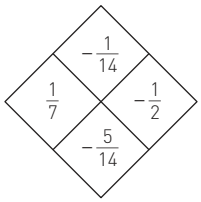

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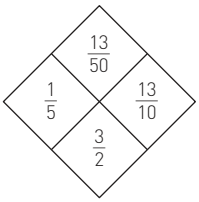

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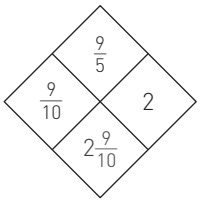

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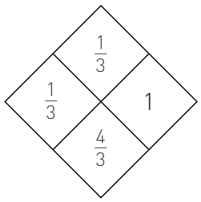

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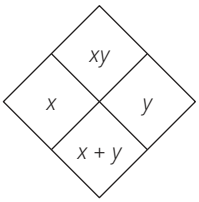

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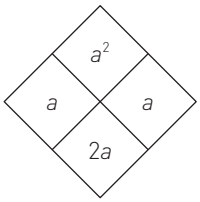

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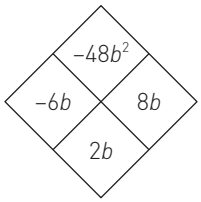

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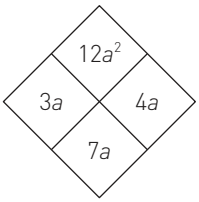

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Arithmetic Operations With Decimals

GUIDED SKILL SUPPORT

Overview

Computations involving operations with decimals are in this course to address grade-level concepts. A review of the standard algorithms is provided, along with examples and practice problems.

ADDING AND SUBTRACTING DECIMALS

Write the problem, with the decimal points aligned, in a vertical column. Write in zeros if necessary so that all of the numbers have the same number of digits after the decimal point. Add or subtract as with whole numbers. Place the decimal point in the answer in alignment with the rest of the column.

MULTIPLYING DECIMALS

Multiply as with whole numbers. In the product, the number of decimal places equals the total number of decimal places in the factors (the numbers you multiplied). Sometimes, zeros need to be added to place the decimal point.

DIVIDING DECIMALS

When dividing a decimal by a whole number, place the decimal point in the answer space directly above the decimal point in the number being divided. Divide as with whole numbers. Sometimes it is necessary to add zeros to the right-hand side of the decimal of the number being divided to complete the division.

When dividing decimals or whole numbers by a decimal, multiply the divisor by a power of 10 to make it a whole number. Multiply the dividend by the same power of 10. Then divide, following the same rules as for division by a whole number.

For additional information, see the Methods & Meanings in Lessons 3.3.2 and 3.3.3 of the *Core Connections Course 2* text.

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Examples

1. Add 47.37, 28.9, 14.56, and 7.8.

$$\begin{array}{r} {\scriptstyle 1} \\ 47.37 \\ 28.90 \\ 14.56 \\ +\ 7.80 \\ \hline 3 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 2\ 1} \\ 47.37 \\ 28.90 \\ 14.56 \\ +\ 7.80 \\ \hline .63 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 2\ 2\ 1} \\ 47.37 \\ 28.90 \\ 14.56 \\ +\ 7.80 \\ \hline 8.63 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 2\ 2\ 1} \\ 47.37 \\ 28.90 \\ 14.56 \\ +\ 7.80 \\ \hline 98.63 \end{array}$$

2. Subtract 198.76 from 473.2.

$$\begin{array}{r} {\scriptstyle 1\ 10} \\ 473.2\cancel{0} \\ -\ 198.76 \\ \hline 4 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 11} \\ {\scriptstyle 2\ \cancel{1}\ 10} \\ 473.\cancel{2}0 \\ -\ 198.76 \\ \hline .44 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 12\ 11} \\ {\scriptstyle 6\ \cancel{2}\ \cancel{1}\ 10} \\ 47\cancel{3}.\cancel{2}0 \\ -\ 198.76 \\ \hline 4.44 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 16\ 12\ 11} \\ {\scriptstyle 3\ \cancel{6}\ \cancel{2}\ \cancel{1}\ 10} \\ \cancel{4}7\cancel{3}.\cancel{2}0 \\ -\ 198.76 \\ \hline 74.44 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 16\ 12\ 11} \\ {\scriptstyle 3\ \cancel{6}\ \cancel{2}\ \cancel{1}\ 10} \\ \cancel{4}7\cancel{3}.\cancel{2}0 \\ -\ 198.76 \\ \hline 274.44 \end{array}$$

3. Multiply 27.32 by 14.53.

$$\begin{array}{rl} 27.32 & \text{2 decimal places} \\ \times\ 14.53 & \text{2 decimal places} \\ \hline 0.8196 & \\ 13.6600 & \\ 109.2800 & \\ +\ 273.2000 & \\ \hline 396.9596 & \text{4 decimal places} \end{array}$$

4. Multiply 0.37 by 0.0004.

$$\begin{array}{rl} 0.37 & \text{2 decimal places} \\ \times\ 0.0004 & \text{4 decimal places} \\ \hline 0.000148 & \text{6 decimal places} \end{array}$$

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5. Divide 32.4 by 8.

$$\begin{array}{r} 4.05 \\ 8\overline{)32.40} \\ -\,32.00 \\ \hline 0.40 \\ -\,0.40 \\ \hline 0.00 \end{array}$$

6. Divide 27.42 by 1.2.

First, multiply each number by 10^1 or 10. Then divide, following the same rules as for division by a whole number. Add a zero in the hundredth place of the dividend to complete the division.

$$1.2\overline{)27.42} \rightarrow 12\overline{)274.2} \rightarrow \begin{array}{r} 22.85 \\ 12\overline{)274.20} \\ -\,240.00 \\ \hline 34.20 \\ -\,24.00 \\ \hline 10.20 \\ -\,9.60 \\ \hline 0.60 \\ -\,0.60 \\ \hline 0.00 \end{array}$$

Practice

1. Add:

a. 4.7 + 7.9

b. 3.93 + 2.82

c. 38.72 + 6.7

d. 4.73 + 692

e. 42.1083 + 14.73

f. 9.999 + 0.001

g. 0.0001 + 99.9999

h. 2.037 + 0.09387

i. 47.9 + 68.073

j. 476.384 + 27.847

k. 48.32 + 284.3 + 4.638

l. 278.63 + 47.0432 + 21.6

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2. Subtract:

a. 8.73 – 4.6 b. 9.38 – 7.5 c. 7.045 – 3.76

d. 6.304 – 3.68 e. 14 – 7.431 f. 23 – 15.37

g. 0.647 – 0.39 h. 1.34 – 0.0538 i. 2.07 – 0.523

j. 3.8 – 2.406 k. 47.13 – 42.703 l. 15.368 + 14.4 – 18.537

3. Multiply:

a. 7.34 · 6.4 b. 3.71 · 4.03 c. 0.04 · 3.75

d. 41.6 · 0.302 e. 9.4 · 0.0053 f. 0.004 · 0.005

g. 0.235 · 0.43 h. 4.32 · 0.0072 i. 0.0006 · 0.00013

j. 0.078 · 3.1 k. 421 · 0.00005 l. 8.38 · 0.0001

4. Divide (round answers to the nearest hundredth, if necessary):

a. 18.32 ÷ 5 b. 147.3 ÷ 6 c. 100.32 ÷ 24

d. 53.6 ÷ 0.004 e. 1.32 ÷ 0.032 f. 82.6 ÷ 0.04

g. 25.46 ÷ 5.05 h. 7.035 ÷ 0.005 i. 306.4 ÷ 3.2

j. 6.042 ÷ 0.006 k. 500 ÷ 0.004 l. 420 ÷ 0.05

Answers

1. a. 12.6 b. 6.75 c. 45.42 d. 696.73 e. 56.8383 f. 10.000

g. 100.0000 h. 2.13087 i. 115.973 j. 504.231 k. 337.258 l. 347.2732

2. a. 4.13 b. 1.88 c. 3.285 d. 2.624 e. 6.569 f. 7.63

g. 0.257 h. 1.2862 i. 1.547 j. 1.394 k. 4.427 l. 11.2304

3. a. 46.976 b. 14.9513 c. 0.15 d. 12.5632 e. 0.04982 f. 0.00002

g. 0.10105 h. 0.031104 i. 0.000000078 j. 0.2418 k. 0.02105 l. 0.000838

4. a. 3.664 b. 24.55 c. 4.18 d. 13,400 e. 41.25 f. 2,065

g. ≈ 5.04 h. 1,407 i. 95.75 j. 1,007 k. 125,000 l. 8,400

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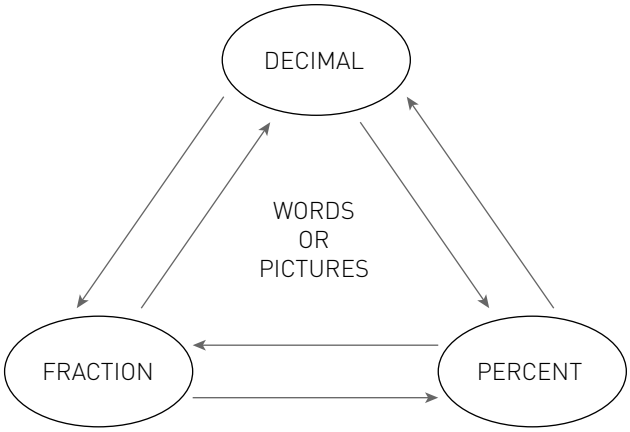
Fraction–Decimal–Percent Equivalents

GUIDED SKILL SUPPORT

Overview

Fractions, decimals, and percents can all be used to represent the same portion or number.



For additional examples and practice, see the *Core Connections Course 2* Checkpoint 2 materials and problem 2-16.

Examples

1. Decimal to percent: 0.81

Multiply the decimal by 100.

$(0.81)(100) = 81\%$

2. Percent to decimal: 43%

Divide the percent by 100.

$43\% \div 100 = 0.43$

3. Fraction to percent: $\frac{4}{5}$

Set up an equivalent fraction using 100 as the denominator. The numerator is the percent.

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

4. Percent to fraction: 56%

Use 100 as the denominator. Use the digits in the percent as the numerator. Reduce if possible.

$$56\% = \frac{56}{100} \cdot \boxed{\frac{\frac{1}{4}}{\frac{1}{4}}} = \frac{14}{25}$$

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5. Terminating decimal to fraction:

a. 0.2

Use the digits in the decimal as the numerator. Use the decimal place value name as the denominator.

$$0.2 = \frac{2}{10} = \frac{1}{5}$$

b. 0.17

Use the digits in the decimal as the numerator. Use the decimal place value name as the denominator.

$$0.17 = \frac{17}{100}$$

6. Fraction to decimal:

a. $\frac{3}{8}$

Divide the numerator by the denominator.

$$\frac{3}{8} = 3 \div 8 = 0.375$$

b. $\frac{5}{8}$

Divide the numerator by the denominator.

$$\frac{5}{8} = 5 \div 8 = 0.625$$

c. $\frac{3}{11}$

Divide the numerator by the denominator.

$$\frac{3}{11} = 3 \div 1 = 0.2727\ldots = 0.\overline{27}$$

7. Repeating decimal to fraction: $0.\overline{524}$

When the repeating block begins in the tenth place, count the number of decimal places in the repeating block. Write the repeating block as the numerator. Then, write the power of 10 for the number of places in the block, minus 1, as the denominator. In this case, the repeating block, 524, has three decimal places, so 524 is the numerator, and 1,000 – 1, or 999, is the denominator.

$$0.524 = \frac{524}{1{,}000 - 1} = \frac{524}{999}$$

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Practice

Convert the fraction, decimal, or percent as indicated.

1. $\frac{1}{4}$ to a decimal.

2. 50% into a fraction in lowest terms.

3. 0.75 to a fraction in lowest terms.

4. 75% to a decimal.

5. 0.38 to a percent.

6. $\frac{1}{5}$ to a percent.

7. 0.3 to a fraction.

8. $\frac{1}{8}$ to a decimal.

9. $\frac{1}{3}$ to a decimal.

10. 0.08 to a percent.

11. 87% to a decimal.

12. $\frac{3}{5}$ to a percent.

13. 0.4 to a fraction in lowest terms.

14. 65% to a fraction in lowest terms.

15. $\frac{1}{9}$ to a decimal.

16. 125% to a fraction in lowest terms.

17. $\frac{8}{5}$ to a decimal.

18. 3.25 to a percent.

19. $\frac{1}{16}$ to a decimal. Then convert the decimal to a percent.

20. $\frac{1}{7}$ to a decimal.

21. 43% to a fraction. Then convert the fraction to a decimal.

22. 0.375 to a percent. Then convert the percent to a fraction.

23. $\frac{7}{8}$ to a decimal. Then convert the decimal to a percent.

24. $0.\overline{12}$ to a fraction.

25. $0.\overline{175}$ to a fraction.

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Answers

1. 0.25 **2.** $\frac{1}{2}$ **3.** $\frac{3}{4}$ **4.** 0.75

5. 38% **6.** 20% **7.** $\frac{3}{10}$ **8.** 0.125

9. $0.\overline{3}$ **10.** 8% **11.** 0.87 **12.** 60%

13. $\frac{2}{5}$ **14.** $\frac{13}{20}$ **15.** $0.\overline{1}$ **16.** $\frac{5}{4}$ or $1\frac{1}{4}$

17. 1.6 **18.** 325% **19.** 0.0625; 6.25% **20.** $0.\overline{142857}$

21. $\frac{43}{100}$; 0.43 **22.** $37\frac{1}{2}\%$; $\frac{3}{8}$ **23.** 0.875; 87.5% **24.** $\frac{12}{99} = \frac{4}{33}$

25. $\frac{175}{999}$

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Adding Integers

GUIDED SKILL SUPPORT

Overview

Integers are positive and negative whole numbers. Integer addition is introduced using two concrete models: movement along a **number line** and positive and negative **integer tiles**.

To add two integers using a **number line**, start at the first number on the number line and then move the appropriate number of spaces to the right or left depending on whether the second number is positive or negative. The final location is the sum of the two integers.

When using **integer tiles**, a positive number is represented by the appropriate number of "+" tiles, and a negative number is represented by the appropriate number of "–" tiles. To add two integers, start with a tile representation of the first integer in a diagram and then place into the diagram a tile representation of the second integer. Any equal number of "+" tiles and "–" tiles makes "zero" and can be removed from the diagram. The tiles that remain represent the sum.

For additional information, see the Methods & Meanings box in Lesson 2.2.4 of the *Core Connections Course 2* text.

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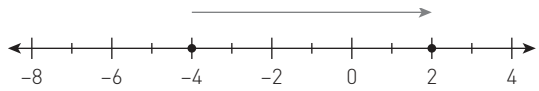
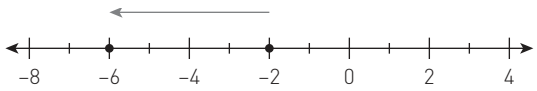
Examples

1. $-4 + 6$



$-4 + 6 = 2$

2. $-2 + (-4)$



$-2 + (-4) = -6$

3. $5 + (-6)$

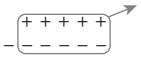
Start with tiles representing the first number.

+ + + + +

Add tiles representing the second number.

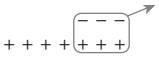
+ + + + +
− − − − −

Circle the zero pairs and consider what remains. −1 is the answer.



$5 + (-6) = -1$

4. $-3 + 7$



$-3 + 7 = 4$

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Practice

Use either the number line model or integer tiles to calculate each sum.

1. 4 + (–2)

2. 6 + (–1)

3. 7 + (–7)

4. –10 + 6

5. –8 + 2

6. –12 + 7

7. –5 + (–8)

8. –10 + (–2)

9. –11 + (–16)

10. –8 + 10

11. –7 + 15

12. –26 + 12

13. –3 + 4 + 6

14. 56 + 17

15. 7 + (–10) + (–3)

16. –95 + 26

17. 35 + (–6) + 8

18. –113 + 274

19. 105 + (–65) + 20

20. –6 + 2 + (–4) + 3 + 5

21. 5 + (–3) + (–2) + (–8)

22. –6 + (–3) + (–2) + 9

23. –6 + (–3) + 9

24. 20 + (–70)

25. 12 + (–7) + (–8) + 4 + (–3)

26. –26 + (–13)

27. –16 + (–8) + 9

28. 12 + (–13) + 18 + (–16)

29. 50 + (–70) + 30

30. 19 + (–13) + (–5) + 20

Answers

1. 2 **2.** 5 **3.** 0 **4.** –4 **5.** –6 **6.** –5

7. –13 **8.** –12 **9.** –27 **10.** 2 **11.** 8 **12.** –14

13. 7 **14.** 73 **15.** –6 **16.** –69 **17.** 37 **18.** 161

19. 60 **20.** 0 **21.** –8 **22.** –2 **23.** 0 **24.** –50

25. –2 **26.** –39 **27.** –15 **28.** 1 **29.** 10 **30.** 21

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Multiplying Integers

GUIDED SKILL SUPPORT

Overview

Multiplication by a positive integer can be represented by repeated addition of groups of the same number.

$$(4)(2) = 2 + 2 + 2 + 2 = 8 \text{ and } (4)(-2) = (-2) + (-2) + (-2) + (-2) = -8$$

In both examples, the 4 indicates the number of groups. In the first example, those are groups of 2, while in the second, they are groups of –2.

Multiplication by a negative integer can be represented by removing or subtracting groups of the same number.

(–4)(2) means "remove four groups of 2." $(-4)(2) = -(2) - (2) - (2) - (2) = -8$

(–4)(–2) means "remove four groups of –2." $(-4)(-2) = -(-2) - (-2) - (-2) - (-2) = 8$

Integer multiplication can also be modeled using a number line or an integer tile diagram. If there is an *even* number of negative factors to be multiplied (and none of the factors are equal to zero), the product is *positive*; if there is an *odd* number of negative factors to be multiplied (and none of the factors are equal to zero), the product is *negative*.

This rule also applies when there are more than two factors. Multiply the first pair of factors, then multiply that result by the next factor, and so on, until all factors have been multiplied.

$$(-2)(3)(-3)(-5) = -90 \text{ and } (-1)(-1)(-2)(-6) = 12$$

Remember to apply the correct order of operations when you are working with more than one operation. For additional information, see the Methods & Meanings box in Lesson 3.2.5 of the *Core Connections Course 2* text.

Examples

1. $2 \cdot 3$

2 groups of 3.

+ + + + + +

(2)(3) = 3 + 3 = 6

2. $2 \cdot (-3)$

2 groups of (–3).

– – – – – –

(2)(–3) = (–3) + (–3) = –6

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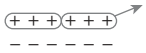
3. $(-2) \cdot 3$

Start with a neutral field.

Remove 2 groups of 3



$(-2)(3) = -(3) - (3) = -6$

4. $(-2) \cdot (-3)$

Start with a neutral field.

Remove 2 groups of (–3).

$(-2)(-3) = -(-3) - (-3) = 6$

Practice

Multiply:

1. $(-4)(2)$ **2.** $(-3)(4)$ **3.** $(-12)(5)$ **4.** $(-2)(8)$

5. $(4)(-9)$ **6.** $(13)(-8)$ **7.** $(5)(-3)$ **8.** $(10)(-7)$

9. $(-7)(-6)$ **10.** $(-7)(-9)$ **11.** $(-2)(-8)$ **12.** $(-12)(-4)$

13. $(-8)(-4)(2)$ **14.** $(-3)(-3)(-3)$ **15.** $(-5)(-2)(8)(4)$ **16.** $(-5)(-4)(-6)(-3)$

17. $(-2)(-5)(4)(8)$ **18.** $(-2)(-5)(-4)(-8)$ **19.** $(-2)(-5)(4)(-8)$ **20.** $(2)(-5)(4)(-8)$

Answers

1. –8 **2.** –12 **3.** –60 **4.** –16

5. –36 **6.** –104 **7.** –15 **8.** –70

9. 42 **10.** 63 **11.** 16 **12.** 48

13. 64 **14.** –27 **15.** 320 **16.** 360

17. 320 **18.** 320 **19.** –320 **20.** 320

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Multiplying Fractions

GUIDED SKILL SUPPORT

Overview

Multiplication of fractions is reviewed using a rectangular area model. Divide a unit rectangle into vertical sections to represent the denominator of the second fraction. Then shade the number of vertical sections represented by the numerator. Next, divide the rectangle horizontally using the denominator of the first fraction. The numerator again indicates the number of parts to shade. Darken the overlap of the two fractions to represent the product.

The rule for multiplying fractions derived from the area models is to multiply the numerators, then multiply the denominators, as shown.

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$$

For additional information, see the Methods & Meanings box in Lesson 2.2.5 of the *Core Connections Course 2* text.

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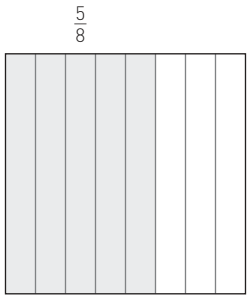
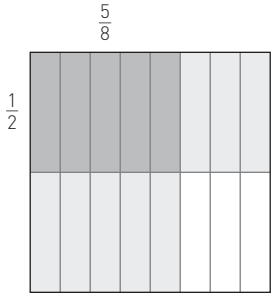
Examples

1. $\frac{1}{2} \cdot \frac{5}{8}$ (that is, $\frac{1}{2}$ of $\frac{5}{8}$)

Draw a unit rectangle and divide it into 8 pieces vertically to represent the denominator of $\frac{5}{8}$. Lightly shade 5 of those pieces to represent the numerator. Label it $\frac{5}{8}$.



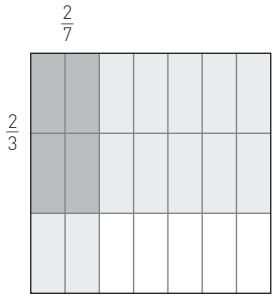
Divide the rectangle in half horizontally. Shade one half, labeling it $\frac{1}{2}$.



The double-shaded region represents $\frac{1}{2}$ of $\frac{5}{8}$. Write an equation to represent this.

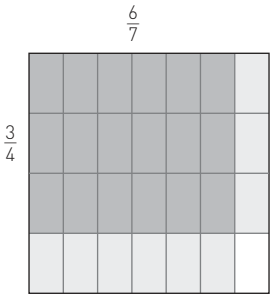
$$\frac{1}{2} \cdot \frac{5}{8} = \frac{5}{16}$$

2. $\frac{2}{3} \cdot \frac{2}{7}$



$$\frac{2}{3} \cdot \frac{2}{7} = \frac{2 \cdot 2}{3 \cdot 7} = \frac{4}{21}$$

3. $\frac{3}{4} \cdot \frac{6}{7}$



$$\frac{3}{4} \cdot \frac{6}{7} = \frac{3 \cdot 6}{4 \cdot 7} = \frac{18}{28} = \frac{9}{14}$$

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Practice

Draw an area model for each of the following multiplication problems and write the answer.

1. $\frac{1}{3} \cdot \frac{1}{6}$ **2.** $\frac{1}{4} \cdot \frac{3}{5}$ **3.** $\frac{2}{3} \cdot \frac{5}{9}$

Determine the following products using any method. Write your answer in the lowest terms.

4. $\frac{1}{3} \cdot \frac{2}{5}$ **5.** $\frac{2}{3} \cdot \frac{2}{7}$ **6.** $\frac{3}{4} \cdot \frac{1}{5}$

7. $\frac{2}{5} \cdot \frac{2}{3}$ **8.** $\frac{2}{3} \cdot \frac{1}{4}$ **9.** $\frac{5}{6} \cdot \frac{2}{3}$

10. $\frac{4}{5} \cdot \frac{3}{4}$ **11.** $\frac{2}{15} \cdot \frac{1}{2}$ **12.** $\frac{3}{7} \cdot \frac{1}{2}$

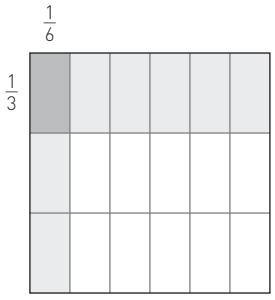
13. $\frac{3}{8} \cdot \frac{4}{5}$ **14.** $\frac{2}{9} \cdot \frac{3}{5}$ **15.** $\frac{3}{10} \cdot \frac{5}{7}$

16. $\frac{5}{11} \cdot \frac{6}{7}$ **17.** $\frac{5}{6} \cdot \frac{3}{10}$ **18.** $\frac{10}{11} \cdot \frac{3}{5}$

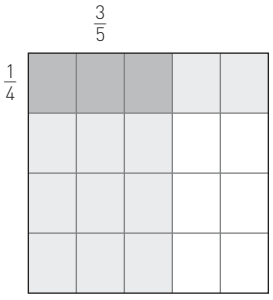
19. $\frac{5}{12} \cdot \frac{3}{5}$ **20.** $\frac{7}{9} \cdot \frac{5}{14}$

Answers

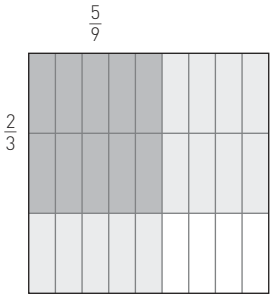
1. $\frac{1}{18}$



2. $\frac{3}{20}$



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



4. $\frac{2}{5}$ **5.** $\frac{4}{21}$ **6.** $\frac{3}{20}$

7. $\frac{4}{15}$ **8.** $\frac{2}{12} = \frac{1}{6}$ **9.** $\frac{10}{18} = \frac{5}{9}$

10. $\frac{12}{20} = \frac{3}{5}$ **11.** $\frac{2}{30} = \frac{1}{15}$ **12.** $\frac{3}{14}$

13. $\frac{12}{40} = \frac{3}{10}$ **14.** $\frac{6}{45} = \frac{2}{15}$ **15.** $\frac{15}{70} = \frac{3}{14}$

16. $\frac{30}{77}$ **17.** $\frac{15}{60} = \frac{1}{4}$ **18.** $\frac{30}{55} = \frac{6}{11}$

19. $\frac{15}{60} = \frac{1}{4}$ **20.** $\frac{35}{126} = \frac{5}{18}$

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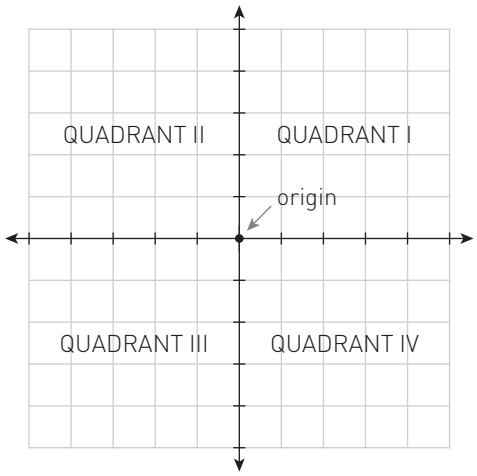
Graphing in Four Quadrants

GUIDED SKILL SUPPORT

Overview

The coordinate plane is made of two axes: a horizontal axis called the *x*-axis and a vertical axis called the *y*-axis. The axes intersect at the point (0, 0), called the origin. The axes divide the plane into four quadrants, labeled I, II, III, and IV.



Points on a coordinate graph are identified by two numbers in an ordered pair written as (*x*, *y*). The first number is the *x*-coordinate of the point and the second number is the *y*-coordinate. Taken together, the two coordinates name exactly one point on the graph. The examples show how to place a point on an *xy*-coordinate graph.

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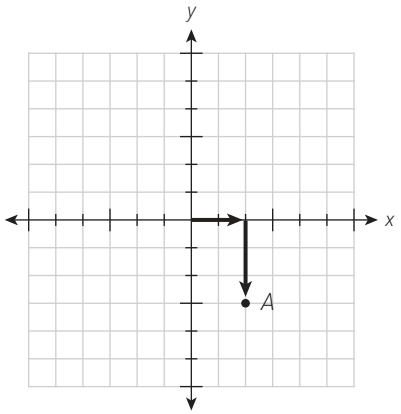
Examples

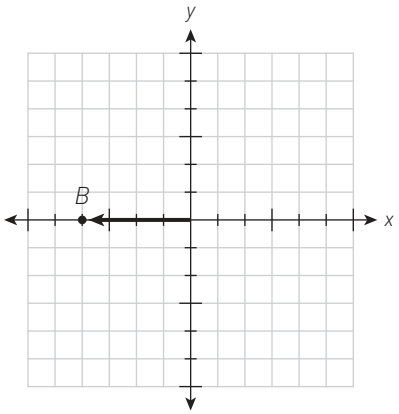
1. Graph point A at (2, –3).

Go right 2 units from the origin (0, 0), then go down 3 units. Mark and label the point.



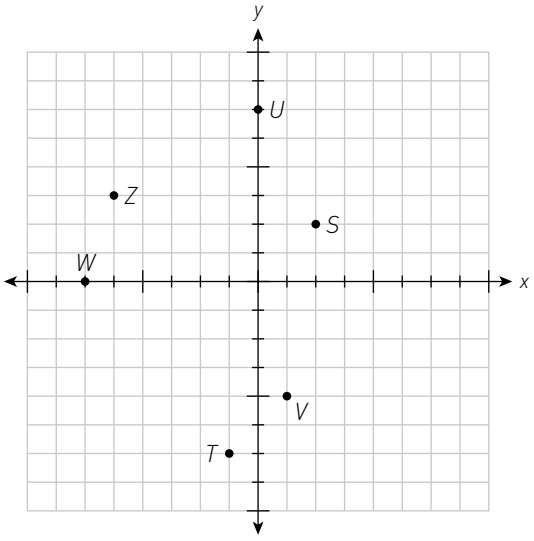
2. Graph point B at (–4, 0).

Go to the left from the origin 4 units, but do not go up or down. Mark and label the point.



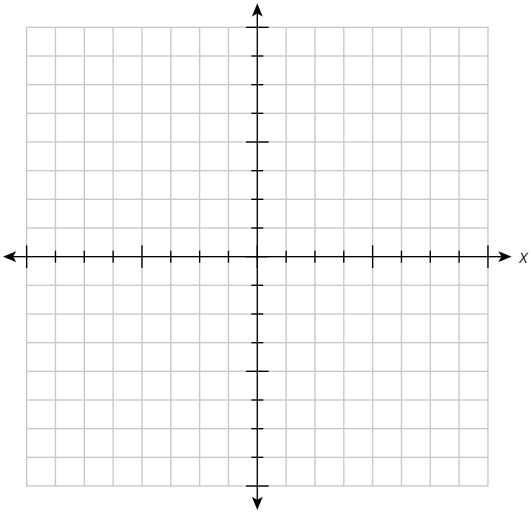
Practice

1. Name the coordinate pair for each point shown on the grid.



2. Use the ordered pair to locate each point on a coordinate grid. Place a dot at each point and label it with its name.

$J(3, 4)$, $K(0, -4)$, $L(-5, 0)$, $M(-2, -3)$, $N(-2, 3)$, $O(2, -3)$, $P(-4, -6)$, $Q(4, -5)$, $R(-5, -4)$



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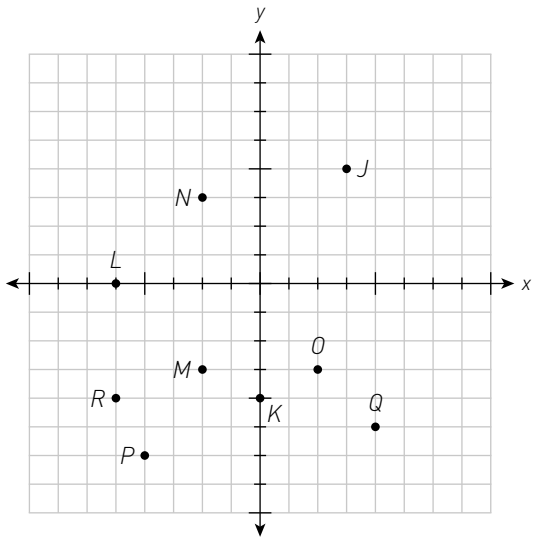
Answers

1. $S(2, 2)$, $T(-1, -6)$, $U(0, 6)$, $V(1, -4)$, $W(-6, 0)$, $Z(-5, 3)$

2.



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