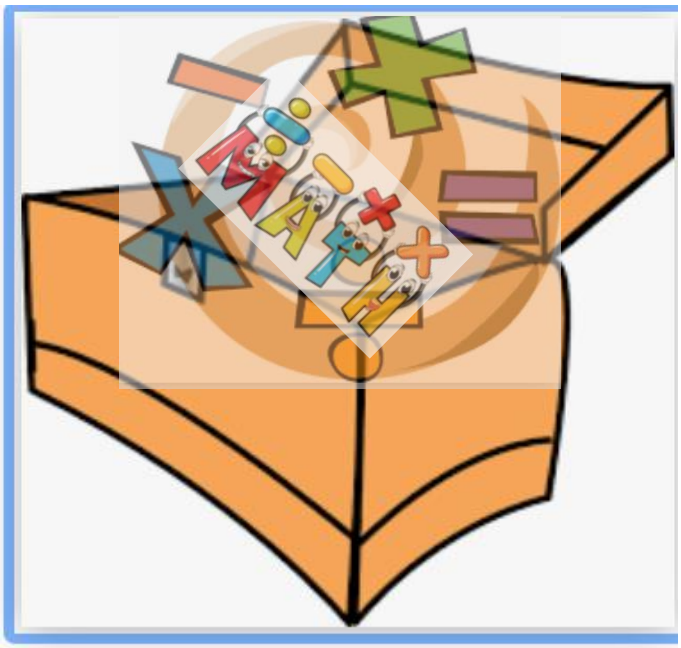
Getting Ready for Algebra I

The best way to prepare for Algebra I is to go through your Mathematics Toolbox . We will use this toolbox often in solving Algebra I problems. Use the pages that follow like packing list. Like all packing lists, it should be used to help you identify what you already have in your Mathematics Toolbox and also what you still need. Notice there is no Calculator or Math App in these pages. Make a list of what you still need and bring that list with you on the first day of school, so together, we could work on making sure you have everything you need in that Mathematics Toolbox of yours to be successful in Algebra I.



Every Week Practice

Multiplying and Dividing

Vocabulary

Factor

Product

Dividend

Divisor

Quotient

Fact Family

1 x	2 x	3 x	4 x
1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4
1 x 2 = 2	2 x 2 = 4	3 x 2 = 6	4 x 2 = 8
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12
1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16
1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20
1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24
1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28
1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32
1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36
1 x 10 = 10	2 x 10 = 20	3 x 10 = 30	4 x 10 = 40
1 x 11 = 11	2 x 11 = 22	3 x 11 = 33	4 x 11 = 44
1 x 12 = 12	2 x 12 = 24	3 x 12 = 36	4 x 12 = 48
www.class-templates.com	www.class-templates.com	www.class-templates.com	www.class-template.com

5 x	6 x	7 x	8 x
5 x 1 = 5	6 x 1 = 6	7 x 1 = 7	8 x 1 = 8
5 x 2 = 10	6 x 2 = 12	7 x 2 = 14	8 x 2 = 16
5 x 3 = 15	6 x 3 = 18	7 x 3 = 21	8 x 3 = 24
5 x 4 = 20	6 x 4 = 24	7 x 4 = 28	8 x 4 = 32
5 x 5 = 25	6 x 5 = 30	7 x 5 = 35	8 x 5 = 40
5 x 6 = 30	6 x 6 = 36	7 x 6 = 42	8 x 6 = 48
5 x 7 = 35	6 x 7 = 42	7 x 7 = 49	8 x 7 = 56
5 x 8 = 40	6 x 8 = 48	7 x 8 = 56	8 x 8 = 64
5 x 9 = 45	6 x 9 = 54	7 x 9 = 63	8 x 9 = 72
5 x 10 = 50	6 x 10 = 60	7 x 10 = 70	8 x 10 = 80
5 x 11 = 55	6 x 11 = 66	7 x 11 = 77	8 x 11 = 88
5 x 12 = 60	6 x 12 = 72	7 x 12 = 84	8 x 12 = 96
www.class-templates.com	www.class-templates.com	www.class-templates.com	www.class-templates.com

9 x	10 x	11 x	12 x
9 x 1 = 9	10 x 1 = 10	11 x 1 = 11	12 x 1 = 12
9 x 2 = 18	10 x 2 = 20	11 x 2 = 22	12 x 2 = 24
9 x 3 = 27	10 x 3 = 30	11 x 3 = 33	12 x 3 = 36
9 x 4 = 36	10 x 4 = 40	11 x 4 = 44	12 x 4 = 48
9 x 5 = 45	10 x 5 = 50	11 x 5 = 55	12 x 5 = 60
9 x 6 = 54	10 x 6 = 60	11 x 6 = 66	12 x 6 = 72
9 x 7 = 63	10 x 7 = 70	11 x 7 = 77	12 x 7 = 84
9 x 8 = 72	10 x 8 = 80	11 x 8 = 88	12 x 8 = 96
9 x 9 = 81	10 x 9 = 90	11 x 9 = 99	12 x 9 = 108
9 x 10 = 90	10 x 10 = 100	11 x 10 = 110	12 x 10 = 120
9 x 11 = 99	10 x 11 = 110	11 x 11 = 121	12 x 11 = 132
9 x 12 = 108	10 x 12 = 120	11 x 12 = 132	12 x 12 = 144
www.class-templates.com	www.class-templates.com	www.class-templates.com	www.class-templates.com

REVIEW: Comparing, Ordering, and Graphing Integers

Name _____

Key Concept and Vocabulary

zero

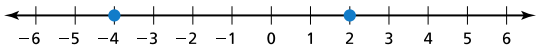
. . . , −3, −2, −1, 0, 1, 2, 3, . . .

negative integers

positive integers

Visual Model

Number Line



$-4 < 2$ because -4 is to the left of 2 on the number line.

Skill Examples

1. $0 \le 4$ "0 is less than or equal to 4."
2. $-1 > -3$ "−1 is greater than −3."
3. $-2 < -1$ "−2 is less than −1."
4. $2 > -2$ "2 is greater than −2."
5. $3 \ge 2$ "3 is greater than or equal to 2."

Application Example

6. The temperature in Seattle is 4°F.
The temperature in Denver is −6°F.
Which temperature is greater?

$-6 < 4$ "−6 is less than 4."

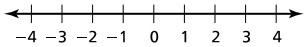
The temperature is greater in Seattle.

PRACTICE

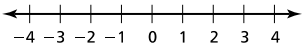
Check your answers at BigIdeasMath.com.

Graph the two numbers. Then compare them using < or >.

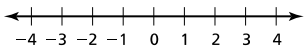
7. −3 ☐ 2



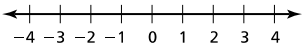
8. −1 ☐ 0



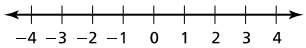
9. −1 ☐ −4



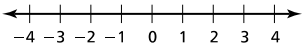
10. 1 ☐ 3



11. 0 ☐ 2



12. 3 ☐ −1



Order the temperatures from least to greatest.

13. −5°F, 13°F, 0°F, 5°F, 2°F, 20°F

_____

14. 7°C, −4°C, −11°C, 0°C, 8°C, −12°C

_____

Use an integer to describe the real-life situation.

15. A *profit* of \$5 _____
A loss of \$5 _____

16. A *depth* of 8 ft _____
A *height* of 4 ft _____

17. A *decrease* of 5°F _____
An *increase* of 8°F _____

18. **BUSINESS LOSS** During its first week, a business had a loss that was greater than \$4, but less than \$6. Circle each integer that could represent this loss.

−\$7, −\$6, −\$5, −\$4, −\$3, −\$2, −\$1, \$0, \$1, \$2, \$3, \$4, \$5, \$6, \$7

REVIEW: Comparing, Ordering, and Graphing Integers

Name _____

Key Concept and Vocabulary

zero

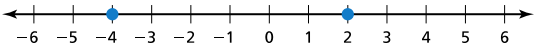
. . . , −3, −2, −1, 0, 1, 2, 3, . . .

negative integers

positive integers

Visual Model

Number Line



$-4 < 2$ because -4 is to the left of 2 on the number line.

Skill Examples

1. $0 \le 4$ "0 is less than or equal to 4."
2. $-1 > -3$ "–1 is greater than –3."
3. $-2 < -1$ "–2 is less than –1."
4. $2 > -2$ "2 is greater than –2."
5. $3 \ge 2$ "3 is greater than or equal to 2."

Application Example

6. The temperature in Seattle is 4°F. The temperature in Denver is −6°F. Which temperature is greater?

   $-6 < 4$ "−6 is less than 4."

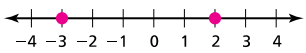
   The temperature is greater in Seattle.

PRACTICE

Check your answers at BigIdeasMath.com.

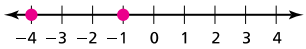
Graph the two numbers. Then compare them using < or >.

7. −3 [<] 2

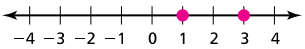


8. −1 [<] 0

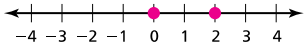
9. −1 [>] −4



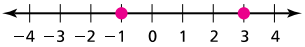
10. 1 [<] 3



11. 0 [<] 2



12. 3 [>] −1



Order the temperatures from least to greatest.

13. −5°F, 13°F, 0°F, 5°F, 2°F, 20°F

    −5°F, 0°F, 2°F, 5°F, 13°F, 20°F

14. 7°C, −4°C, −11°C, 0°C, 8°C, −12°C

    −12°C, −11°C, −4°C, 0°C, 7°C, 8°C

Use an integer to describe the real-life situation.

15. A *profit* of \$5 5

    A loss of \$5 −5

16. A *depth* of 8 ft −8

    A *height* of 4 ft 4

17. A *decrease* of 5°F −5

    An *increase* of 8°F 8

18. **BUSINESS LOSS** During its first week, a business had a loss that was greater than \$4, but less than \$6. Circle each integer that could represent this loss.

    −\$7, −\$6, (−\$5,) −\$4, −\$3, −\$2, −\$1, \$0, \$1, \$2, \$3, \$4, \$5, \$6, \$7

REVIEW: Absolute Value

Name _____

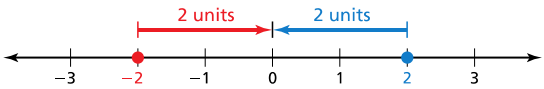
Key Concept and Vocabulary

The **absolute value** of a number is the distance between the number and 0 on a number line. The absolute value of a number is written as $|a|$.

$|-5| = 5$ $\quad |5| = 5$

Visual Model

$|-2| = 2$ $\quad |2| = 2$



Skill Examples

1. $|12| = 12$
2. $|-8| = 8$
3. $|-22| = 22$
4. $|0| = 0$
5. $|-4.2| = 4.2$

Application Example

6. The table shows the elevations of two people at the ocean. Which person is farther from sea level?

Person	Elevation (feet)
A	−4
B	3

Person A: $|-4| = 4$

Person B: $|3| = 3$

Because 4 is greater than 3, Person A is farther from sea level.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the absolute value.

7. $|18| =$ 18
8. $|-1| =$ 1
9. $|-9| =$ 9
10. $|1.8| =$ 1.8
11. $|-5.5| =$ 5.5
12. $\left|-\frac{3}{4}\right| =$ $\frac{3}{4}$
13. $\left|1\frac{2}{3}\right| =$ $1\frac{2}{3}$
14. $\left|-\frac{8}{5}\right| =$ $\frac{8}{5}$

Complete the statement using <, >, or =.

15. $|-13|$ $\boxed{=}$ $|13|$
16. $|-5|$ $\boxed{<}$ 8
17. $|-12.1|$ $\boxed{>}$ $|-10.9|$

TEMPERATURE CHANGE **The table shows the change in temperature each hour for 4 hours.**

Hour	Change in Temperature (°F)
1	−5
2	−2
3	6
4	4

18. In which hour did the temperature increase the most? Hour 3
19. In which hour did the temperature decrease the most? Hour 1
20. In which hour did the temperature change the most? Hour 3
21. In which hour did the temperature change the least? Hour 4

REVIEW: Absolute Value

Name _____

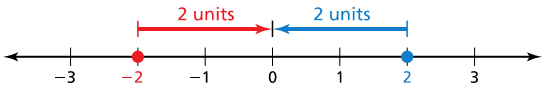
Key Concept and Vocabulary

The **absolute value** of a number is the distance between the number and 0 on a number line. The absolute value of a number is written as $|a|$.

$|-5| = 5$ $\quad$ $|5| = 5$

Visual Model

$|-2| = 2$ $\quad$ $|2| = 2$



Skill Examples

1. $|12| = 12$
2. $|-8| = 8$
3. $|-22| = 22$
4. $|0| = 0$
5. $|-4.2| = 4.2$

Application Example

6. The table shows the elevations of two people at the ocean. Which person is farther from sea level?

Person	Elevation (feet)
A	−4
B	3

Person A: $|-4| = 4$

Person B: $|3| = 3$

Because 4 is greater than 3, Person A is farther from sea level.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the absolute value.

7. $|18| =$ _____
8. $|-1| =$ _____
9. $|-9| =$ _____
10. $|1.8| =$ _____
11. $|-5.5| =$ _____
12. $\left|-\frac{3}{4}\right| =$ _____
13. $\left|1\frac{2}{3}\right| =$ _____
14. $\left|-\frac{8}{5}\right| =$ _____

Complete the statement using <, >, or =.

15. $|-13|$ ☐ $|13|$
16. $|-5|$ ☐ 8
17. $|-12.1|$ ☐ $|-10.9|$

TEMPERATURE CHANGE **The table shows the change in temperature each hour for 4 hours.**

Hour	Change in Temperature (°F)
1	−5
2	−2
3	6
4	4

18. In which hour did the temperature increase the most? _____
19. In which hour did the temperature decrease the most? _____
20. In which hour did the temperature change the most? _____
21. In which hour did the temperature change the least? _____

REVIEW: Adding and Subtracting Integers

Name _____

Key Concept and Vocabulary

terms sum

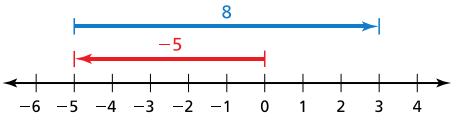
$6 + (-2) = 4$

$7 - (-3) = 10$

terms difference

Visual Model

Positive numbers involve movement to the right. Negative numbers involve movement to the left.



$-5 + 8 = 3$

Skill Examples

1. $5 + (-3) = 2$
2. $5 - (-2) = 5 + 2 = 7$
3. $-2 + 4 = 2$
4. $-3 - (-2) = -3 + 2 = -1$
5. $8 - (-3) = 8 + 3 = 11$

To subtract, add the opposite.

Application Example

6. The temperature is 8°F in the morning and drops to −5°F in the evening. What is the difference between these temperatures?

$$8 - (-5) = 8 + 5$$
$$= 13$$

The difference is 13 degrees.

PRACTICE

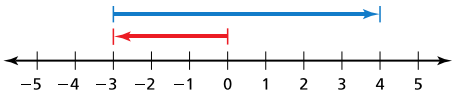
Check your answers at BigIdeasMath.com.

Find the sum or difference.

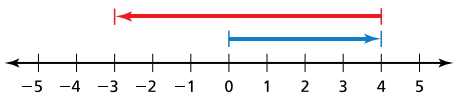
7. $-2 + 3 =$ _____
8. $-4 - 5 =$ _____
9. $8 - 2 =$ _____
10. $8 - (-2) =$ _____
11. $-4 - (-1) =$ _____
12. $-5 + (-5) =$ _____
13. $4 - (-8) =$ _____
14. $4 - 8 =$ _____
15. $-4 + (-6) =$ _____
16. $-4 - (-6) =$ _____
17. $10 - 13 =$ _____
18. $13 - (-10) =$ _____

Write the addition or subtraction shown by the number line.

19.



20.



21. **TEMPERATURE** The temperature is 16°F in the morning and drops to −15°F in the evening. What is the difference between these temperatures? _____

22. **SUBMARINE** A submarine is 450 feet below sea level. It descends 300 feet. What is its new position? Show your work.

_____

REVIEW: Adding and Subtracting Integers

Name _____

Key Concept and Vocabulary

terms sum

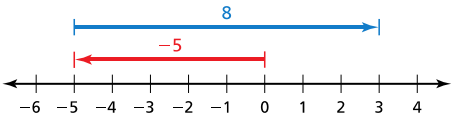
$6 + (-2) = 4$

$7 - (-3) = 10$

terms difference

Visual Model

Positive numbers involve movement to the right. Negative numbers involve movement to the left.



$-5 + 8 = 3$

Skill Examples

1. $5 + (-3) = 2$
2. $5 - (-2) = 5 + 2 = 7$
3. $-2 + 4 = 2$
4. $-3 - (-2) = -3 + 2 = -1$
5. $8 - (-3) = 8 + 3 = 11$

To subtract, add the opposite.

Application Example

6. The temperature is 8°F in the morning and drops to −5°F in the evening. What is the difference between these temperatures?

$$8 - (-5) = 8 + 5$$
$$= 13$$

The difference is 13 degrees.

PRACTICE

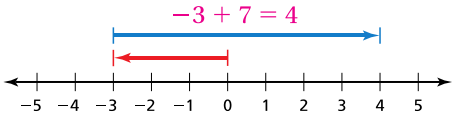
Check your answers at BigIdeasMath.com.

Find the sum or difference.

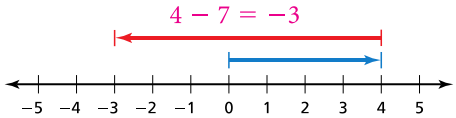
7. $-2 + 3 =$ 1
8. $-4 - 5 =$ −9
9. $8 - 2 =$ 6
10. $8 - (-2) =$ 10
11. $-4 - (-1) =$ −3
12. $-5 + (-5) =$ −10
13. $4 - (-8) =$ 12
14. $4 - 8 =$ −4
15. $-4 + (-6) =$ −10
16. $-4 - (-6) =$ 2
17. $10 - 13 =$ −3
18. $13 - (-10) =$ 23

Write the addition or subtraction shown by the number line.

19. $-3 + 7 = 4$



20. $4 - 7 = -3$



21. **TEMPERATURE** The temperature is 16°F in the morning and drops to −15°F in the evening. What is the difference between these temperatures? 31 degrees

22. **SUBMARINE** A submarine is 450 feet below sea level. It descends 300 feet. What is its new position? Show your work.
750 feet below sea level; $-450 - 300 = -750$

REVIEW: Multiplying and Dividing Integers

Name _____

Key Concept and Vocabulary

factors product

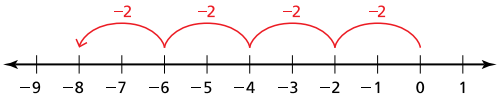
$8 \cdot (-5) = -40$

$-12 \div (-3) = 4$

dividend divisor quotient

Visual Model

$4 \cdot (-2) = (-2) + (-2) + (-2) + (-2)$



Skill Examples

1. $-3 \cdot (-4) = 12$
2. $-36 \div (-6) = 6$

same sign, product and quotient positive

3. $-7 \cdot 0 = 0$
4. $-10 \div 5 = -2$
5. $-5 \cdot 6 = -30$

different signs, product and quotient negative

Application Example

6. You pay six friends \$5 each from your bank account. Use integer multiplication to represent the change in the amount of money in your account.

$$6 \cdot (-5) = -30$$

The amount of money in your bank account decreases \$30.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the product or quotient.

7. $-3 \times (-5) =$ _____
8. $7(-3) =$ _____
9. $0 \cdot (-5) =$ _____
10. $(-5)(-7) =$ _____
11. $-8 \cdot 2 =$ _____
12. $(-5)^2 =$ _____
13. $(-3)^3 =$ _____
14. $4(-2)(-3) =$ _____
15. $-16 \div 4 =$ _____
16. $-20 \div (-5) =$ _____
17. $\frac{-9}{3} =$ _____
18. $\frac{-20}{-10} =$ _____

Complete the multiplication or division equation.

19. $-15 \div$ _____ $= -3$
20. $45 \div$ _____ $= -5$
21. _____ $\div (-20) = 5$
22. $8 \cdot$ _____ $= -64$
23. _____ $\cdot (-9) = 27$
24. $-12 \cdot$ _____ $= -96$

25. **BANK ACCOUNT** You pay eight friends \$10 each from your bank account. Use integer multiplication to represent the change in the amount of money in your account.

_____

26. **TEMPERATURE** The low temperatures for a week in Edmonton, Alberta are −15°C, −12°C, −10°C, −12°C, −18°C, −20°C, and −25°C. What is the mean low temperature for the week? Show your work.

_____

_____

REVIEW: Multiplying and Dividing Integers

Name _____

Key Concept and Vocabulary

factors product

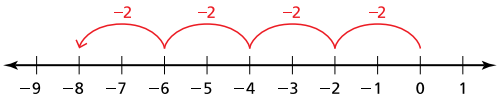
$8 \cdot (-5) = -40$

$-12 \div (-3) = 4$

dividend divisor quotient

Visual Model

$4 \cdot (-2) = (-2) + (-2) + (-2) + (-2)$



Skill Examples

1. $-3 \cdot (-4) = 12$
2. $-36 \div (-6) = 6$

same sign, product and quotient positive

3. $-7 \cdot 0 = 0$
4. $-10 \div 5 = -2$
5. $-5 \cdot 6 = -30$

different signs, product and quotient negative

Application Example

6. You pay six friends \$5 each from your bank account. Use integer multiplication to represent the change in the amount of money in your account.

$$6 \cdot (-5) = -30$$

The amount of money in your bank account decreases \$30.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the product or quotient.

7. $-3 \times (-5) =$ 15
8. $7(-3) =$ −21
9. $0 \cdot (-5) =$ 0
10. $(-5)(-7) =$ 35
11. $-8 \cdot 2 =$ −16
12. $(-5)^2 =$ 25
13. $(-3)^3 =$ −27
14. $4(-2)(-3) =$ 24
15. $-16 \div 4 =$ −4
16. $-20 \div (-5) =$ 4
17. $\frac{-9}{3} =$ −3
18. $\frac{-20}{-10} =$ 2

Complete the multiplication or division equation.

19. $-15 \div$ 5 $= -3$
20. $45 \div$ (−9) $= -5$
21. −100 $\div (-20) = 5$
22. $8 \cdot$ (−8) $= -64$
23. −3 $\cdot (-9) = 27$
24. $-12 \cdot$ 8 $= -96$

25. **BANK ACCOUNT** You pay eight friends \$10 each from your bank account. Use integer multiplication to represent the change in the amount of money in your account.

$8 \cdot (-10) = -80$

26. **TEMPERATURE** The low temperatures for a week in Edmonton, Alberta are −15°C, −12°C, −10°C, −12°C, −18°C, −20°C, and −25°C. What is the mean low temperature for the week? Show your work.

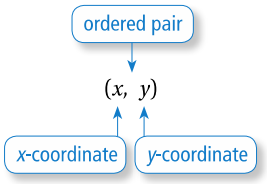
−16°C; $[-15 + (-12) + (-10) + (-12) + (-18) + (-20) + (-25)] \div 7$

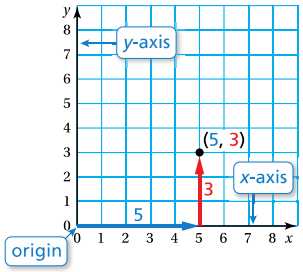
$= -112 \div 7 = -16$

REVIEW: The Coordinate Plane: First Quadrant

Name _____

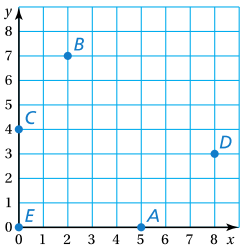
Key Concept and Vocabulary





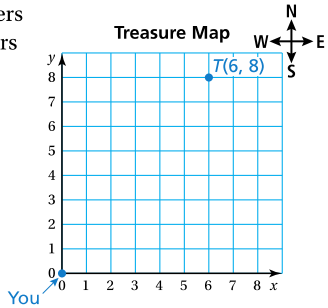
Skill Examples

1. $A(5, 0)$
2. $B(2, 7)$
3. $C(0, 4)$
4. $D(8, 3)$
5. $E(0, 0)$



Application Example

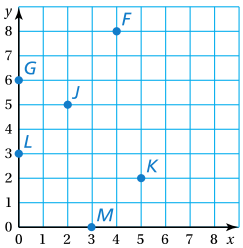
6. You walk 6 meters east and 8 meters north to find a treasure. Plot and label the location of the treasure on the map.



PRACTICE

Check your answers at BigIdeasMath.com.

In Exercises 7–12, use the coordinate plane below.



Write the ordered pair corresponding to the point.

7. Point F _____
8. Point G _____

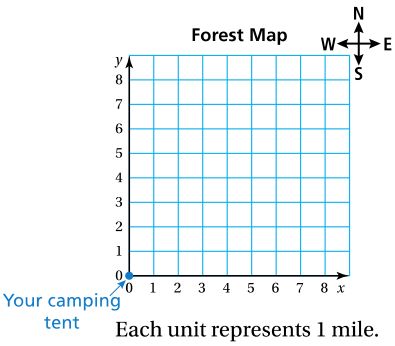
Plot and label the point in the coordinate plane.

9. $H(6, 5)$
10. $I(7, 0)$

Name the point for the ordered pair.

11. $(5, 2)$ _____
12. $(0, 3)$ _____

13. **WATERFALL** You hike 3 miles east and 4 miles north of your camping tent to find a waterfall. Plot and label the location of the waterfall on the map.



Each unit represents 1 mile.

REVIEW: The Coordinate Plane: First Quadrant

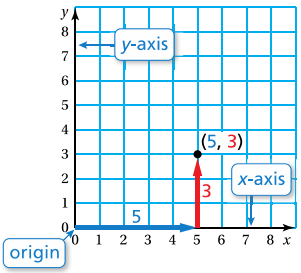
Name _____

Key Concept and Vocabulary

ordered pair

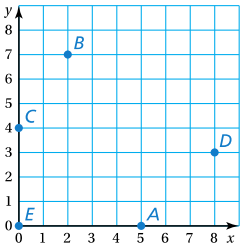
(x, y)

x-coordinate y-coordinate



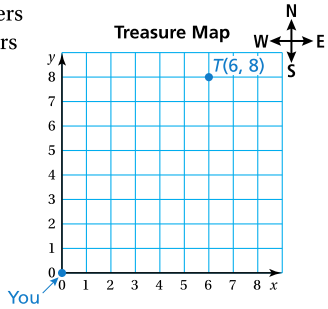
Skill Examples

1. $A(5, 0)$
2. $B(2, 7)$
3. $C(0, 4)$
4. $D(8, 3)$
5. $E(0, 0)$



Application Example

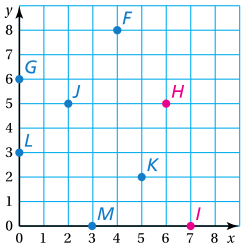
6. You walk 6 meters east and 8 meters north to find a treasure. Plot and label the location of the treasure on the map.



PRACTICE

Check your answers at BigIdeasMath.com.

In Exercises 7–12, use the coordinate plane below.



Write the ordered pair corresponding to the point.

7. Point F (4, 8)
8. Point G (0, 6)

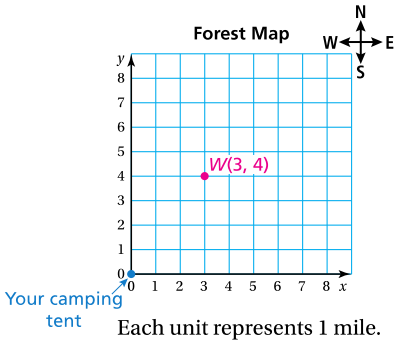
Plot and label the point in the coordinate plane.

9. $H(6, 5)$
10. $I(7, 0)$

Name the point for the ordered pair.

11. $(5, 2)$ point K
12. $(0, 3)$ point L

13. **WATERFALL** You hike 3 miles east and 4 miles north of your camping tent to find a waterfall. Plot and label the location of the waterfall on the map.



Each unit represents 1 mile.

REVIEW: The Coordinate Plane

Name _____

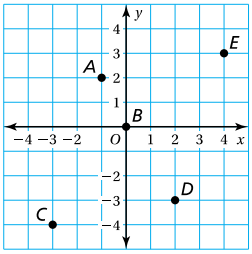
Key Concept and Vocabulary

ordered pair

(x, y)

x-coordinate

y-coordinate



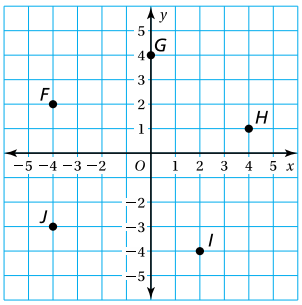
Skill Examples

1. $A(-1, 2)$ *(Quadrant II)*
2. $B(0, 0)$ *(origin)*
3. $C(-3, -4)$ *(Quadrant III)*
4. $D(2, -3)$ *(Quadrant IV)*
5. $E(4, 3)$ *(Quadrant I)*

PRACTICE

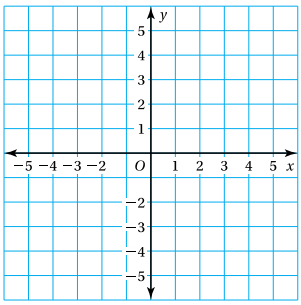
Check your answers at BigIdeasMath.com.

Write the ordered pair corresponding to the point.



6. F _____
7. G _____
8. H _____
9. I _____
10. J _____

Plot the ordered pair in the coordinate plane. Name the quadrant for the point.



11. $K(-3, 5)$ _____
12. $L(-3, 0)$ _____
13. $M(2, 5)$ _____
14. $N(4, -2)$ _____
15. $P(-2, -4)$ _____

REVIEW: The Coordinate Plane

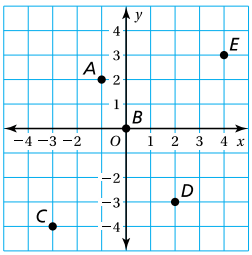
Name _____

Key Concept and Vocabulary

ordered pair

(x, y)

x-coordinate | *y*-coordinate



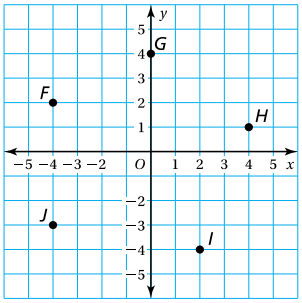
Skill Examples

1. $A(-1, 2)$ *(Quadrant II)*
2. $B(0, 0)$ *(origin)*
3. $C(-3, -4)$ *(Quadrant III)*
4. $D(2, -3)$ *(Quadrant IV)*
5. $E(4, 3)$ *(Quadrant I)*

PRACTICE

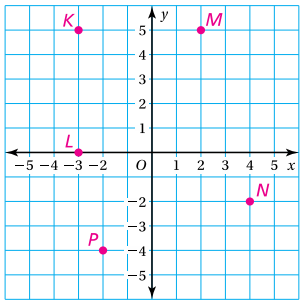
Check your answers at BigIdeasMath.com.

Write the ordered pair corresponding to the point.



6. F $(-4, 2)$
7. G $(0, 4)$
8. H $(4, 1)$
9. I $(2, -4)$
10. J $(-4, -3)$

Plot the ordered pair in the coordinate plane. Name the quadrant for the point.



11. $K(-3, 5)$ Quadrant II
12. $L(-3, 0)$ *x*-axis
13. $M(2, 5)$ Quadrant I
14. $N(4, -2)$ Quadrant IV
15. $P(-2, -4)$ Quadrant III

REVIEW: Writing Equivalent Fractions

Name _____

Key Concept and Vocabulary

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Multiply or divide the numerator and denominator by the same number.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Visual Model

$\frac{2}{3}$

equivalent fractions

$\frac{8}{12}$

Skill Examples

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

$\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$ are all equivalent.

3. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$
4. $\frac{63}{56} = \frac{63 \div 7}{56 \div 7} = \frac{9}{8}$

Application Example

5. A pizza has 12 pieces. Two-thirds of the pizza is left. How many pieces are left?

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

There are 8 pieces left.

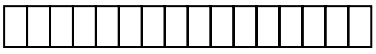
PRACTICE

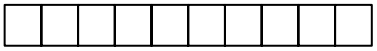
Check your answers at BigIdeasMath.com.

Find the equivalent fraction.

6. $\frac{1}{2} = \frac{\square}{8}$
7. $\frac{3}{5} = \frac{\square}{15}$
8. $\frac{4}{3} = \frac{\square}{9}$
9. $\frac{1}{3} = \frac{\square}{27}$
10. $\frac{8}{20} = \frac{\square}{5}$
11. $\frac{56}{64} = \frac{\square}{8}$
12. $\frac{6}{14} = \frac{3}{\square}$
13. $\frac{36}{16} = \frac{9}{\square}$
14. $\frac{1}{5} = \frac{10}{\square}$
15. $\frac{12}{36} = \frac{3}{\square}$
16. $\frac{7}{10} = \frac{14}{\square}$
17. $\frac{9}{24} = \frac{3}{\square}$

Shade the model so that the fraction is equivalent.

18.  = 

19.  = 

20. **PIZZA** A pizza has 12 pieces. Three-fourths of the pizza is left. How many pieces are left? _____

21. **SURVEY** A survey asked 240 people if they liked a movie. One-third liked it, one-sixth did not like it, and one-half had not seen it. How many people are in each of the three categories? _____

REVIEW: Writing Equivalent Fractions

Name _____

Key Concept and Vocabulary

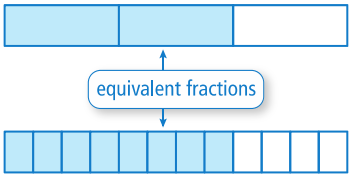
$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Multiply or divide the numerator and denominator by the same number.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Visual Model

$\frac{2}{3}$



equivalent fractions

$\frac{8}{12}$

Skill Examples

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

$\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$ are all equivalent.

3. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$
4. $\frac{63}{56} = \frac{63 \div 7}{56 \div 7} = \frac{9}{8}$

Application Example

5. A pizza has 12 pieces. Two-thirds of the pizza is left. How many pieces are left?

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

There are 8 pieces left.

PRACTICE

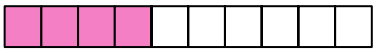
Check your answers at BigIdeasMath.com.

Find the equivalent fraction.

6. $\frac{1}{2} = \frac{\boxed{4}}{8}$
7. $\frac{3}{5} = \frac{\boxed{9}}{15}$
8. $\frac{4}{3} = \frac{\boxed{12}}{9}$
9. $\frac{1}{3} = \frac{\boxed{9}}{27}$
10. $\frac{8}{20} = \frac{\boxed{2}}{5}$
11. $\frac{56}{64} = \frac{\boxed{7}}{8}$
12. $\frac{6}{14} = \frac{3}{\boxed{7}}$
13. $\frac{36}{16} = \frac{9}{\boxed{4}}$
14. $\frac{1}{5} = \frac{10}{\boxed{50}}$
15. $\frac{12}{36} = \frac{3}{\boxed{9}}$
16. $\frac{7}{10} = \frac{14}{\boxed{20}}$
17. $\frac{9}{24} = \frac{3}{\boxed{8}}$

Shade the model so that the fraction is equivalent.

18.  = 

19.  = 

20. **PIZZA** A pizza has 12 pieces. Three-fourths of the pizza is left. How many pieces are left? 9 pieces

21. **SURVEY** A survey asked 240 people if they liked a movie. One-third liked it, one-sixth did not like it, and one-half had not seen it. How many people are in each of the three categories? liked: 80, did not like: 40, had not seen: 120

REVIEW: Simplifying Fractions

Name _____

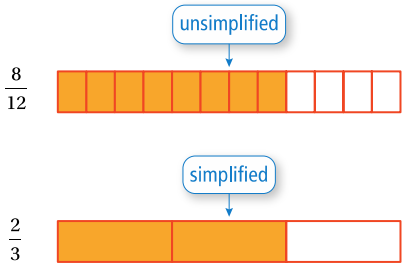
Key Concept and Vocabulary

Divide the numerator and the denominator by a common factor.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Simplest form: The numerator and denominator have no common factors other than 1.

Visual Model



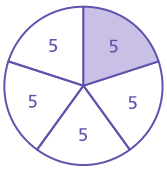
Skill Examples

1. $\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}$
2. $\frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$
3. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$
4. $\frac{80}{100} = \frac{80 \div 20}{100 \div 20} = \frac{4}{5}$

Application Example

5. Five of the 25 students in your class have a social media account. Write this fraction in simplest form.

$$\frac{5}{25} = \frac{5 \div 5}{25 \div 5} = \frac{1}{5}$$



One-fifth of the students in your class have a social media account.

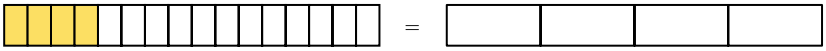
PRACTICE

Check your answers at BigIdeasMath.com.

Write the fraction in simplest form.

6. $\frac{16}{18} =$ _____
7. $\frac{10}{12} =$ _____
8. $\frac{6}{8} =$ _____
9. $\frac{15}{45} =$ _____
10. $\frac{12}{40} =$ _____
11. $\frac{14}{21} =$ _____
12. $\frac{6}{2} =$ _____
13. $\frac{20}{50} =$ _____
14. $\frac{24}{16} =$ _____
15. $\frac{20}{15} =$ _____
16. $\frac{55}{60} =$ _____
17. $\frac{21}{35} =$ _____

Shade the model so that the fraction is simplified.

18. 

19. 

20. **SOCIAL MEDIA** Eight of the 24 students in your class have a social media account. Write this fraction in simplest form. _____

21. **SIMPLIFYING** Write five different fractions that each simplify to $\frac{2}{5}$.

_____

REVIEW: Simplifying Fractions

Name _____

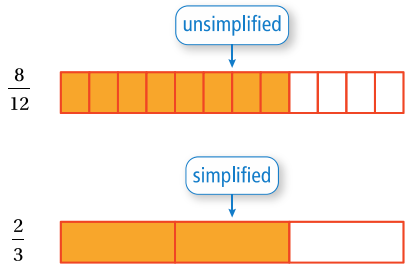
Key Concept and Vocabulary

Divide the numerator and the denominator by a common factor.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Simplest form: The numerator and denominator have no common factors other than 1.

Visual Model



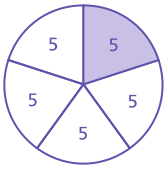
Skill Examples

1. $\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}$
2. $\frac{3}{6} = \frac{3 \div 3}{6 \div 3} = \frac{1}{2}$
3. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$
4. $\frac{80}{100} = \frac{80 \div 20}{100 \div 20} = \frac{4}{5}$

Application Example

5. Five of the 25 students in your class have a social media account. Write this fraction in simplest form.

$$\frac{5}{25} = \frac{5 \div 5}{25 \div 5} = \frac{1}{5}$$



One-fifth of the students in your class have a social media account.

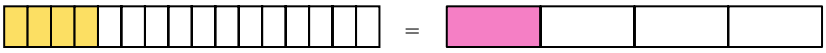
PRACTICE

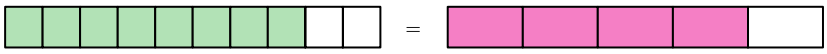
Check your answers at BigIdeasMath.com.

Write the fraction in simplest form.

6. $\frac{16}{18} = \frac{8}{9}$
7. $\frac{10}{12} = \frac{5}{6}$
8. $\frac{6}{8} = \frac{3}{4}$
9. $\frac{15}{45} = \frac{1}{3}$
10. $\frac{12}{40} = \frac{3}{10}$
11. $\frac{14}{21} = \frac{2}{3}$
12. $\frac{6}{2} = 3$
13. $\frac{20}{50} = \frac{2}{5}$
14. $\frac{24}{16} = \frac{3}{2}$
15. $\frac{20}{15} = \frac{4}{3}$
16. $\frac{55}{60} = \frac{11}{12}$
17. $\frac{21}{35} = \frac{3}{5}$

Shade the model so that the fraction is simplified.

18. 

19. 

20. **SOCIAL MEDIA** Eight of the 24 students in your class have a social media account. Write this fraction in simplest form. $\frac{8}{24} = \frac{1}{3}$

21. **SIMPLIFYING** Write five different fractions that each simplify to $\frac{2}{5}$.

Sample answer: $\frac{4}{10}, \frac{10}{25}, \frac{20}{50}, \frac{24}{60}, \frac{30}{75}$

REVIEW: Adding and Subtracting Fractions with Like Denominators

Name _____

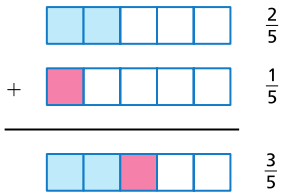
Key Concept and Vocabulary

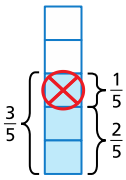
$$\frac{2}{5} + \frac{1}{5} = \frac{2+1}{5} = \frac{3}{5}$$

Add or subtract numerators.

$$\frac{3}{5} - \frac{1}{5} = \frac{3-1}{5} = \frac{2}{5}$$

Visual Models





$\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$

Skill Examples

1. $\frac{4}{8} + \frac{3}{8} = \frac{4+3}{8} = \frac{7}{8}$
2. $\frac{3}{4} + \frac{1}{4} = \frac{3+1}{4} = \frac{4}{4} = 1$
3. $\frac{7}{10} - \frac{4}{10} = \frac{7-4}{10} = \frac{3}{10}$
4. $\frac{13}{25} - \frac{8}{25} = \frac{13-8}{25} = \frac{5}{25} = \frac{1}{5}$

Application Example

5. On Monday, you painted $\frac{2}{5}$ of a fence. On Tuesday, you painted the same amount. What fraction of the fence do you have left to paint?

$1 = \frac{5}{5}$ and $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$; $\frac{5}{5} - \frac{4}{5} = \frac{1}{5}$

You have $\frac{1}{5}$ of the fence left to paint.

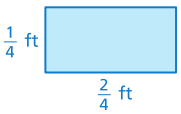
PRACTICE

Check your answers at BigIdeasMath.com.

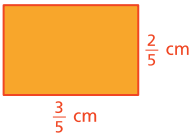
Find the sum or difference.

6. $\frac{3}{6} + \frac{2}{6} =$ _____
7. $\frac{6}{12} + \frac{5}{12} =$ _____
8. $\frac{1}{10} + \frac{3}{10} =$ _____
9. $\frac{3}{4} + \frac{2}{4} =$ _____
10. $\frac{3}{8} + \frac{1}{8} =$ _____
11. $\frac{1}{5} + \frac{2}{5} + \frac{2}{5} =$ _____
12. $\frac{6}{8} - \frac{1}{8} =$ _____
13. $\frac{2}{3} - \frac{1}{3} =$ _____
14. $\frac{7}{4} - \frac{3}{4} =$ _____
15. $\frac{9}{10} - \frac{7}{10} =$ _____
16. $\frac{10}{12} - \frac{3}{12} =$ _____
17. $\frac{6}{6} - \left(\frac{1}{6} + \frac{2}{6}\right) =$ _____

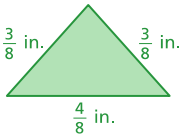
Find the perimeter of the rectangle or triangle.

18. 

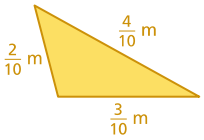
Perimeter = _____

19. 

Perimeter = _____

20. 

Perimeter = _____

21. 

Perimeter = _____

22. **REACHING YOUR GOAL** You have a savings goal. In January, you saved $\frac{2}{10}$ of your goal. In February, you saved $\frac{3}{10}$ of your goal. How much of your goal remains? Explain.

_____

REVIEW: Adding and Subtracting Fractions with Like Denominators

Name _____

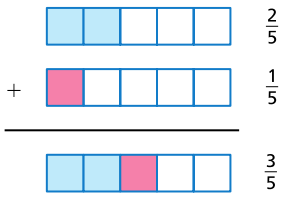
Key Concept and Vocabulary

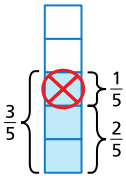
$\frac{2}{5} + \frac{1}{5} = \frac{2+1}{5} = \frac{3}{5}$

Add or subtract numerators.

$\frac{3}{5} - \frac{1}{5} = \frac{3-1}{5} = \frac{2}{5}$

Visual Models





$\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$

Skill Examples

1. $\frac{4}{8} + \frac{3}{8} = \frac{4+3}{8} = \frac{7}{8}$
2. $\frac{3}{4} + \frac{1}{4} = \frac{3+1}{4} = \frac{4}{4} = 1$
3. $\frac{7}{10} - \frac{4}{10} = \frac{7-4}{10} = \frac{3}{10}$
4. $\frac{13}{25} - \frac{8}{25} = \frac{13-8}{25} = \frac{5}{25} = \frac{1}{5}$

Application Example

5. On Monday, you painted $\frac{2}{5}$ of a fence. On Tuesday, you painted the same amount. What fraction of the fence do you have left to paint?

$1 = \frac{5}{5}$ and $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$; $\frac{5}{5} - \frac{4}{5} = \frac{1}{5}$

You have $\frac{1}{5}$ of the fence left to paint.

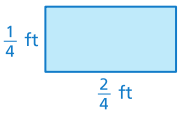
PRACTICE

Check your answers at BigIdeasMath.com.

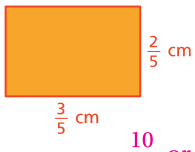
Find the sum or difference.

6. $\frac{3}{6} + \frac{2}{6} =$ $\frac{5}{6}$
7. $\frac{6}{12} + \frac{5}{12} =$ $\frac{11}{12}$
8. $\frac{1}{10} + \frac{3}{10} =$ $\frac{4}{10}$, or $\frac{2}{5}$
9. $\frac{3}{4} + \frac{2}{4} =$ $\frac{5}{4}$
10. $\frac{3}{8} + \frac{1}{8} =$ $\frac{4}{8}$, or $\frac{1}{2}$
11. $\frac{1}{5} + \frac{2}{5} + \frac{2}{5} =$ $\frac{5}{5}$, or 1
12. $\frac{6}{8} - \frac{1}{8} =$ $\frac{5}{8}$
13. $\frac{2}{3} - \frac{1}{3} =$ $\frac{1}{3}$
14. $\frac{7}{4} - \frac{3}{4} =$ $\frac{4}{4}$, or 1
15. $\frac{9}{10} - \frac{7}{10} =$ $\frac{2}{10}$, or $\frac{1}{5}$
16. $\frac{10}{12} - \frac{3}{12} =$ $\frac{7}{12}$
17. $\frac{6}{6} - \left(\frac{1}{6} + \frac{2}{6}\right) =$ $\frac{3}{6}$, or $\frac{1}{2}$

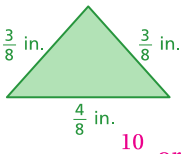
Find the perimeter of the rectangle or triangle.

18. 

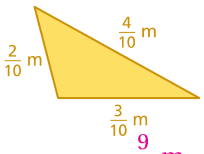
Perimeter = $\frac{6}{4}$, or $\frac{3}{2}$ ft

19. 

Perimeter = $\frac{10}{5}$, or 2 cm

20. 

Perimeter = $\frac{10}{8}$, or $\frac{5}{4}$ in.

21. 

Perimeter = $\frac{9}{10}$ m

22. **REACHING YOUR GOAL** You have a savings goal. In January, you saved $\frac{2}{10}$ of your goal. In February, you saved $\frac{3}{10}$ of your goal. How much of your goal remains? Explain.

$\frac{1}{2}$ of your goal remains; $1 - \left(\frac{2}{10} + \frac{3}{10}\right) = \frac{10}{10} - \frac{5}{10} = \frac{5}{10} = \frac{1}{2}$

REVIEW: Adding and Subtracting Fractions with Unlike Denominators

Name _____

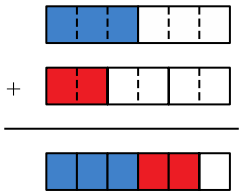
Key Concept and Vocabulary

$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

Use a like denominator.

$\frac{1}{2} - \frac{1}{3} = \frac{3}{6} - \frac{2}{6} = \frac{1}{6}$

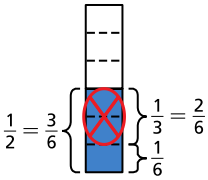
Visual Models



$\frac{1}{2} = \frac{3}{6}$

$\frac{1}{3} = \frac{2}{6}$

$\frac{5}{6}$



$\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$

Skill Examples

1. $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$
2. $\frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15} = \frac{13}{15}$
3. $\frac{5}{6} - \frac{1}{3} = \frac{5}{6} - \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$
4. $\frac{2}{3} - \frac{1}{4} = \frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

Application Example

5. You ride your bike $\frac{3}{8}$ mile to the store. Then you ride $\frac{1}{4}$ mile to school. How far do you ride altogether?

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

You ride $\frac{5}{8}$ mile.

PRACTICE

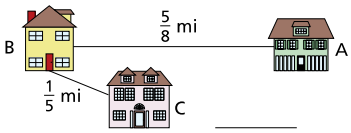
Check your answers at BigIdeasMath.com.

Find the sum or difference.

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

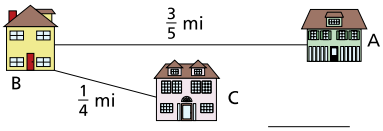
Find the total distance from House A to House B and then to House C.

18.



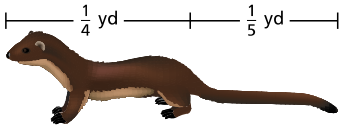
_____

19.



_____

20. **WEASEL LENGTH** Find the total length of the weasel. _____



21. **IMPROVING YOUR SPEED** You swam at a rate of $\frac{3}{10}$ mile per hour in March. You swam at a rate of $\frac{3}{8}$ mile per hour in April. How much faster did you swim in April? _____

REVIEW: Adding and Subtracting Fractions with Unlike Denominators

Name _____

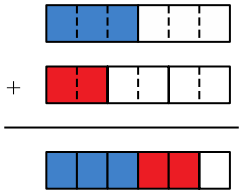
Key Concept and Vocabulary

$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$

Use a like denominator.

$\frac{1}{2} - \frac{1}{3} = \frac{3}{6} - \frac{2}{6} = \frac{1}{6}$

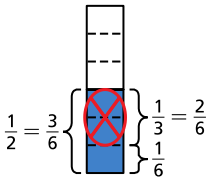
Visual Models



$\frac{1}{2} = \frac{3}{6}$

$+$ $\frac{1}{3} = \frac{2}{6}$

$\frac{5}{6}$



$\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$

Skill Examples

1. $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$
2. $\frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15} = \frac{13}{15}$
3. $\frac{5}{6} - \frac{1}{3} = \frac{5}{6} - \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$
4. $\frac{2}{3} - \frac{1}{4} = \frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

Application Example

5. You ride your bike $\frac{3}{8}$ mile to the store. Then you ride $\frac{1}{4}$ mile to school. How far do you ride altogether?

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

You ride $\frac{5}{8}$ mile.

PRACTICE

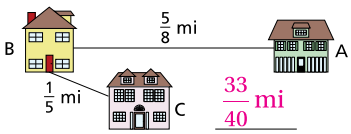
Check your answers at BigIdeasMath.com.

Find the sum or difference.

6. $\frac{1}{8} + \frac{3}{4} =$ $\frac{7}{8}$
7. $\frac{1}{3} + \frac{1}{5} =$ $\frac{8}{15}$
8. $\frac{3}{10} + \frac{1}{4} =$ $\frac{22}{40}$, or $\frac{11}{20}$
9. $\frac{1}{2} + \frac{2}{5} =$ $\frac{9}{10}$
10. $\frac{1}{3} + \frac{1}{8} =$ $\frac{11}{24}$
11. $\frac{1}{8} + \frac{2}{5} =$ $\frac{21}{40}$
12. $\frac{5}{8} - \frac{1}{4} =$ $\frac{3}{8}$
13. $\frac{5}{6} - \frac{3}{5} =$ $\frac{7}{30}$
14. $\frac{5}{8} - \frac{2}{5} =$ $\frac{9}{40}$
15. $\frac{7}{10} - \frac{1}{4} =$ $\frac{18}{40}$, or $\frac{9}{20}$
16. $\frac{3}{5} - \frac{1}{6} =$ $\frac{13}{30}$
17. $\frac{1}{5} - \frac{1}{6} =$ $\frac{1}{30}$

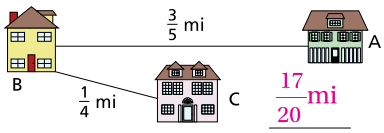
Find the total distance from House A to House B and then to House C.

18.



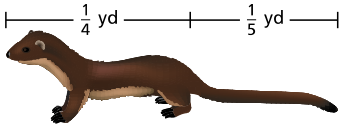
$\frac{33}{40}$ mi

19.



$\frac{17}{20}$ mi

20. **WEASEL LENGTH** Find the total length of the weasel. $\frac{9}{20}$ yd



21. **IMPROVING YOUR SPEED** You swam at a rate of $\frac{3}{10}$ mile per hour in March. You swam at a rate of $\frac{3}{8}$ mile per hour in April. How much faster did you swim in April? $\frac{6}{80}$, or $\frac{3}{40}$ mile per hour

REVIEW: Multiplying Whole Numbers and Fractions

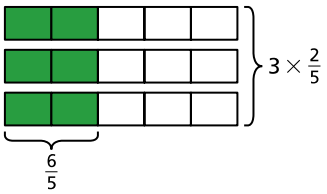
Name _____

Key Concept and Vocabulary

Multiply whole number and numerator.

$3 \times \frac{2}{5} = \frac{3 \times 2}{5} = \frac{6}{5}$

Visual Model



Skill Examples

1. $4 \times \frac{2}{3} = \frac{4 \times 2}{3} = \frac{8}{3}$
2. $5 \times \frac{1}{6} = \frac{5 \times 1}{6} = \frac{5}{6}$
3. $2 \times \frac{3}{4} = \frac{2 \times 3}{4} = \frac{6}{4} = \frac{3}{2}$
4. $8 \times \frac{5}{10} = \frac{8 \times 5}{10} = \frac{40}{10} = 4$

Application Example

5. One lap around a track is equal to $\frac{4}{5}$ mile. You walk 3 laps around the track. How many miles do you walk?

$3 \times \frac{4}{5} = \frac{3 \times 4}{5} = \frac{12}{5}$

You walk $\frac{12}{5}$ miles.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the product.

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

Compare.

18. $4 \times \frac{7}{8} \square 6 \times \frac{3}{8}$
19. $\frac{4}{5} \times 3 \square \frac{3}{10} \times 9$
20. $\frac{4}{3} \times 9 \square 8 \times \frac{3}{2}$

21. **CINNAMON** A recipe calls for $\frac{3}{4}$ teaspoon of cinnamon. You make 3 batches of the recipe.

How may teaspoons of cinnamon do you use? _____

22. **PIANO PRACTICE** You spend $\frac{5}{2}$ hours practicing the piano each day for 3 days. Your friend spends $\frac{4}{3}$ hours practicing the piano each day for 4 days. Who spends more time practicing the piano? _____

REVIEW: Multiplying Whole Numbers and Fractions

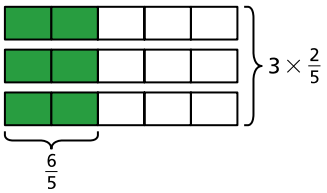
Name _____

Key Concept and Vocabulary

Multiply whole number and numerator.

$3 \times \frac{2}{5} = \frac{3 \times 2}{5} = \frac{6}{5}$

Visual Model



Skill Examples

1. $4 \times \frac{2}{3} = \frac{4 \times 2}{3} = \frac{8}{3}$
2. $5 \times \frac{1}{6} = \frac{5 \times 1}{6} = \frac{5}{6}$
3. $2 \times \frac{3}{4} = \frac{2 \times 3}{4} = \frac{6}{4} = \frac{3}{2}$
4. $8 \times \frac{5}{10} = \frac{8 \times 5}{10} = \frac{40}{10} = 4$

Application Example

5. One lap around a track is equal to $\frac{4}{5}$ mile. You walk 3 laps around the track. How many miles do you walk?

$3 \times \frac{4}{5} = \frac{3 \times 4}{5} = \frac{12}{5}$

You walk $\frac{12}{5}$ miles.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the product.

6. $3 \times \frac{1}{4} =$ $\frac{3}{4}$
7. $1 \times \frac{5}{8} =$ $\frac{5}{8}$
8. $5 \times \frac{2}{3} =$ $\frac{10}{3}$
9. $2 \times \frac{2}{5} =$ $\frac{4}{5}$
10. $4 \times \frac{7}{10} =$ $\frac{28}{10}$, or $\frac{14}{5}$
11. $8 \times \frac{3}{4} =$ $\frac{24}{6}$, or 6
12. $3 \times \frac{4}{3} =$ $\frac{12}{3}$, or 4
13. $6 \times \frac{7}{12} =$ $\frac{42}{12}$, or $\frac{7}{2}$
14. $\frac{3}{2} \times 5 =$ $\frac{15}{2}$
15. $\frac{9}{10} \times 9 =$ $\frac{81}{10}$
16. $3 \times 2 \times \frac{4}{5} =$ $\frac{24}{5}$
17. $4 \times \frac{5}{12} \times 6 =$ $\frac{120}{12}$, or 10

Compare.

18. $4 \times \frac{7}{8}$ $\boxed{>}$ $6 \times \frac{3}{8}$
19. $\frac{4}{5} \times 3$ $\boxed{<}$ $\frac{3}{10} \times 9$
20. $\frac{4}{3} \times 9$ $\boxed{=}$ $8 \times \frac{3}{2}$

21. **CINNAMON** A recipe calls for $\frac{3}{4}$ teaspoon of cinnamon. You make 3 batches of the recipe. How may teaspoons of cinnamon do you use? $\frac{9}{4}$ teaspoons

22. **PIANO PRACTICE** You spend $\frac{5}{2}$ hours practicing the piano each day for 3 days. Your friend spends $\frac{4}{3}$ hours practicing the piano each day for 4 days. Who spends more time practicing the piano? you

REVIEW: Multiplying Fractions

Name _____

Key Concept and Vocabulary

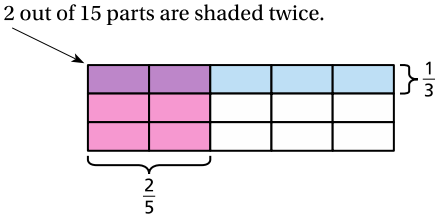
Multiply numerators.

$$\frac{1}{3} \times \frac{2}{5} = \frac{1 \times 2}{3 \times 5} = \frac{2}{15}$$

Multiply denominators.

Visual Model

2 out of 15 parts are shaded twice.



Skill Examples

1. $\frac{2}{3} \times \frac{1}{4} = \frac{2 \times 1}{3 \times 4} = \frac{2}{12} = \frac{1}{6}$
2. $\frac{3}{8} \times \frac{4}{5} = \frac{3 \times 4}{8 \times 5} = \frac{12}{40} = \frac{3}{10}$
3. $\frac{2}{5} \times \frac{1}{4} = \frac{2 \times 1}{5 \times 4} = \frac{2}{20} = \frac{1}{10}$
4. $\frac{5}{6} \times \frac{3}{4} = \frac{5 \times 3}{6 \times 4} = \frac{15}{24} = \frac{5}{8}$

Application Example

5. A recipe calls for $\frac{3}{4}$ cup of flour. You want to make $\frac{1}{2}$ of the recipe. How much flour do you need?

$$\frac{1}{2} \times \frac{3}{4} = \frac{1 \times 3}{2 \times 4} = \frac{3}{8}$$

You need $\frac{3}{8}$ cup flour.

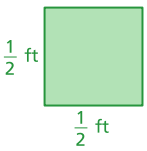
PRACTICE

Check your answers at BigIdeasMath.com.

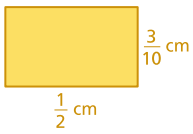
Find the product.

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

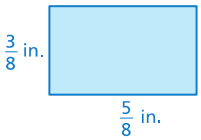
Find the area of the rectangle.

18. 

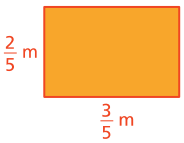
Area = _____

19. 

Area = _____

20. 

Area = _____

21. 

Area = _____

22. **OPEN-ENDED** Find three different pairs of fractions that have the same product.

$\square \cdot \square = \square \qquad \square \cdot \square = \square \qquad \square \cdot \square = \square$

REVIEW: Multiplying Fractions

Name _____

Key Concept and Vocabulary

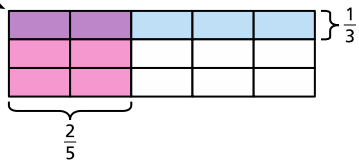
Multiply numerators.

$$\frac{1}{3} \times \frac{2}{5} = \frac{1 \times 2}{3 \times 5} = \frac{2}{15}$$

Multiply denominators.

Visual Model

2 out of 15 parts are shaded twice.



Skill Examples

1. $\frac{2}{3} \times \frac{1}{4} = \frac{2 \times 1}{3 \times 4} = \frac{2}{12} = \frac{1}{6}$
2. $\frac{3}{8} \times \frac{4}{5} = \frac{3 \times 4}{8 \times 5} = \frac{12}{40} = \frac{3}{10}$
3. $\frac{2}{5} \times \frac{1}{4} = \frac{2 \times 1}{5 \times 4} = \frac{2}{20} = \frac{1}{10}$
4. $\frac{5}{6} \times \frac{3}{4} = \frac{5 \times 3}{6 \times 4} = \frac{15}{24} = \frac{5}{8}$

Application Example

5. A recipe calls for $\frac{3}{4}$ cup of flour. You want to make $\frac{1}{2}$ of the recipe. How much flour do you need?

$$\frac{1}{2} \times \frac{3}{4} = \frac{1 \times 3}{2 \times 4} = \frac{3}{8}$$

You need $\frac{3}{8}$ cup flour.

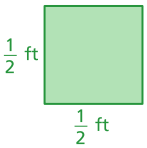
PRACTICE

Check your answers at BigIdeasMath.com.

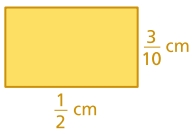
Find the product.

6. $\frac{1}{3} \times \frac{3}{8} =$ $\frac{3}{24}$, or $\frac{1}{8}$
7. $\frac{1}{2} \times \frac{1}{4} =$ $\frac{1}{8}$
8. $\frac{1}{10} \times \frac{3}{10} =$ $\frac{3}{100}$
9. $\frac{3}{2} \times \frac{2}{5} =$ $\frac{6}{10}$, or $\frac{3}{5}$
10. $\frac{3}{8} \times \frac{1}{2} =$ $\frac{3}{16}$
11. $\frac{1}{5} \times \frac{2}{5} =$ $\frac{2}{25}$
12. $\frac{2}{3} \times \frac{2}{3} =$ $\frac{4}{9}$
13. $\frac{3}{2} \times \frac{2}{3} =$ $\frac{6}{6}$, or 1
14. $\frac{3}{1} \times \frac{1}{3} =$ $\frac{3}{3}$, or 1
15. $\frac{5}{12} \times \frac{5}{2} =$ $\frac{25}{24}$
16. $\frac{15}{8} \times \frac{6}{5} =$ $\frac{90}{40}$, or $\frac{9}{4}$
17. $\frac{1}{3} \times \frac{3}{4} \times \frac{4}{5} =$ $\frac{12}{60}$, or $\frac{1}{5}$

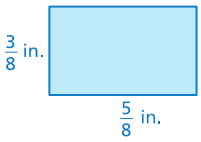
Find the area of the rectangle.

18. 

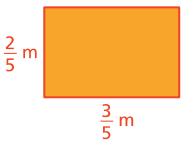
Area = $\frac{1}{4}$ ft^2

19. 

Area = $\frac{3}{20}$ cm^2

20. 

Area = $\frac{15}{64}$ in.^{2}

21. 

Area = $\frac{6}{25}$ m^2

22. **OPEN-ENDED** Find three different pairs of fractions that have the same product.

Sample answer: $\frac{9}{10} \cdot \frac{5}{6} = \frac{3}{4}$ $\quad \frac{7}{8} \cdot \frac{6}{7} = \frac{3}{4}$ $\quad \frac{4}{5} \cdot \frac{15}{16} = \frac{3}{4}$

REVIEW: Dividing Whole Numbers and Fractions

Name _____

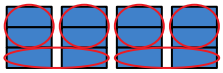
Key Concept and Vocabulary

$4 \div \frac{2}{3} = 4 \times \frac{3}{2} = \frac{4 \times 3}{2} = \frac{12}{2} = 6$

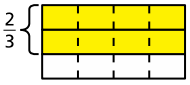
Invert and multiply.

$\frac{2}{3} \div 4 = \frac{2}{3} \times \frac{1}{4} = \frac{2 \times 1}{3 \times 4} = \frac{2}{12} = \frac{1}{6}$

Visual Models



There are 6 two-thirds in 4 wholes.



There are 4 two-twelfths, or one-sixths, in $\frac{2}{3}$.

Skill Examples

1. $2 \div \frac{4}{5} = 2 \times \frac{5}{4} = \frac{2 \times 5}{4} = \frac{10}{4} = \frac{5}{2}$
2. $4 \div \frac{1}{2} = 4 \times 2 = 8$
3. $\frac{3}{4} \div 3 = \frac{3}{4} \times \frac{1}{3} = \frac{3 \times 1}{4 \times 3} = \frac{3}{12} = \frac{1}{4}$
4. $\frac{1}{3} \div 5 = \frac{1}{3} \times \frac{1}{5} = \frac{1 \times 1}{3 \times 5} = \frac{1}{15}$

Application Example

5. You have $\frac{1}{2}$ gallon of milk. You pour the milk equally into 8 glasses. How much milk is in each glass?

$\frac{1}{2} \div 8 = \frac{1}{2} \times \frac{1}{8} = \frac{1 \times 1}{2 \times 8} = \frac{1}{16}$

There is $\frac{1}{16}$ gallon of milk in each glass.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the quotient.

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

Compare.

18. $5 \div \frac{1}{4}$ ☐ $4 \div \frac{1}{5}$
19. $\frac{7}{8} \div 6$ ☐ $\frac{7}{8} \div 8$
20. $2 \div \frac{3}{2}$ ☐ $3 \div \frac{2}{3}$

21. **SMOOTHIES** You need $\frac{3}{4}$ cup of strawberries to make a smoothie. How many smoothies can you make with 3 cups of strawberries? _____

22. **WATERING PLANTS** You have 5 gallons of water. You use $\frac{1}{2}$ of the water to water a tree. Then you divide the rest of the water equally among 10 plants. How much water does each plant get? _____

REVIEW: Dividing Whole Numbers and Fractions

Name _____

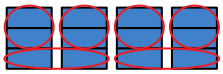
Key Concept and Vocabulary

$4 \div \frac{2}{3} = 4 \times \frac{3}{2} = \frac{4 \times 3}{2} = \frac{12}{2} = 6$

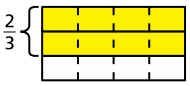
Invert and multiply.

$\frac{2}{3} \div 4 = \frac{2}{3} \times \frac{1}{4} = \frac{2 \times 1}{3 \times 4} = \frac{2}{12} = \frac{1}{6}$

Visual Models



There are 6 two-thirds in 4 wholes.



There are 4 two-twelfths, or one-sixths, in $\frac{2}{3}$.

Skill Examples

1. $2 \div \frac{4}{5} = 2 \times \frac{5}{4} = \frac{2 \times 5}{4} = \frac{10}{4} = \frac{5}{2}$
2. $4 \div \frac{1}{2} = 4 \times 2 = 8$
3. $\frac{3}{4} \div 3 = \frac{3}{4} \times \frac{1}{3} = \frac{3 \times 1}{4 \times 3} = \frac{3}{12} = \frac{1}{4}$
4. $\frac{1}{3} \div 5 = \frac{1}{3} \times \frac{1}{5} = \frac{1 \times 1}{3 \times 5} = \frac{1}{15}$

Application Example

5. You have $\frac{1}{2}$ gallon of milk. You pour the milk equally into 8 glasses. How much milk is in each glass?

$\frac{1}{2} \div 8 = \frac{1}{2} \times \frac{1}{8} = \frac{1 \times 1}{2 \times 8} = \frac{1}{16}$

There is $\frac{1}{16}$ gallon of milk in each glass.

PRACTICE

Check your answers at BigIdeasMath.com.

Find the quotient.

6. $2 \div \frac{1}{5} =$ 10
7. $3 \div \frac{1}{2} =$ 6
8. $6 \div \frac{3}{4} =$ $\frac{24}{3}$, or 8
9. $4 \div \frac{5}{6} =$ $\frac{24}{5}$
10. $6 \div \frac{4}{5} =$ $\frac{30}{4}$, or $\frac{15}{2}$
11. $10 \div \frac{3}{8} =$ $\frac{80}{3}$
12. $\frac{1}{4} \div 3 =$ $\frac{1}{12}$
13. $\frac{1}{3} \div 2 =$ $\frac{1}{6}$
14. $\frac{5}{8} \div 5 =$ $\frac{5}{40}$, or $\frac{1}{8}$
15. $\frac{3}{5} \div 6 =$ $\frac{3}{30}$, or $\frac{1}{10}$
16. $\frac{3}{4} \div 7 =$ $\frac{3}{28}$
17. $\frac{4}{5} \div 10 =$ $\frac{4}{50}$, or $\frac{2}{25}$

Compare.

18. $5 \div \frac{1}{4}$ $\boxed{=}$ $4 \div \frac{1}{5}$
19. $\frac{7}{8} \div 6$ $\boxed{>}$ $\frac{7}{8} \div 8$
20. $2 \div \frac{3}{2}$ $\boxed{<}$ $3 \div \frac{2}{3}$

21. **SMOOTHIES** You need $\frac{3}{4}$ cup of strawberries to make a smoothie. How many smoothies can you make with 3 cups of strawberries? 4 smoothies

22. **WATERING PLANTS** You have 5 gallons of water. You use $\frac{1}{2}$ of the water to water a tree. Then you divide the rest of the water equally among 10 plants. How much water does each plant get? $\frac{1}{4}$ gallon of water

REVIEW: Dividing Fractions

Name _____

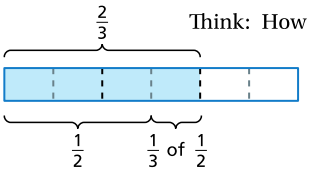
Key Concept and Vocabulary

$$\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \times \frac{2}{1} = \frac{2 \times 2}{3 \times 1} = \frac{4}{3}$$

Invert and multiply.

Visual Model

Think: How many $\frac{1}{2}$s are in $\frac{2}{3}$?



There are $1\frac{1}{3}$, or $\frac{4}{3}$, one-halves in $\frac{2}{3}$.

Skill Examples

1. $\frac{2}{5} \div \frac{1}{5} = \frac{2}{5} \times \frac{5}{1} = \frac{2 \times 5}{5 \times 1} = \frac{10}{5} = 2$
2. $\frac{9}{4} \div \frac{3}{4} = \frac{9}{4} \times \frac{4}{3} = \frac{9 \times 4}{4 \times 3} = \frac{36}{12} = 3$
3. $\frac{1}{6} \div \frac{2}{3} = \frac{1}{6} \times \frac{3}{2} = \frac{1 \times 3}{6 \times 2} = \frac{3}{12} = \frac{1}{4}$
4. $\frac{3}{4} \div \frac{5}{12} = \frac{3}{4} \times \frac{12}{5} = \frac{3 \times 12}{4 \times 5} = \frac{36}{20} = \frac{9}{5}$

Application Example

5. There are $\frac{3}{2}$ cups of trail mix in a bag. A serving of trail mix is $\frac{1}{4}$ cup. How many servings of trail mix are in the bag?

$$\frac{3}{2} \div \frac{1}{4} = \frac{3}{2} \times \frac{4}{1} = \frac{3 \times 4}{2 \times 1} = \frac{12}{2} = 6$$

There are 6 servings of trail mix in the bag.

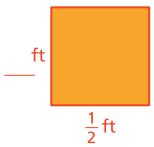
PRACTICE

Check your answers at BigIdeasMath.com.

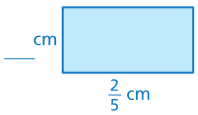
Find the quotient.

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

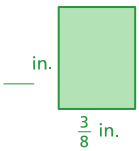
Find the unknown measure of the rectangle.

18. 

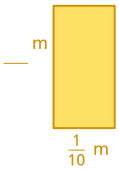
Area $= \frac{1}{4}$ ft^2

19. 

Area $= \frac{2}{25}$ cm^2

20. 

Area $= \frac{3}{16}$ in.^{2}

21. 

Area $= \frac{1}{50}$ m^2

22. **MAGNETIC TAPE** A refrigerator magnet uses $\frac{5}{8}$ inch of magnetic tape. How many refrigerator magnets can you make with $9\frac{3}{8}$ inches of magnetic tape? Explain.

_____

REVIEW: Dividing Fractions

Name _____

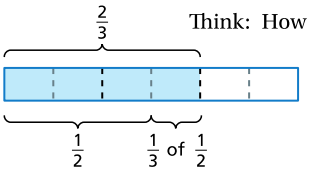
Key Concept and Vocabulary

$\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \times \frac{2}{1} = \frac{2 \times 2}{3 \times 1} = \frac{4}{3}$

Invert and multiply.

Visual Model

Think: How many $\frac{1}{2}$s are in $\frac{2}{3}$?



There are $1\frac{1}{3}$, or $\frac{4}{3}$, one-halves in $\frac{2}{3}$.

Skill Examples

1. $\frac{2}{5} \div \frac{1}{5} = \frac{2}{5} \times \frac{5}{1} = \frac{2 \times 5}{5 \times 1} = \frac{10}{5} = 2$
2. $\frac{9}{4} \div \frac{3}{4} = \frac{9}{4} \times \frac{4}{3} = \frac{9 \times 4}{4 \times 3} = \frac{36}{12} = 3$
3. $\frac{1}{6} \div \frac{2}{3} = \frac{1}{6} \times \frac{3}{2} = \frac{1 \times 3}{6 \times 2} = \frac{3}{12} = \frac{1}{4}$
4. $\frac{3}{4} \div \frac{5}{12} = \frac{3}{4} \times \frac{12}{5} = \frac{3 \times 12}{4 \times 5} = \frac{36}{20} = \frac{9}{5}$

Application Example

5. There are $\frac{3}{2}$ cups of trail mix in a bag. A serving of trail mix is $\frac{1}{4}$ cup. How many servings of trail mix are in the bag?

$\frac{3}{2} \div \frac{1}{4} = \frac{3}{2} \times \frac{4}{1} = \frac{3 \times 4}{2 \times 1} = \frac{12}{2} = 6$

There are 6 servings of trail mix in the bag.

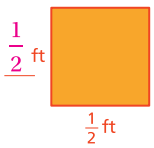
PRACTICE

Check your answers at BigIdeasMath.com.

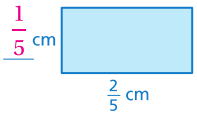
Find the quotient.

6. $\frac{3}{5} \div \frac{1}{5} =$ $\frac{15}{5}$, or 3
7. $\frac{1}{2} \div \frac{1}{8} =$ $\frac{8}{2}$, or 4
8. $\frac{2}{3} \div \frac{1}{6} =$ $\frac{12}{3}$, or 4
9. $\frac{1}{5} \div \frac{2}{3} =$ $\frac{3}{10}$
10. $\frac{2}{3} \div \frac{3}{4} =$ $\frac{8}{9}$
11. $\frac{4}{5} \div \frac{3}{10} =$ $\frac{40}{15}$, or $\frac{8}{3}$
12. $\frac{3}{8} \div \frac{3}{8} =$ $\frac{24}{24}$, or 1
13. $\frac{1}{3} \div \frac{5}{6} =$ $\frac{6}{15}$, or $\frac{2}{5}$
14. $\frac{2}{3} \div \frac{2}{9} =$ $\frac{18}{6}$, or 3
15. $\frac{9}{4} \div \frac{1}{4} =$ $\frac{36}{4}$, or 9
16. $\frac{3}{4} \div \frac{2}{3} =$ $\frac{9}{8}$
17. $\frac{7}{10} \div \frac{3}{8} =$ $\frac{56}{30}$, or $\frac{28}{10}$

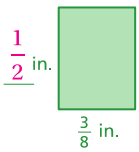
Find the unknown measure of the rectangle.

18. 

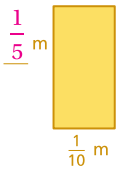
Area $= \frac{1}{4}$ ft^2

19. 

Area $= \frac{2}{25}$ cm^2

20. 

Area $= \frac{3}{16}$ in.^{2}

21. 

Area $= \frac{1}{50}$ m^2

22. **MAGNETIC TAPE** A refrigerator magnet uses $\frac{5}{8}$ inch of magnetic tape. How many refrigerator magnets can you make with $9\frac{3}{8}$ inches of magnetic tape? Explain.

15 magnets; $9\frac{3}{8} = \frac{75}{8}$, $\frac{75}{8} \div \frac{5}{8} = \frac{75}{8} \times \frac{8}{5} = \frac{600}{40} = 15$

REVIEW: Evaluating Complex Fractions

Name _____

Key Concept and Vocabulary

A complex fraction is a fraction that contains a fraction in its numerator, denominator, or both. To simplify a complex fraction, divide its numerator by its denominator.

Algebra: $\dfrac{\frac{a}{b}}{\frac{c}{d}} = \dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{a}{b} \cdot \dfrac{d}{c}$, where $b, c, d \neq 0$

Numbers: $\dfrac{\frac{2}{3}}{\frac{5}{6}} = \dfrac{2}{3} \div \dfrac{5}{6} = \dfrac{2}{3} \cdot \dfrac{6}{5} = \dfrac{12}{15} = \dfrac{4}{5}$

Skill Examples

1. $\dfrac{\frac{5}{8}}{4} = \dfrac{5}{8} \div 4 = \dfrac{5}{8} \cdot \dfrac{1}{4} = \dfrac{5}{32}$

2. $\dfrac{15}{\frac{9}{10}} = 15 \div \dfrac{9}{10} = \dfrac{15}{1} \cdot \dfrac{10}{9} = \dfrac{150}{9} = \dfrac{50}{3}$

3. $\dfrac{\frac{1}{3}}{\frac{5}{7}} = \dfrac{1}{3} \div \dfrac{5}{7} = \dfrac{1}{3} \cdot \dfrac{7}{5} = \dfrac{7}{15}$

4. $\dfrac{\frac{9}{16}}{\frac{3}{8}} = \dfrac{9}{16} \div \dfrac{3}{8} = \dfrac{9}{16} \cdot \dfrac{8}{3} = \dfrac{72}{48} = \dfrac{3}{2}$

PRACTICE

Check your answers at BigIdeasMath.com.

Simplify the complex fraction.

5. $\dfrac{\frac{3}{2}}{6} =$ _____

6. $\dfrac{20}{\frac{4}{5}} =$ _____

7. $\dfrac{\frac{9}{2}}{\frac{12}{7}} =$ _____

8. $\dfrac{\frac{7}{10}}{\frac{9}{20}} =$ _____

9. $\dfrac{\frac{2}{3}}{\frac{16}{27}} =$ _____

10. $\dfrac{5}{\frac{7}{10}} =$ _____

11. $\dfrac{\frac{12}{17}}{8} =$ _____

12. $\dfrac{\frac{3}{14}}{\frac{13}{49}} =$ _____

13. $\dfrac{\frac{27}{32}}{\frac{7}{8}} =$ _____

14. $\dfrac{\frac{9}{10}}{3} =$ _____

15. $\dfrac{6}{\frac{1}{6}} =$ _____

16. $\dfrac{\frac{4}{5}}{\frac{22}{25}} =$ _____

17. $\dfrac{24}{\frac{18}{7}} =$ _____

18. $\dfrac{\frac{1}{4}}{\frac{1}{10}} =$ _____

19. $\dfrac{\frac{3}{5}}{16} =$ _____

20. $\dfrac{\frac{16}{21}}{\frac{8}{9}} =$ _____

REVIEW: Evaluating Complex Fractions

Name _____

Key Concept and Vocabulary

A complex fraction is a fraction that contains a fraction in its numerator, denominator, or both. To simplify a complex fraction, divide its numerator by its denominator.

Algebra: $\dfrac{\frac{a}{b}}{\frac{c}{d}} = \dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{a}{b} \cdot \dfrac{d}{c}$, where $b, c, d \neq 0$

Numbers: $\dfrac{\frac{2}{3}}{\frac{5}{6}} = \dfrac{2}{3} \div \dfrac{5}{6} = \dfrac{2}{3} \cdot \dfrac{6}{5} = \dfrac{12}{15} = \dfrac{4}{5}$

Skill Examples

1. $\dfrac{\frac{5}{8}}{4} = \dfrac{5}{8} \div 4 = \dfrac{5}{8} \cdot \dfrac{1}{4} = \dfrac{5}{32}$

2. $\dfrac{15}{\frac{9}{10}} = 15 \div \dfrac{9}{10} = \dfrac{15}{1} \cdot \dfrac{10}{9} = \dfrac{150}{9} = \dfrac{50}{3}$

3. $\dfrac{\frac{1}{3}}{\frac{5}{7}} = \dfrac{1}{3} \div \dfrac{5}{7} = \dfrac{1}{3} \cdot \dfrac{7}{5} = \dfrac{7}{15}$

4. $\dfrac{\frac{9}{16}}{\frac{3}{8}} = \dfrac{9}{16} \div \dfrac{3}{8} = \dfrac{9}{16} \cdot \dfrac{8}{3} = \dfrac{72}{48} = \dfrac{3}{2}$

PRACTICE

Check your answers at BigIdeasMath.com.

Simplify the complex fraction.

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

6. $\dfrac{20}{\frac{4}{5}} = 25$

7. $\dfrac{\frac{9}{2}}{\frac{12}{7}} = \dfrac{21}{8}$

8. $\dfrac{\frac{7}{10}}{\frac{9}{20}} = \dfrac{14}{9}$

9. $\dfrac{\frac{2}{3}}{\frac{16}{27}} = \dfrac{9}{8}$

10. $\dfrac{5}{\frac{7}{10}} = \dfrac{50}{7}$

11. $\dfrac{\frac{12}{17}}{8} = \dfrac{3}{34}$

12. $\dfrac{\frac{3}{14}}{\frac{13}{49}} = \dfrac{21}{26}$

13. $\dfrac{\frac{27}{32}}{\frac{7}{8}} = \dfrac{27}{28}$

14. $\dfrac{\frac{9}{10}}{3} = \dfrac{3}{10}$

15. $\dfrac{6}{\frac{1}{6}} = 36$

16. $\dfrac{\frac{4}{5}}{\frac{22}{25}} = \dfrac{10}{11}$

17. $\dfrac{24}{\frac{18}{7}} = \dfrac{28}{3}$

18. $\dfrac{\frac{1}{4}}{\frac{1}{10}} = \dfrac{5}{2}$

19. $\dfrac{\frac{3}{5}}{16} = \dfrac{3}{80}$

20. $\dfrac{\frac{16}{21}}{\frac{8}{9}} = \dfrac{6}{7}$

REVIEW: Mixed Numbers and Improper Fractions

Name _____

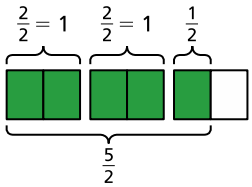
Key Concept and Vocabulary

improper fraction: a fraction greater than 1

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

mixed number: represents the sum of a whole number and a proper fraction

Visual Model



Skill Examples

1. $\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 2\frac{1}{3}$

2. $\frac{8}{4} = \frac{4}{4} + \frac{4}{4} = 2$

3. $2\frac{1}{4} = \frac{8}{4} + \frac{1}{4} = \frac{9}{4}$

4. $3\frac{3}{5} = \frac{15}{5} + \frac{3}{5} = \frac{18}{5}$

Application Example

5. You fill a half-gallon container with water 13 times. How many gallons of water do you use?

13 halves → $\frac{13}{2} = 6\frac{1}{2}$ ← 6 and one-half

You use $6\frac{1}{2}$ gallons of water.

PRACTICE

Check your answers at BigIdeasMath.com.

Write the improper fraction as a mixed number.

6. $\frac{4}{3} =$ _____

7. $\frac{3}{2} =$ _____

8. $\frac{8}{3} =$ _____

9. $\frac{9}{6} =$ _____

10. $\frac{7}{4} =$ _____

11. $\frac{28}{3} =$ _____

12. $\frac{19}{4} =$ _____

13. $\frac{11}{2} =$ _____

Write the mixed number as an improper fraction.

14. $2\frac{2}{3} =$ _____

15. $5\frac{1}{4} =$ _____

16. $3\frac{2}{5} =$ _____

17. $1\frac{3}{8} =$ _____

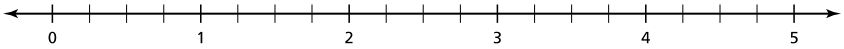
18. Rewrite the sentence using a mixed number: Susan drinks $\frac{5}{4}$ quarts of milk.

_____

19. Rewrite the sentence using an improper fraction: Tom runs for $2\frac{1}{4}$ hours.

_____

20. **NUMBER LINE** Plot the improper fractions on the number line: $\frac{7}{4}$, $\frac{7}{2}$, and $\frac{19}{4}$.



REVIEW: Mixed Numbers and Improper Fractions

Name _____

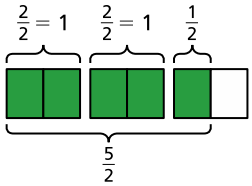
Key Concept and Vocabulary

improper fraction: a fraction greater than 1

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

mixed number: represents the sum of a whole number and a proper fraction

Visual Model



Skill Examples

1. $\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 2\frac{1}{3}$

2. $\frac{8}{4} = \frac{4}{4} + \frac{4}{4} = 2$

3. $2\frac{1}{4} = \frac{8}{4} + \frac{1}{4} = \frac{9}{4}$

4. $3\frac{3}{5} = \frac{15}{5} + \frac{3}{5} = \frac{18}{5}$

Application Example

5. You fill a half-gallon container with water 13 times. How many gallons of water do you use?

13 halves → $\frac{13}{2} = 6\frac{1}{2}$ ← 6 and one-half

You use $6\frac{1}{2}$ gallons of water.

PRACTICE

Check your answers at BigIdeasMath.com.

Write the improper fraction as a mixed number.

6. $\frac{4}{3} =$ $1\frac{1}{3}$

7. $\frac{3}{2} =$ $1\frac{1}{2}$

8. $\frac{8}{3} =$ $2\frac{2}{3}$

9. $\frac{9}{6} =$ $1\frac{1}{2}$

10. $\frac{7}{4} =$ $1\frac{3}{4}$

11. $\frac{28}{3} =$ $9\frac{1}{3}$

12. $\frac{19}{4} =$ $4\frac{3}{4}$

13. $\frac{11}{2} =$ $5\frac{1}{2}$

Write the mixed number as an improper fraction.

14. $2\frac{2}{3} =$ $\frac{8}{3}$

15. $5\frac{1}{4} =$ $\frac{21}{4}$

16. $3\frac{2}{5} =$ $\frac{17}{5}$

17. $1\frac{3}{8} =$ $\frac{11}{8}$

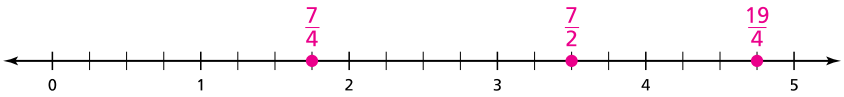
18. Rewrite the sentence using a mixed number: Susan drinks $\frac{5}{4}$ quarts of milk.

Susan drinks $1\frac{1}{4}$ quarts of milk.

19. Rewrite the sentence using an improper fraction: Tom runs for $2\frac{1}{4}$ hours.

Tom runs for $\frac{9}{4}$ hours.

20. **NUMBER LINE** Plot the improper fractions on the number line: $\frac{7}{4}$, $\frac{7}{2}$, and $\frac{19}{4}$.



REVIEW: Adding and Subtracting Mixed Numbers

Name _____

Key Concept and Vocabulary

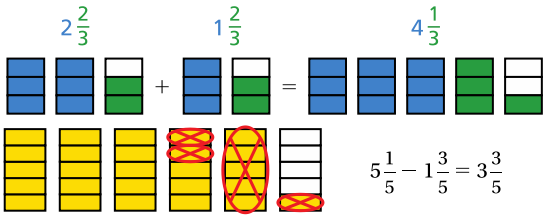
$2\frac{2}{3} + 1\frac{2}{3} = (2 + 1) + \left(\frac{2}{3} + \frac{2}{3}\right)$

$= 3\frac{4}{3} = 4\frac{1}{3}$

$5\frac{1}{5} - 1\frac{3}{5} = 4\frac{6}{5} - 1\frac{3}{5}$

$= (4 - 1) + \left(\frac{6}{5} - \frac{3}{5}\right) = 3\frac{3}{5}$

Visual Models

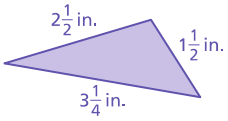


Skill Examples

1. $5\frac{3}{5} + 1\frac{4}{5} = 6\frac{7}{5} = 7\frac{2}{5}$
2. $3\frac{1}{4} + 2\frac{1}{2} = 3\frac{1}{4} + 2\frac{2}{4} = 5\frac{3}{4}$
3. $4\frac{1}{3} - 1\frac{2}{3} = 3\frac{4}{3} - 1\frac{2}{3} = 2\frac{2}{3}$
4. $5\frac{5}{6} - 3\frac{1}{3} = 5\frac{5}{6} - 3\frac{2}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

Application Example

5. Find the perimeter of the triangle.



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

The perimeter is $7\frac{1}{4}$ inches.

PRACTICE

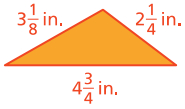
Check your answers at BigIdeasMath.com.

Find the sum or difference. Write your answer in simplest form.

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

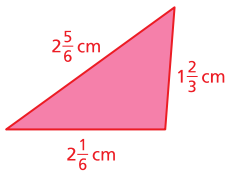
Find the perimeter of the triangle.

18.



Perimeter = _____

19.



Perimeter = _____

20. **HEIGHT** Sarah was $50\frac{1}{4}$ inches tall when she was 12 years old. She was $48\frac{1}{2}$ inches tall when she was 11 years old. How much did she grow during the year? _____

21. **PAINT** You use $2\frac{3}{4}$ cups of blue paint and $2\frac{3}{4}$ cups of yellow paint to make green paint. How many cups of green paint do you make? _____

REVIEW: Adding and Subtracting Mixed Numbers

Name _____

Key Concept and Vocabulary

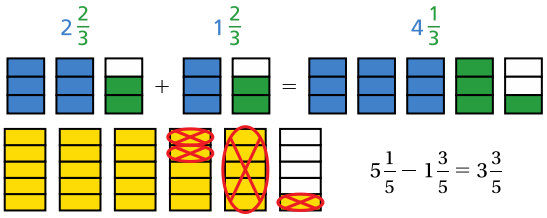
$2\frac{2}{3} + 1\frac{2}{3} = (2 + 1) + \left(\frac{2}{3} + \frac{2}{3}\right)$

$= 3\frac{4}{3} = 4\frac{1}{3}$

$5\frac{1}{5} - 1\frac{3}{5} = 4\frac{6}{5} - 1\frac{3}{5}$

$= (4 - 1) + \left(\frac{6}{5} - \frac{3}{5}\right) = 3\frac{3}{5}$

Visual Models



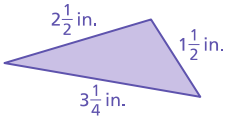
$5\frac{1}{5} - 1\frac{3}{5} = 3\frac{3}{5}$

Skill Examples

1. $5\frac{3}{5} + 1\frac{4}{5} = 6\frac{7}{5} = 7\frac{2}{5}$
2. $3\frac{1}{4} + 2\frac{1}{2} = 3\frac{1}{4} + 2\frac{2}{4} = 5\frac{3}{4}$
3. $4\frac{1}{3} - 1\frac{2}{3} = 3\frac{4}{3} - 1\frac{2}{3} = 2\frac{2}{3}$
4. $5\frac{5}{6} - 3\frac{1}{3} = 5\frac{5}{6} - 3\frac{2}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

Application Example

5. Find the perimeter of the triangle.



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

The perimeter is $7\frac{1}{4}$ inches.

PRACTICE

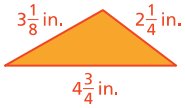
Check your answers at BigIdeasMath.com.

Find the sum or difference. Write your answer in simplest form.

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

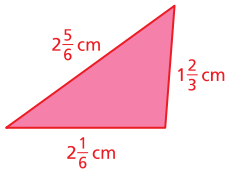
Find the perimeter of the triangle.

18.



Perimeter = $10\frac{1}{8}$ in.

19.



Perimeter = $6\frac{2}{3}$ cm

20. **HEIGHT** Sarah was $50\frac{1}{4}$ inches tall when she was 12 years old. She was $48\frac{1}{2}$ inches tall when she was 11 years old. How much did she grow during the year? $1\frac{3}{4}$ in.

21. **PAINT** You use $2\frac{3}{4}$ cups of blue paint and $2\frac{3}{4}$ cups of yellow paint to make green paint. How many cups of green paint do you make? $5\frac{1}{2}$ cups

REVIEW: Multiplying Mixed Numbers

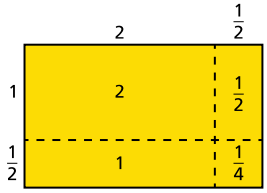
Name _____

Key Concept and Vocabulary

$2\frac{1}{2} \times 1\frac{1}{2} = \frac{5}{2} \times \frac{3}{2} = \frac{15}{4} = 3\frac{3}{4}$

Rewrite as improper fractions.

Visual Model



Area $= 2 + 1 + \frac{1}{2} + \frac{1}{4} = 3\frac{3}{4}$

Skill Examples

1. $3\frac{1}{2} \times 2\frac{1}{3} = \frac{7}{2} \times \frac{7}{3} = \frac{49}{6} = 8\frac{1}{6}$
2. $1\frac{3}{4} \times 4\frac{1}{2} = \frac{7}{4} \times \frac{9}{2} = \frac{63}{8} = 7\frac{7}{8}$
3. $2\frac{2}{5} \times 1\frac{2}{3} = \frac{12}{5} \times \frac{5}{3} = \frac{60}{15} = 4$
4. $1\frac{1}{2} \times 1\frac{1}{2} = \frac{3}{2} \times \frac{3}{2} = \frac{9}{4} = 2\frac{1}{4}$

Application Example

5. Your friend earns $7\frac{1}{2}$ dollars each hour she works. How much money will she earn after working $4\frac{1}{2}$ hours?

$7\frac{1}{2} \times 4\frac{1}{2} = \frac{15}{2} \times \frac{9}{2} = \frac{135}{4} = 33\frac{3}{4}$

She will earn $33\frac{3}{4}$ dollars, or \$33.75.

PRACTICE

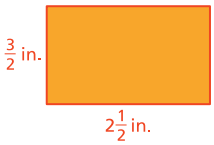
Check your answers at BigIdeasMath.com.

Find the product. Write your answer in simplest form.

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

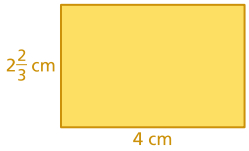
Find the area of the rectangle.

18.



Area = _____

19.



Area = _____

20. **RECIPE** Rewrite the recipe so that each ingredient is one-third of the full recipe.

$2\frac{1}{2}$ cups flour
2 tsp baking powder
4 Tbsp butter
$\frac{1}{2}$ tsp salt
$\frac{3}{4}$ cup milk

_____ cup flour
_____ tsp salt
_____ tsp baking powder
_____ cup milk
_____ Tbsp butter

REVIEW: Multiplying Mixed Numbers

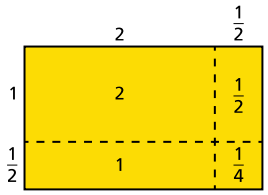
Name _____

Key Concept and Vocabulary

$2\frac{1}{2} \times 1\frac{1}{2} = \frac{5}{2} \times \frac{3}{2} = \frac{15}{4} = 3\frac{3}{4}$

Rewrite as improper fractions.

Visual Model



Area $= 2 + 1 + \frac{1}{2} + \frac{1}{4} = 3\frac{3}{4}$

Skill Examples

1. $3\frac{1}{2} \times 2\frac{1}{3} = \frac{7}{2} \times \frac{7}{3} = \frac{49}{6} = 8\frac{1}{6}$
2. $1\frac{3}{4} \times 4\frac{1}{2} = \frac{7}{4} \times \frac{9}{2} = \frac{63}{8} = 7\frac{7}{8}$
3. $2\frac{2}{5} \times 1\frac{2}{3} = \frac{12}{5} \times \frac{5}{3} = \frac{60}{15} = 4$
4. $1\frac{1}{2} \times 1\frac{1}{2} = \frac{3}{2} \times \frac{3}{2} = \frac{9}{4} = 2\frac{1}{4}$

Application Example

5. Your friend earns $7\frac{1}{2}$ dollars each hour she works. How much money will she earn after working $4\frac{1}{2}$ hours?

$7\frac{1}{2} \times 4\frac{1}{2} = \frac{15}{2} \times \frac{9}{2} = \frac{135}{4} = 33\frac{3}{4}$

She will earn $33\frac{3}{4}$ dollars, or \$33.75.

PRACTICE

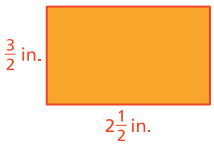
Check your answers at BigIdeasMath.com.

Find the product. Write your answer in simplest form.

6. $2\frac{1}{3} \times 1\frac{1}{3} =$ $3\frac{1}{9}$
7. $4\frac{2}{3} \times 1\frac{1}{2} =$ 7
8. $1\frac{1}{2} \times 3 =$ $4\frac{1}{2}$
9. $5\frac{1}{6} \times \frac{1}{3} =$ $1\frac{13}{18}$
10. $\frac{3}{4} \times 3\frac{1}{2} =$ $2\frac{5}{8}$
11. $5 \times 4\frac{1}{2} =$ $22\frac{1}{2}$
12. $2\frac{1}{7} \times \frac{7}{15} =$ 1
13. $1\frac{3}{5} \times \frac{3}{8} =$ $\frac{3}{5}$
14. $1\frac{1}{3} \times 1\frac{1}{3} =$ $1\frac{7}{9}$
15. $2\frac{2}{3} \times 3\frac{1}{3} =$ $8\frac{1}{3}$
16. $2\frac{1}{4} \times 8 =$ 18
17. $3\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} =$ $\frac{7}{8}$

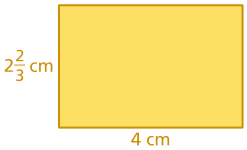
Find the area of the rectangle.

18.



Area = $3\frac{3}{4}$ in.^{2}

19.



Area = $10\frac{2}{3}$ cm^2

20. **RECIPE** Rewrite the recipe so that each ingredient is one-third of the full recipe.

$2\frac{1}{2}$ cups flour
2 tsp baking powder
4 Tbsp butter
$\frac{1}{2}$ tsp salt
$\frac{3}{4}$ cup milk

$\frac{5}{6}$ cup flour
$\frac{2}{3}$ tsp baking powder
$1\frac{1}{3}$ Tbsp butter
$\frac{1}{6}$ tsp salt
$\frac{1}{4}$ cup milk

REVIEW: Dividing Mixed Numbers

Name _____

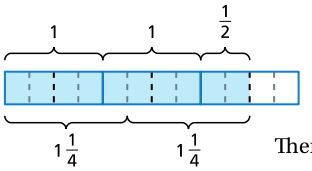
Key Concept and Vocabulary

Rewrite as improper fractions.

$$2\frac{1}{2} \div 1\frac{1}{4} = \frac{5}{2} \div \frac{5}{4}$$
$$= \frac{5}{2} \times \frac{4}{5}$$
$$= \frac{20}{10} = 2$$

Visual Model

Think: How many $\frac{1}{4}$s are in $2\frac{1}{2}$?



There are two $1\frac{1}{4}$s in $2\frac{1}{2}$.

Skill Examples

1. $5 \div 2\frac{1}{2} = \frac{5}{1} \div \frac{5}{2} = \frac{5}{1} \times \frac{2}{5} = \frac{10}{5} = 2$
2. $7\frac{1}{3} \div 11 = \frac{22}{3} \div \frac{11}{1} = \frac{22}{3} \times \frac{1}{11} = \frac{22}{33} = \frac{2}{3}$
3. $3\frac{3}{4} \div 2\frac{1}{2} = \frac{15}{4} \div \frac{5}{2} = \frac{15}{4} \times \frac{2}{5} = \frac{30}{20} = \frac{3}{2} = 1\frac{1}{2}$
4. $4\frac{1}{6} \div 1\frac{2}{3} = \frac{25}{6} \div \frac{5}{3} = \frac{25}{6} \times \frac{3}{5} = \frac{75}{30} = \frac{5}{2} = 2\frac{1}{2}$

Application Example

5. You need $2\frac{1}{2}$ inches of ribbon to make a Blue-Ribbon award. How many awards can you make with 35 inches of ribbon?

$$35 \div 2\frac{1}{2} = \frac{35}{1} \div \frac{5}{2} = \frac{35}{1} \times \frac{2}{5} = \frac{70}{5} = 14$$

You can make 14 awards.

PRACTICE

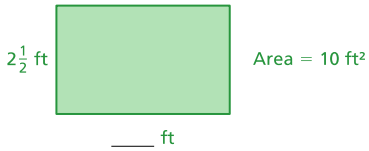
Check your answers at BigIdeasMath.com.

Find the quotient. Write your answer in simplest form.

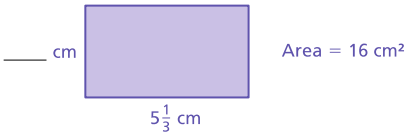
6. $4\frac{1}{2} \div 9 =$ _____
7. $3\frac{3}{7} \div 8 =$ _____
8. $4\frac{2}{3} \div 7 =$ _____
9. $1\frac{7}{9} \div 4 =$ _____
10. $8 \div 1\frac{1}{3} =$ _____
11. $32 \div 3\frac{1}{5} =$ _____
12. $11 \div 2\frac{3}{4} =$ _____
13. $9 \div 1\frac{1}{2} =$ _____
14. $5\frac{1}{2} \div \frac{1}{2} =$ _____
15. $\frac{1}{2} \div 1\frac{1}{2} =$ _____
16. $1\frac{1}{4} \div 1\frac{1}{4} =$ _____
17. $3\frac{1}{2} \div 1\frac{1}{3} =$ _____

Find the unknown measure of the rectangle.

18.



19.



20. **RED RIBBONS** You need $3\frac{1}{2}$ inches of ribbon to make a Red-Ribbon award. How many awards can you make with 35 inches of ribbon? _____

21. **SHIPPING** You are stacking books into a shipping box that is 15 inches high. Each book is $1\frac{1}{4}$ inches thick. How many books can you fit in a stack? _____

REVIEW: Dividing Mixed Numbers

Name _____

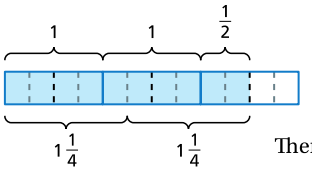
Key Concept and Vocabulary

Rewrite as improper fractions.

$$2\frac{1}{2} \div 1\frac{1}{4} = \frac{5}{2} \div \frac{5}{4}$$
$$= \frac{5}{2} \times \frac{4}{5}$$
$$= \frac{20}{10} = 2$$

Visual Model

Think: How many $\frac{1}{4}$s are in $2\frac{1}{2}$?



There are two $1\frac{1}{4}$s in $2\frac{1}{2}$.

Skill Examples

1. $5 \div 2\frac{1}{2} = \frac{5}{1} \div \frac{5}{2} = \frac{5}{1} \times \frac{2}{5} = \frac{10}{5} = 2$
2. $7\frac{1}{3} \div 11 = \frac{22}{3} \div \frac{11}{1} = \frac{22}{3} \times \frac{1}{11} = \frac{22}{33} = \frac{2}{3}$
3. $3\frac{3}{4} \div 2\frac{1}{2} = \frac{15}{4} \div \frac{5}{2} = \frac{15}{4} \times \frac{2}{5} = \frac{30}{20} = \frac{3}{2} = 1\frac{1}{2}$
4. $4\frac{1}{6} \div 1\frac{2}{3} = \frac{25}{6} \div \frac{5}{3} = \frac{25}{6} \times \frac{3}{5} = \frac{75}{30} = \frac{5}{2} = 2\frac{1}{2}$

Application Example

5. You need $2\frac{1}{2}$ inches of ribbon to make a Blue-Ribbon award. How many awards can you make with 35 inches of ribbon?

$$35 \div 2\frac{1}{2} = \frac{35}{1} \div \frac{5}{2} = \frac{35}{1} \times \frac{2}{5} = \frac{70}{5} = 14$$

You can make 14 awards.

PRACTICE

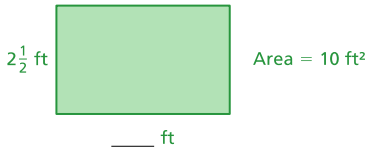
Check your answers at BigIdeasMath.com.

Find the quotient. Write your answer in simplest form.

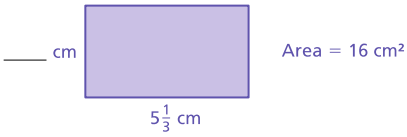
6. $4\frac{1}{2} \div 9 =$ _____
7. $3\frac{3}{7} \div 8 =$ _____
8. $4\frac{2}{3} \div 7 =$ _____
9. $1\frac{7}{9} \div 4 =$ _____
10. $8 \div 1\frac{1}{3} =$ _____
11. $32 \div 3\frac{1}{5} =$ _____
12. $11 \div 2\frac{3}{4} =$ _____
13. $9 \div 1\frac{1}{2} =$ _____
14. $5\frac{1}{2} \div \frac{1}{2} =$ _____
15. $\frac{1}{2} \div 1\frac{1}{2} =$ _____
16. $1\frac{1}{4} \div 1\frac{1}{4} =$ _____
17. $3\frac{1}{2} \div 1\frac{1}{3} =$ _____

Find the unknown measure of the rectangle.

18.



19.



20. **RED RIBBONS** You need $3\frac{1}{2}$ inches of ribbon to make a Red-Ribbon award. How many awards can you make with 35 inches of ribbon? _____

21. **SHIPPING** You are stacking books into a shipping box that is 15 inches high. Each book is $1\frac{1}{4}$ inches thick. How many books can you fit in a stack? _____