

Summer Math Exercises

*For students who
are entering*

Algebra 3/Trig



Cherokee Christian
S C H O O L S

It has been discovered that idle students lose learning over the summer months. To help you succeed next fall—and perhaps to help you learn some lessons that you did not learn the first time through—we have prepared the following packet of math exercises to be completed over the summer. It is clear that most students do not want to spend their entire summer doing math work. Based on how fast or slow you work, you may find that you only need to do math a few days a week. Working on this packet will be most effective if you do work throughout the summer so try not to skip weeks. You may use the following chart to get an idea of how often you might need to work problems:

Into Alg 3
Problems: 212

<u>Min/Day</u>	<u>Min/Prob</u>	<u>Prob/Day</u>	<u>Sessions</u>
60	2	30	7
60	3	20	11
60	5	12	18
45	2	22.5	9
45	3	15	14
45	5	9	24
30	2	15	14
30	3	10	21
30	5	6	35

For example, if you work on math for 60 minutes per session and took 2 minutes per problem, you could complete 30 problems a day. That would equate to only about 7 sessions of working math problems over the summer. At the other end of the spectrum, if you want to work only 30 minutes each time and took on average 5 minutes to complete each problem, you would only get 6 problems done during a session and would have to do about 35 sessions to complete the work (i.e., math work about every other day during the summer break). Note that students who learned the material previously should not take more than an average of 5 minutes to work a problem.

This work is **MANDATORY** for CCS students. Please follow these guidelines:

- Complete the problems assigned on the next page.
- Bring the completed work to the **first day of classes** so you will get credit.
- Use PENCIL and **write legibly**.
- **Do all your work on separate sheets of paper**. Note that some sections indicated that calculators are not to be used. Show your work for these problems as needed.
- Identify each section with a header (e.g, Lesson 1.1) and number each problem.
- Please circle your answers.

Assignment for students entering Algebra 3

Lessons	No of Probs	Problems Assigned	Date Completed
1.1	14	2-41 every 3 rd	
1.2	10	2-29 every 3 rd	
1.3	8	11-33 every 3 rd	
1.4	11	2-32 every 3 rd	
2.1	8	2-23 every 3 rd	
2.2	7	8-26 every 3 rd	
2.3	11	2-32 every 3 rd	
2.4	11	2-32 every 3 rd	
3.1	10	2-29 every 3 rd	
3.2	9	2-26 every 3 rd	
3.3	13	2-38 every 3 rd	
3.4	8	2-23 every 3 rd	
4.1	9	2-26 every 3 rd	
4.2	10	2-29 every 3 rd	
4.3	9	2-26 every 3 rd	
4.4	10	2-29 every 3 rd	
5.1	10	2-29 every 3 rd	
5.2	9	8-24 even	
5.3	9	8-24 even	
5.4	14	2-41 every 3 rd	
Assess	13	2-26 every 3 rd ,28,31,34,37	
	213		

Practice

For use with Lesson 1.1: Operations with Integers

Evaluate the expression.

- | | | |
|-----------------------------------|----------------------------------|--|
| 1. $-4 + 3$ | 2. $-7 - 18$ | 3. $4(-3)$ |
| 4. $-8 \div (-2)$ | 5. -24×2 | 6. $7 - 9$ |
| 7. $25 \times (-3) \times 2$ | 8. $-9 \cdot 0$ | 9. $40 \div (-8)$ |
| 10. $9 \div (-1)$ | 11. $-36 + 36$ | 12. $3(2 - 7)$ |
| 13. $8 \cdot (-2 \cdot 3)$ | 14. $(4 + 8) - 7$ | 15. $-7(-3 + 2)$ |
| 16. $84 - 90$ | 17. $-44 \div (-4)$ | 18. $-3 \cdot (-2) \cdot (-4) \cdot 5$ |
| 19. $32 - 84$ | 20. $-3(2 + 4)$ | 21. $62 \div (-2)$ |
| 22. $3 \cdot 2 + 16$ | 23. $5 + 8 \cdot 2 - 4$ | 24. $10 \div (3 + 2) + 6$ |
| 25. $[10 + (5^2 \cdot 2) \div 5]$ | 26. $\frac{20 + 4}{4 + 3^2 - 1}$ | 27. $\frac{18 \div 2}{3(5 - 2)}$ |
| 28. $11 - 24(8 - 5) \div 2^2$ | 29. $6 \div [4 - (6 - 8)] + 3^2$ | |
| 30. $-3^2 + 4[16 \div (3 - 5)]$ | 31. $18 \div 2 - 4^2 - (-4)^2$ | |

Identify the property that is illustrated by the given statement.

- | | |
|---|--|
| 32. $7 + (-4) = -4 + 7$ | 33. $7(4 + 2) = (7 \cdot 4) + (7 \cdot 2)$ |
| 34. $-6 \cdot (3 \cdot 2) = (-6 \cdot 3) \cdot 2$ | 35. $8 \cdot 0 = 0$ |
| 36. $-3 + 0 = -3$ | 37. $(-8) \cdot (-5) = (-5) \cdot (-8)$ |
| 38. $-3 + (5 + 2) = (-3 + 5) + 2$ | 39. $-2 + 2 = 0$ |
| 40. $-9 + (-7) = -7 + (-9)$ | 41. $1 \cdot (-32) = -32$ |

42. **Admission Prices** The admission prices to an amusement park are \$27 for adults, \$16 for children, and \$18 for senior citizens. There are 6 adults, 13 children and 2 senior citizens in your group. Write an expression to represent the total admission cost for your group. Find the total cost.
43. **Pizza Party** You and 3 friends buy a pizza for \$10 including tax, plus a delivery fee of \$2. Write and solve an expression to find C , the cost per person.

Practice

For use with Lesson 1.2: Operations with Rational Numbers

Add or subtract.

1. $\frac{5}{12} + \frac{3}{12}$

2. $\frac{17}{26} - \frac{6}{13}$

3. $\frac{2}{5} - \frac{7}{40}$

4. $\frac{1}{3} + \frac{5}{12}$

5. $\frac{5}{8} + \frac{11}{12}$

6. $9.2 - 8.75$

7. $\frac{1}{3} - \frac{2}{9}$

8. $15.85 + 1.005$

9. $9\frac{2}{5} + 3\frac{1}{3}$

Find the reciprocal of each number.

10. 15

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

12. $\frac{3}{13}$

13. $3\frac{2}{7}$

14. $\frac{5}{9}$

15. $4\frac{1}{6}$

Multiply or divide.

16. 8.2×8.2

17. $\frac{7}{8} \div \frac{2}{21}$

18. $35.511 \div 5.7$

19. $\frac{9}{10} \times \frac{5}{3}$

20. 1.4×6.3

21. $\frac{5}{12} \div \frac{5}{32}$

22. $7.788 \div 2.2$

23. $\frac{3}{4} \times \frac{16}{27}$

24. $\frac{5}{12} \div \frac{1}{6}$

Evaluate the expression.

25. $\frac{1}{2} \times \frac{8}{9} \div \frac{1}{36}$

26. $\frac{1}{2} + \frac{1}{6} - \frac{2}{3}$

27. $\frac{5}{8} - \left(\frac{3}{5} - \frac{1}{2}\right)$

28. $\frac{5}{6} - \frac{1}{3} + \frac{5}{12}$

29. $9.88 \times 3.5 - 0.26$

30. $7(14.77 - 10.5)$

31. **Fishing** You went trout fishing. You caught trout with the lengths (in inches) of $8\frac{2}{3}$, $10\frac{1}{2}$, $8\frac{3}{4}$, $9\frac{5}{6}$, $10\frac{1}{3}$, and $9\frac{5}{12}$. Find the average length of the trout you caught.

32. **Gasoline Prices** Last week the price of gasoline was \$1.25 per gallon. This week the price of gasoline is \$1.33 per gallon. What is the change in the price per gallon of gasoline?

Practice

For use with Lesson 1.3: Square Root Concepts

Find all square roots of the number or write *no square roots*. Check the results by squaring each root.

- | | | |
|---------|---------|---------|
| 1. 1 | 2. 49 | 3. -4 |
| 4. -9 | 5. 0 | 6. 100 |
| 7. 0.09 | 8. 0.16 | 9. 0.04 |

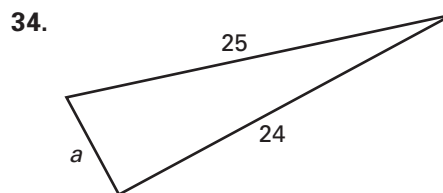
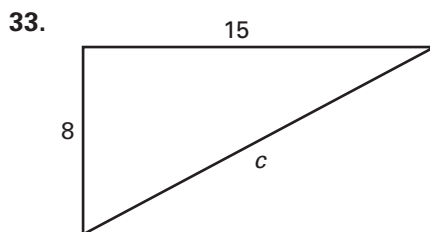
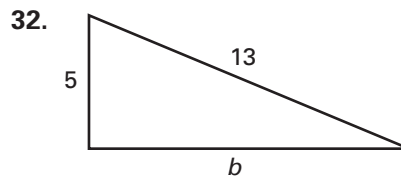
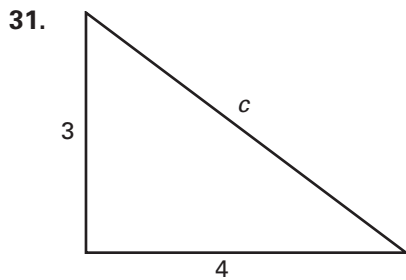
Evaluate the expression.

- | | | |
|--------------------------------|----------------------------------|--------------------------------|
| 10. $\sqrt{25}$ | 11. $-\sqrt{64}$ | 12. $\pm\sqrt{225}$ |
| 13. $-\sqrt{16}$ | 14. $\sqrt{144}$ | 15. $\pm\sqrt{169}$ |
| 16. $-5\sqrt{9}$ | 17. $\pm 7\sqrt{36}$ | 18. $3\sqrt{49}$ |
| 19. $12\sqrt{4} - 6\sqrt{100}$ | 20. $-10\sqrt{81} + 4\sqrt{121}$ | 21. $2\sqrt{225} + \sqrt{400}$ |

Approximate the square roots.

- | | | |
|------------------|------------------|-------------------|
| 22. $\sqrt{20}$ | 23. $-\sqrt{3}$ | 24. $\sqrt{7}$ |
| 25. $\sqrt{5}$ | 26. $-\sqrt{10}$ | 27. $\sqrt{115}$ |
| 28. $\sqrt{288}$ | 29. $\sqrt{75}$ | 30. $-\sqrt{401}$ |

Geometry Use the Pythagorean theorem ($a^2 + b^2 = c^2$) to find the missing side length of the given right triangle.



Practice

For use with Lesson 1.4: Simplifying Square Roots

Simplify the expression using the product property.

1. $\sqrt{8}$

2. $\sqrt{24}$

3. $\sqrt{45}$

4. $\sqrt{12}$

5. $\sqrt{32}$

6. $3\sqrt{28}$

7. $\frac{1}{3}\sqrt{54}$

8. $\sqrt{2} \cdot \sqrt{8}$

9. $\sqrt{7} \cdot 2\sqrt{14}$

10. $\sqrt{2} \cdot \sqrt{5}$

11. $3\sqrt{6} \cdot \sqrt{6}$

12. $2\sqrt{27} \cdot 2\sqrt{5}$

Simplify the expression using the quotient property. Rationalize the denominator when necessary.

13. $\sqrt{\frac{1}{9}}$

14. $\sqrt{\frac{11}{16}}$

15. $\frac{\sqrt{18}}{\sqrt{6}}$

16. $2\sqrt{\frac{5}{4}}$

17. $4\sqrt{\frac{3}{32}}$

18. $\frac{2\sqrt{15}}{\sqrt{12}}$

19. $\sqrt{\frac{4}{8}}$

20. $\frac{-3\sqrt{2}}{\sqrt{8}}$

21. $-\frac{\sqrt{35}}{\sqrt{15}}$

Simplify the expression.

22. $-5\sqrt{3} + 2\sqrt{3}$

23. $\sqrt{45} - \sqrt{125}$

24. $-2\sqrt{2} + 4\sqrt{8}$

25. $5\sqrt{3} - 5\sqrt{2} - 5\sqrt{3}$

26. $3\sqrt{12} - 4\sqrt{27} + \sqrt{75}$

27. $-5\sqrt{8} + 3\sqrt{50}$

28. $2\sqrt{75} - 4\sqrt{3}$

29. $8\sqrt{2} - 3\sqrt{18} - 8\sqrt{2}$

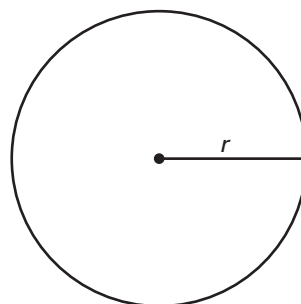
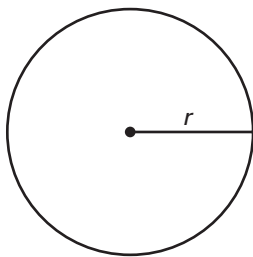
30. $7\sqrt{8} - 4\sqrt{32} - 9\sqrt{50}$

31. $\sqrt{3} \cdot \sqrt{8} + 7\sqrt{6}$

32. **Area** Your square bedroom has an area of 28 square feet. Find the length of one wall.**Geometry** Find the radius of the circle with the given area. The area of a circle is $A = r^2$.

33. $A = 44\pi \text{ in.}^2$

34. $A = 208\pi \text{ cm}^2$



Practice

For use before Lesson 2.1: Evaluating Expressions

Name the operation indicated by the expression.

1. $\frac{9}{r}$

2. $14 + s$

3. $x - 22$

4. $30x$

Write a variable expression for the verbal phrase.5. 15 times x 6. m plus 277. 7 divided by n 8. 35 minus t **Evaluate the expression for the given value of the variable.**

9. $10x$ when $x = 5$

10. $b - 16$ when $b = 24$

11. $\frac{y}{3}$ when $y = 36$

12. $m + 45$ when $m = 58$

Evaluate the expression when $a = -2$, $b = 6$, and $c = -1$.

13. $3(a + b)$

14. $\frac{b}{ac}$

15. $3a - 4b$

16. $25c + 2(b + a)$

17. $c - ab$

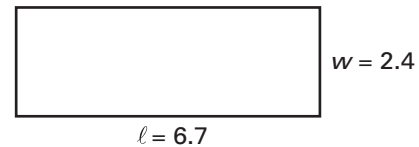
18. $ab(3 - c)$

19. $0.5(3 - a)$

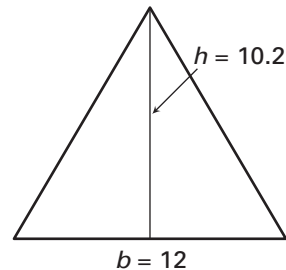
20. $\frac{1}{2}a + \frac{1}{3}b$

21. $0.02a + 0.3b - 0.05c$

- 22. Perimeter** The perimeter of a rectangle is equal to $2l + 2w$, where l is the length and w is the width. Find the perimeter of the rectangle at the right. Dimensions are in inches.



- 23. Area** The area of a triangle is equal to $\frac{1}{2}bh$, where b is the length of the base and h is the height. Find the area of the triangle at the right. Dimensions are in centimeters.



- 24. Average Speed** The average speed (in miles per hour) is given by the formula $\text{Average speed} = \frac{\text{Distance}}{\text{Time}} = \frac{d}{t}$. Find the average speed of a car that traveled 180 miles in 3 hours.

Practice

For use with Lesson 2.2: Simplifying Expressions

Simplify the expression by combining like terms.

1. $17x + (-6x)$

2. $-20y + 9y$

3. $-11a - 13a$

4. $7 - 2x + 4$

5. $-6 - y - 10$

6. $5 + x + x$

7. $\frac{2}{3}w + \frac{1}{4}w$

8. $2.6p - 3.1p$

9. $115x - 140x + 5$

10. $7x^2 - 3x^2 + 4x$

11. $30n + 16 - 12n$

12. $-2x^3 - 4x^3 + 2$

Find the sum or difference using the vertical or horizontal format.

13. $(5y^2 - 6y + 2) + (4y^2 - 3)$

14. $(6x^2 + 6x - 3) - (2x^2 - 2x + 4)$

15. $(3m^3 - 7m + 15) - (4m^2 + 6m - 3)$

16. $(9n^2 - 13) + (-8 + n^2)$

17. $\left(\frac{1}{2}x^2 - \frac{2}{3}\right) + \left(-\frac{1}{4}x^2 + 2x\right)$

18. $(-0.5 - 2.2x) - (-6.9x + 8.7)$

Simplify the expression by using the distributive property and combining like terms.

19. $2(x + 4) - 2x$

20. $8x - 3(x - 1)$

21. $-3(a + 4) + 5a$

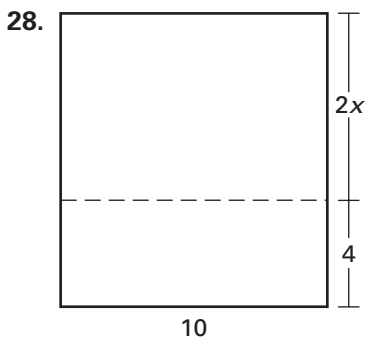
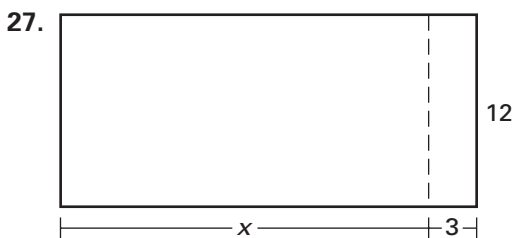
22. $-3(x^2 + x - 2)$

23. $\frac{1}{2}\left(x - \frac{2}{3}\right) + \frac{2}{3}x$

24. $(x - 2)(x + x^2 + 3x^3)$

25. $(2x^2 + 5x - 4x + 7)(-2)$

26. $0.04x + 0.75x + 2(0.03x - 1)$

Geometry Write an expression modeling the area of the large rectangle as the product of its length and width. Then write another expression modeling this area as the sum of the areas of the two smaller rectangles. Simplify each expression.

Practice

For use with Lesson 2.3: Properties of Powers

Evaluate the expression.

1. $6^2 \cdot 6^5$

2. $(8^2)^3$

3. $(3 \cdot 2)^3$

4. 5^{-2}

5. $\left(\frac{1}{3}\right)^{-1}$

6. $12(2^{-2})$

7. $2^{-2} \cdot 2^0$

8. $3^{-9} \cdot 3^9$

9. $15 \cdot 15^{-1}$

10. $\frac{4^6}{4^2}$

11. $\frac{(-2)^2}{-2^2}$

12. $\left(\frac{3}{5}\right)^2$

Simplify the expression. The simplified expression should have no negative exponents.

13. $x \cdot x^7$

14. $(-2y)^3$

15. $(4xy)^2$

16. $(2x^2)^3$

17. $[(-a)^2]^4$

18. $(-x)^2 \cdot (-x)^3 \cdot (x)^4$

19. $[(-2x^5y^2)^2]^3$

20. $\left(-\frac{2}{3}x\right)\left(\frac{6}{7}x^4\right)$

21. $(x^2yz)^3(xy^2z^2)^2$

22. $(3x \cdot 2x^3)^{-2}$

23. $(17xy)^0 \cdot (3x)^2$

24. $\left(\frac{1}{2}xy\right)^{-2}$

25. $(5x)^0 \cdot 5x^0$

26. $(5y)^{-2} \cdot (-2y)^2$

27. $\frac{x^7}{x^6}$

28. $\frac{3x^2}{5x^{-3}}$

29. $\left(\frac{2}{x}\right)^3$

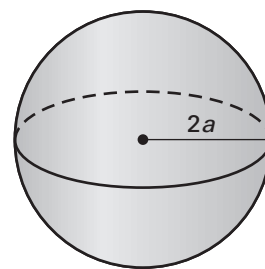
30. $\left(\frac{y^2}{y^6}\right)^{-2}$

31. $\left(\frac{2x^7y^2}{4xy^4}\right)^3$

32. $\frac{a^3 \cdot a^3}{a^2}$

33. $b^5 \cdot \frac{1}{b^7}$

34. **Geometry** The volume of a sphere is given by $V = \frac{4}{3}\pi r^3$, where r is the radius and π is approximately 3.14. What is the volume of the sphere at the right in terms of a ?



Practice

For use with Lesson 2.4: Simplifying Expressions with Powers

Multiply using the distributive property.

- | | | |
|-----------------------|--------------------------------|----------------------------------|
| 1. $(x)(2x^2 + 3)$ | 2. $(-2x)(5x^2 - 3x + 1)$ | 3. $(6x)(2x + 3)$ |
| 4. $(-4y)(2y^2 - 6)$ | 5. $(-3x^4)(5xy^2 + 2x^3 - 7)$ | 6. $(2xy)(-4xy^2 + x^2y - x^3y)$ |
| 7. $(7y)(-6y^3 - 2y)$ | 8. $(-10a)(-a^2 + 3a - 8)$ | 9. $(5b^3)(9b^2 - 8b - 2)$ |

Simplify the product.

- | | |
|---|---|
| 10. $\left(\frac{2x}{y}\right)^3 \cdot \left(\frac{-3x^{-2}}{y}\right)$ | 11. $\left(\frac{0.75x}{0.25y}\right)^{-1} \cdot \left(\frac{x^2}{y^3}\right)^{-1}$ |
| 12. $\frac{4x^3y^3}{2xy} \cdot \frac{5xy^2}{2y}$ | 13. $\frac{36a^8b^2}{ab} \cdot \left(\frac{6}{ab^2}\right)^{-1}$ |
| 14. $\frac{16x^3y}{-4xy^3} \cdot -\frac{2xy}{-x^{-1}}$ | 15. $\frac{6x^{-2}y^2}{xy^{-3}} \cdot \left(\frac{3^{-1}x^2y}{xy^2}\right)$ |

Rewrite in scientific notation.

- | | | |
|----------------|--------------------|---------------|
| 16. 0.07 | 17. 86.3 | 18. 0.0055 |
| 19. 625.308 | 20. 68,000 | 21. 3,452,220 |
| 22. 0.00002004 | 23. 18,000,000,000 | 24. 452,114 |

Evaluate the expression. Write the result in scientific notation.

- | | | |
|--|---|---|
| 25. $(2 \times 10^5) \cdot (4 \times 10^{-2})$ | 26. $(6 \times 10^{-3}) \cdot (4 \times 10^{-7})$ | |
| 27. $(1.2 \times 10^4) \cdot (7 \times 10^{-1})$ | 28. $(4.2 \times 10^{-5}) \cdot (3.3 \times 10^2)$ | |
| 29. $\frac{6 \times 10^{-2}}{3 \times 10^{-6}}$ | 30. $\frac{1.6 \times 10^{-1}}{3.2 \times 10^{-5}}$ | 31. $\frac{8.1 \times 10^{-2}}{2.7 \times 10^{-2}}$ |
| 32. $(5 \times 10^{-2})^2$ | 33. $(3 \times 10^4)^3$ | 34. $(2 \times 10^{-5})^{-4}$ |

35. **Size of Earth** Earth has a radius of about 3.9×10^3 miles. Use the equation $V = \frac{4}{3}\pi r^3$ to find Earth's volume.

Practice

For use with Lesson 3.1: Solving Equations

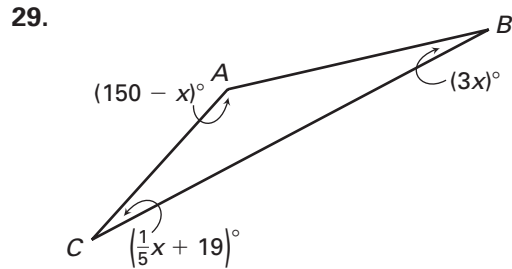
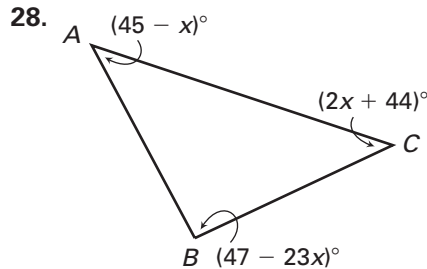
State the inverse.

- | | | |
|------------------|---------------------------------|-----------------------------|
| 1. Add 12. | 2. Subtract 5. | 3. Multiply by 15. |
| 4. Divide by 22. | 5. Divide by $\frac{1}{2}$. | 6. Subtract -2 . |
| 7. Add -10 . | 8. Multiply by $-\frac{3}{5}$. | 9. Subtract $\frac{3}{4}$. |

Solve the equation.

- | | | |
|------------------------------|-------------------------------------|---------------------------------------|
| 10. $x + 7 = 12$ | 11. $y - 8 = 6$ | 12. $-4 + p = -10$ |
| 13. $5 - x = 0$ | 14. $\frac{3}{5} = b - \frac{1}{5}$ | 15. $a + 3\frac{2}{3} = 2\frac{1}{6}$ |
| 16. $30 = -3x$ | 17. $8p = -64$ | 18. $\frac{r}{5} = -6$ |
| 19. $\frac{1}{2}x = 35$ | 20. $-\frac{2}{3}x = -\frac{6}{15}$ | 21. $\frac{y}{-4} = \frac{1}{4}$ |
| 22. $3x + 2 = -14$ | 23. $4x - 15 = 9$ | 24. $\frac{a}{6} + 3 = -2$ |
| 25. $20 = 16 - \frac{1}{4}b$ | 26. $\frac{2}{3}c - 7 = 5$ | 27. $-7x + 4x = 9$ |

Find the measure of each angle in $\triangle ABC$.



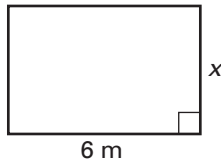
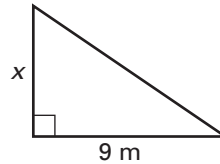
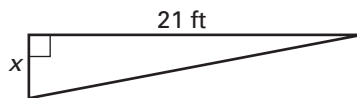
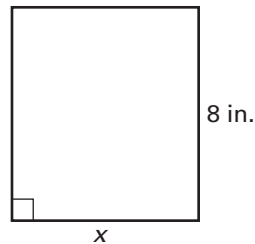
30. **Find the Numbers** The sum of two numbers is 45. The second number is twice the first number. Find the two numbers.

Practice

For use with Lesson 3.2: Solving Inequalities

Solve the inequality.

1. $x + 8 < 14$
2. $-10 < 3 + y$
3. $-7 + x > 20$
4. $12 + x \leq -8$
5. $a - 26 \geq -4$
6. $9 \leq c + 1$
7. $-5 + b > 0$
8. $-2 \leq x - 18$
9. $n + 7 \geq -10$
10. $13x > 52$
11. $-9y < 45$
12. $-\frac{z}{4} \geq 21$
13. $33 \leq -3.3a$
14. $-\frac{b}{10} > -6$
15. $\frac{c}{5} \geq -7$
16. $x + 4 < -8$
17. $21 - y < 13$
18. $-3 \geq 4x + 5$
19. $\frac{1}{2}z + 9 \leq -7$
20. $-19 > -5x + 14$
21. $1.2 < -10x - 1.3$
22. $-\frac{3}{5}a - 11 \geq 26$
23. $8 \leq \frac{4}{9}y - 12$
24. $-3x - 0.4 > 0.8$

Geometry Write and solve an inequality for the value of x .25. Area > 24 square meters26. Area < 36 square meters27. Area ≤ 42 square feet28. Area ≥ 56 square inches

29. **Bowling Tournament** After two games of bowling, Carla has a total score of 475. To win the tournament, she needs a total score of 684 or higher. Let x represent the score she needs for her third game to win the tournament. Write and solve an inequality for x . What is the lowest score she can get for her third game and win the tournament?

Practice

For use with Lesson 3.3: Solving Multi-Step Equations and Inequalities

Solve the equation if possible.

- | | | |
|---------------------------------------|--|--|
| 1. $12x + 21 = 9x$ | 2. $-2x = 16x - 9$ | 3. $18x = 9 + 18x$ |
| 4. $6 - (-5b) = 5b - 3$ | 5. $3 - (x - 4) = 7 - x$ | 6. $20 - 8x = 4x - 4$ |
| 7. $3(4 + 4x) = 12x + 12$ | 8. $-6(3x - 2) = 3(-5x - 1)$ | 9. $4x - 3 = 15 + 2(7x + 6)$ |
| 10. $8c - 4(-5c - 2) = 12c$ | 11. $8(4x + 7) = 2(6 - 16x)$ | 12. $\frac{3}{4}(24 - 8a) = 2(5a + 1)$ |
| 13. $\frac{1}{2}(12n - 4) = 14 - 10n$ | 14. $-\frac{2}{3}x = 4\left(\frac{1}{3}x + 1\right)$ | 15. $-(8n - 2) = 3 + 10(1 - 3n)$ |

Solve the inequality.

- | | | |
|----------------------------|---|--|
| 16. $2(x + 1) \geq -2$ | 17. $\frac{1}{5}y + 12 \leq 8$ | 18. $-3(x - 5) < 2x - 5$ |
| 19. $4x + 1 \leq 2(x + 2)$ | 20. $-2(-x + 3) > 4(2x - 9)$ | 21. $-7x - (5x + 2) \geq -5x - 9$ |
| 22. $10x + 17 < 4x - 1$ | 23. $-1 - x > 31 - 6x$ | 24. $9 + 3x + 1 \leq 3x + 3x + 1$ |
| 25. $4(7 + y) > 16 - 2y$ | 26. $\frac{7}{2}m + 12 \leq 6 + \frac{5}{2}m$ | 27. $\frac{5}{6}x + 3 > -7\left(\frac{1}{6}x + 3\right)$ |

Solve the equation if possible.

- | | | |
|---------------------------|------------------------------|-------------------|
| 28. $3x^2 = 48$ | 29. $-5x^2 = -125$ | 30. $4y^2 = -16$ |
| 31. $\frac{1}{2}n^2 = 18$ | 32. $-\frac{3}{4}t^2 = -108$ | 33. $12m^2 = -24$ |

Solve the absolute-value equation or inequality if possible.

- | | | |
|-------------------------|--------------------------|---------------------|
| 34. $ x = 14$ | 35. $ n = 0$ | 36. $ m < -9$ |
| 37. $ y = \frac{3}{4}$ | 38. $ t > -\frac{7}{8}$ | 39. $ r \leq 1.58$ |

Practice

For use with Lesson 3.4: Writing and Solving Proportions

Tell whether the proportion is **True** or **False**.

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

2. $\frac{25}{3} = \frac{100}{12}$

3. $\frac{12}{8} = \frac{13}{9}$

4. $\frac{13}{39} = \frac{7}{21}$

5. $\frac{0.5}{8} = \frac{3}{48}$

6. $\frac{12}{2.4} = \frac{25}{5}$

Solve the proportion.

7. $\frac{x}{9} = \frac{12}{15}$

8. $\frac{3}{19} = \frac{6}{w}$

9. $\frac{18}{9} = \frac{9}{m}$

10. $\frac{4}{2x} = \frac{7}{3}$

11. $\frac{2}{3} = \frac{5}{3c}$

12. $\frac{7}{x+2} = \frac{1}{2}$

13. $\frac{6}{3} = \frac{x+8}{-1}$

14. $\frac{r+4}{3} = \frac{r}{5}$

15. $\frac{-5}{6} = \frac{w+4}{2w}$

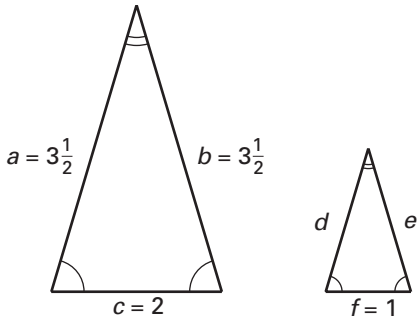
16. $\frac{x+6}{3} = \frac{x-5}{2}$

17. $\frac{x-2}{4} = \frac{x+10}{10}$

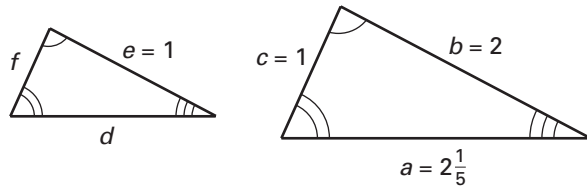
18. $\frac{8}{x+2} = \frac{3}{x-1}$

In Exercises 19–22, pairs of similar triangles are shown. Find the missing lengths of the sides.

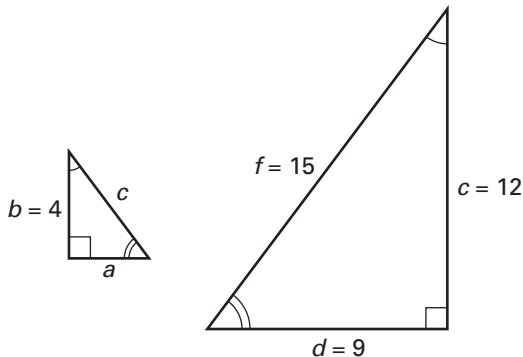
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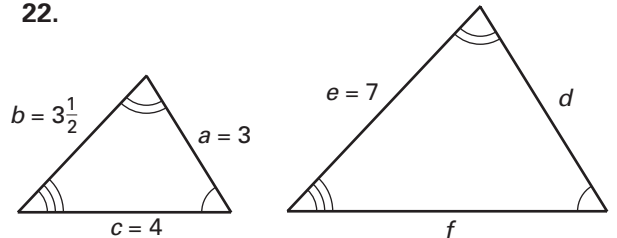
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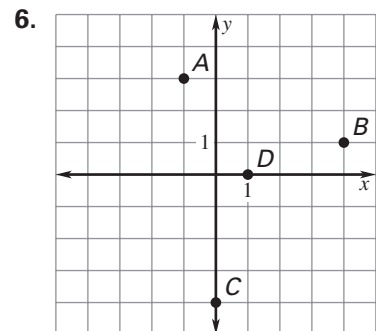
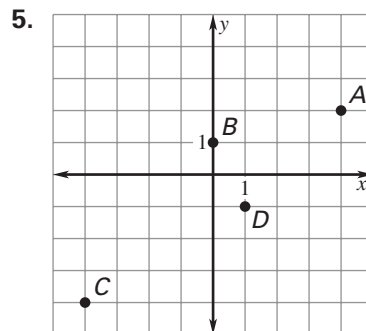
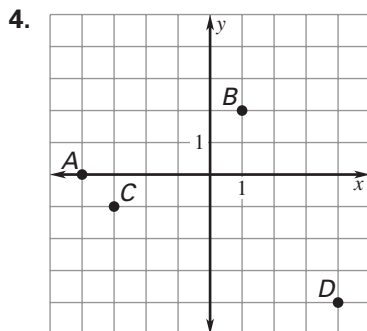
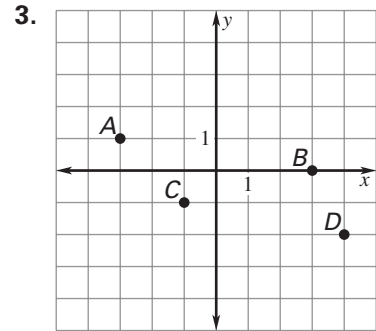
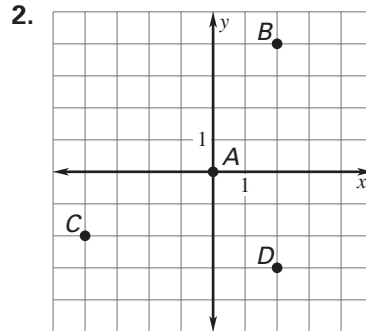
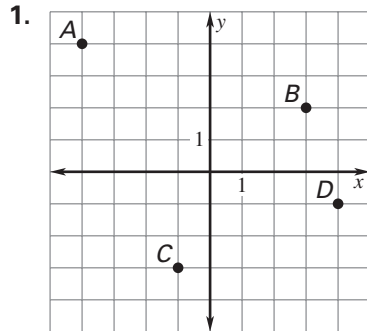
23. Bruce traveled 345 miles in his car on 15 gallons of gasoline. How far will he be able to travel with a full tank of 18 gallons?

24. Trisha earned \$15.75 in 3 hours at her part-time job. How much would she earn for working 5 hours?

Practice

For use with Lesson 4.1: Plotting Points

Write the ordered pairs that correspond to the points labeled **A**, **B**, **C**, and **D** in the coordinate plane.



Plot and label the ordered pairs in a coordinate plane.

- 7. $A(0, 2), B(-1, -3), C(4, 0)$
- 8. $A(6, 3), B(0, 0), C(-3, -3)$
- 9. $A(-2, 4), B(0, -5), C(2, 2)$
- 10. $A(-4, 0), B(-6, -3), C(5, -1)$
- 11. $A(3, -8), B(10, 7), C(0, 0)$
- 12. $A(-6, 6), B(1, -3), C(2, -4)$
- 13. $A(0, 2.5), B(-1.5, -3), C(3, -6.5)$
- 14. $A\left(\frac{1}{2}, 0\right), B\left(-2\frac{3}{4}, \frac{2}{3}\right), C\left(-1\frac{1}{3}, -4\frac{1}{2}\right)$
- 15. Plot the triangle with vertices at $A(5, 8), B(-2, 3),$ and $C(3, -4)$ in a coordinate plane.
- 16. Plot the parallelogram with vertices at $A(-5, 3), B(-2, 9), C(5, 9),$ and $D(2, 3)$ in a coordinate plane.

Without plotting the point, tell whether it is in Quadrant 1, Quadrant 2, Quadrant 3, or Quadrant 4.

- 17. $(-2, -3)$
- 18. $(4, 7)$
- 19. $(-10, 15)$
- 20. $(-6, -2)$
- 21. $(9, -8)$
- 22. $(11, 1)$
- 23. $(-4, 12)$
- 24. $(18, -13)$

True or False? Determine whether the statement is *true* or *false*.

- 25. In the ordered pair $(-6, -8)$, -6 is the x -coordinate.
- 26. The point $(0, -4)$ is in Quadrant 3.
- 27. Each point in a coordinate plane corresponds to an ordered pair of real numbers.

Practice

For use with Lesson 4.2: Slope-Intercept Form of a Linear Equation

Find the slope and y-intercept of the graph of the equation.

1. $y = 5x + 1$

2. $y = -3x - 1$

3. $y = 2x + 7$

4. $y - 3x = 15$

5. $y = 4$

6. $2x + 4y = 16$

7. $y = \frac{1}{5}x + \frac{3}{4}$

8. $y = \frac{x - 2}{6}$

9. $y = \frac{-3x + 9}{8}$

10. $12x + 4y - 2 = 0$

11. $-9x - 3y + 8 = 0$

12. $7x - 14y + 2 = 0$

Graph the equation.

13. $y = x + 2$

14. $y = 2x - 3$

15. $y = x - 5$

16. $y = -x + 4$

17. $y = 7 - x$

18. $y = 3x + 2$

19. $y = -3$

20. $y = \frac{1}{2}x - 6$

21. $y = -\frac{3}{4}x$

Write the equation in slope-intercept form. Then graph the equation.

22. $y = 3$

23. $x - y = 1$

24. $2x - 4y = 12$

25. $x + y = 0$

26. $x + 3y - 3 = 0$

27. $4x - y - 3 = 0$

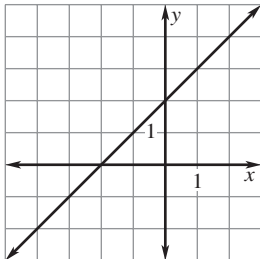
Match the equation with its graph.

A. $y = x + 1$

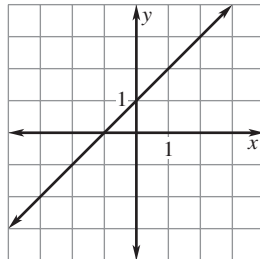
B. $y = -x + 1$

C. $y = x + 2$

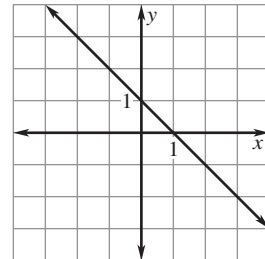
28.



29.



30.



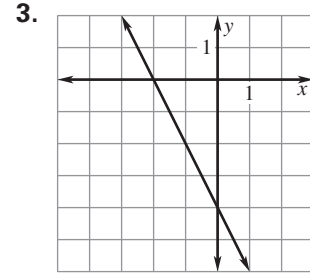
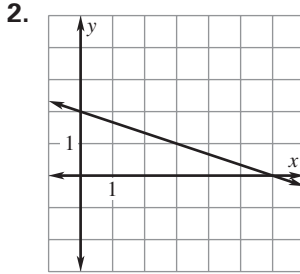
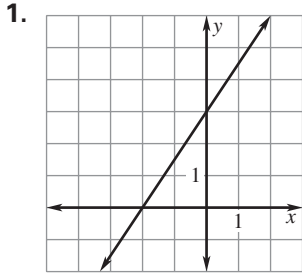
Snowstorm In Exercises 31 and 32, snow fell at a rate of $\frac{2}{3}$ inch per hour. Before the snowstorm began, there were already 5 inches of snow on the ground. The equation $y = \frac{2}{3}x + 5$ models the depth y of snow on the ground after x hours.

31. What is the slope of $y = \frac{2}{3}x + 5$? What is the y-intercept?

32. Graph the amount of snow on the ground during the snowstorm.

Practice

For use with Lesson 4.3: Quick Graphs Using Intercepts

Use the graph to find the x -intercept and y -intercept of the line.Find the x -intercept of the graph of the equation.

4. $x + 2y = 5$

5. $-3x + 4y = -12$

6. $x - 4y = 8$

7. $5x - y = 20$

8. $-2x + 4y = 24$

9. $-6x - 15y = 30$

Find the y -intercept of the graph of the equation.

10. $y = -x + 3$

11. $y = 4x - 2$

12. $y - 7x = -15$

13. $-2x + 5y = -40$

14. $4x + 8y = 64$

15. $2x - 6y = -18$

Graph the line with the given intercepts.

16. x -intercept: 3

17. x -intercept: 4

18. x -intercept: -7

y -intercept: -2

y -intercept: 6

y -intercept: -3

Find the x -intercept and the y -intercept of the line. Graph the equation. Label the points where the line crosses the axes.

19. $y = x + 4$

20. $y = x - 2$

21. $y = 3x + 6$

22. $y = -8 + 4x$

23. $2x + 5y = 10$

24. $-4x + 3y = 12$

25. $x - 7y = 14$

26. $5x - y = 15$

27. $2x + 9y = -36$

Fundraiser In Exercises 28–31, use the following information.

The girls' softball team is having a spaghetti dinner to raise money for new uniforms. By selling tickets for the dinner, the team hopes to raise \$600. Let x represent the number of adult tickets they sell at \$6 each, and let y represent the number of student tickets they sell at \$3 each.

28. Graph the linear function $6x + 3y = 600$.

29. What is the x -intercept? What does it represent in this situation?30. What is the y -intercept? What does it represent in this situation?

31. What are three possible numbers of adult and student tickets to sell that will make the softball team reach its goal?

Practice

For use with Lesson 4.4: Nonlinear Equations

Find the coordinates of the vertex of the graph.

1. $y = 5x^2$

2. $y = \frac{1}{2}x^2$

3. $y = -3x^2 + 6$

4. $y = 2x^2 + 4x$

5. $y = 6x^2 + 2x + 4$

6. $y = -4x^2 - 4x + 8$

Sketch the graph of the function. Label the vertex.

7. $y = x^2$

8. $y = -4x^2$

9. $y = x^2 + 4x - 1$

10. $y = -2x^2 + 4x - 6$

11. $y = 3x^2 + 2x$

12. $y = x^2 - x - 3$

13. $y = x^2 + x + \frac{1}{9}$

14. $y = 3x^2 - 2x - 1$

15. $y = -5x^2 + 5x + 7$

16. $y = 3x^2 - 3x + 4$

17. $y = -2x^2 + 6x - 5$

18. $y = -x^2 + 4x - 12$

19. $y = -\frac{1}{3}x^2 + 2x - 3$

20. $y = -\frac{1}{2}x^2 - 4x + 6$

21. $y = -\frac{1}{4}x^2 - x - 1$

Sketch the graph of the function.

22. $y = |x|$

23. $y = |x + 4|$

24. $y = |x - 5|$

25. $y = 2|2x - 1|$

26. $y = 3|3x + 2| - 1$

27. $y = -|x + 6|$

28. $y = \frac{1}{2}|4x|$

29. $y = |5x + 5| - 8$

30. $y = |-2x + 20| - 5$

Basketball In Exercises 31 and 32, use the following information.

You throw a basketball whose path can be modeled by $y = -16x^2 + 15x + 6$, where x represents time (in seconds) and y represents the height of the basketball (in feet).

31. What is the maximum height that the basketball reaches?

32. In how many seconds will the basketball hit the ground if no one catches it?

Practice

For use with Lesson 5.1: Common Monomial Factors

Find the greatest common factor.

- | | | |
|------------------------|------------------------|--------------------------|
| 1. 6, 18 | 2. 32, 40 | 3. 35, 150 |
| 4. $5x^2$, $20x$ | 5. $21x^4$, $14x^2$ | 6. $12x^3y$, $18x^2y^2$ |
| 7. $42xy^4$, $56x^4y$ | 8. $27x^2y^5$, $15xy$ | 9. $17x^3y^2$, $51y^3$ |

Find the greatest common factor and factor it out of the expression.

- | | |
|-----------------------------|-----------------------------------|
| 10. $24x^3 + 18x^2$ | 11. $5x^3 - 20x$ |
| 12. $6x^2 + 3x^4$ | 13. $24x^2 - 42x^6$ |
| 14. $-3x^4 + 21x^3$ | 15. $6x^3 - 18x$ |
| 16. $4x^4 + 12x$ | 17. $3x - 9x^2$ |
| 18. $25x^5 - 6x^3$ | 19. $4x^5 + 8x^3 - 2x^2$ |
| 20. $18x^6 - 6x^2 + 3x$ | 21. $6x^4 + 14x^3 - 10x^2$ |
| 22. $-3x^5 + 15x^4 - 27x^3$ | 23. $35x^2 - 20x^4 + 5x^5 + 5x^3$ |

Simplify the expression and then factor the greatest common factor out of the expression.

- | | |
|--------------------------------|-----------------------------|
| 24. $3x^4 - 3x(3x^2)$ | 25. $-(2x)^2 + 14x$ |
| 26. $(3x)(5x^3) - 9(3x^2)$ | 27. $2(5x^2) - 3x(x^4)$ |
| 28. $5x(1 - x^2) - 3x^3$ | 29. $2x^3(6x + x^2) + 4x^4$ |
| 30. $-3x(8 - 2x^2) + 4x(3x^2)$ | 31. $4y(4x) + 6x(4y + 8)$ |

PracticeFor use with Lesson 5.2: Factoring $x^2 + bx + c$ **Match the trinomial with the correct factorization.**

- | | |
|--------------------|---------------------|
| 1. $x^2 + x - 12$ | A. $(x + 4)(x + 3)$ |
| 2. $x^2 + 7x + 12$ | B. $(x - 4)(x - 3)$ |
| 3. $x^2 - 7x + 12$ | C. $(x + 4)(x - 3)$ |
| 4. $x^2 - x - 12$ | D. $(x - 4)(x + 3)$ |

Choose the correct factorization. If neither is correct, find the correct factorization.

- | | | |
|----------------------|---------------------|----------------------|
| 5. $x^2 + 14x + 48$ | 6. $x^2 - 3x - 10$ | 7. $x^2 + 8x - 33$ |
| A. $(x + 6)(x + 8)$ | A. $(x - 2)(x + 5)$ | A. $(x + 3)(x - 11)$ |
| B. $(x + 4)(x + 12)$ | B. $(x - 5)(x + 2)$ | B. $(x - 3)(x - 11)$ |

Factor the trinomial.

- | | | |
|----------------------|----------------------|-----------------------|
| 8. $x^2 + 8x - 9$ | 9. $x^2 - 10x + 21$ | 10. $x^2 + 5x - 24$ |
| 11. $x^2 + 13x + 36$ | 12. $x^2 - 3x - 18$ | 13. $x^2 + 14x + 40$ |
| 14. $x^2 - x - 56$ | 15. $x^2 - 7x - 30$ | 16. $x^2 + 12x + 32$ |
| 17. $x^2 + 3x - 54$ | 18. $x^2 - 2x - 15$ | 19. $x^2 - 20x + 100$ |
| 20. $x^2 + 2x - 63$ | 21. $x^2 - 10x - 24$ | 22. $x^2 + 16x + 39$ |
| 23. $x^2 + 6x - 55$ | 24. $x^2 - 9x - 70$ | 25. $x^2 - 22x + 40$ |

PracticeFor use with Lesson 5.3: Factoring $ax^2 + bx + c$ **Match the trinomial with the correct factorization.**

- | | |
|---------------------|----------------------|
| 1. $3x^2 + 14x + 8$ | A. $(3x - 2)(x + 4)$ |
| 2. $3x^2 - 23x - 8$ | B. $(3x + 1)(x - 8)$ |
| 3. $3x^2 + 23x - 8$ | C. $(3x + 2)(x + 4)$ |
| 4. $3x^2 + 10x - 8$ | D. $(3x - 1)(x + 8)$ |

Choose the correct factorization. If neither is correct, find the correct factorization.

- | | | |
|----------------------|-----------------------|-----------------------|
| 5. $3x^2 + 7x - 6$ | 6. $6x^2 - 7x - 3$ | 7. $4x^2 - 21x + 5$ |
| A. $(3x - 1)(x + 6)$ | A. $(3x - 1)(2x - 3)$ | A. $(4x - 1)(x - 5)$ |
| B. $(3x - 2)(x + 3)$ | B. $(6x - 1)(x + 3)$ | B. $(2x - 1)(2x - 5)$ |

Factor the trinomial.

- | | | |
|-----------------------|------------------------|-----------------------|
| 8. $2x^2 + 9x + 7$ | 9. $3x^2 - 8x - 16$ | 10. $4x^2 - 16x + 15$ |
| 11. $5x^2 + 12x - 9$ | 12. $4x^2 + 11x + 6$ | 13. $6x^2 - 23x + 20$ |
| 14. $6x^2 - 3x - 3$ | 15. $8x^2 + 42x - 36$ | 16. $7x^2 + 33x - 10$ |
| 17. $4x^2 - 10x - 14$ | 18. $4x^2 + 24x + 35$ | 19. $9x^2 - 12x - 12$ |
| 20. $5x^2 + 41x - 36$ | 21. $6x^2 + 3x - 30$ | 22. $7x^2 - 59x - 36$ |
| 23. $4x^2 + 37x + 40$ | 24. $10x^2 - 27x + 18$ | 25. $8x^2 + 26x + 21$ |

Practice

For use with Lesson 5.4: Factoring Special Cases

Factor the expression.

- | | | |
|-----------------|-------------------|---------------------|
| 1. $x^2 - 9$ | 2. $64x^2 - 100$ | 3. $6x^2 - 150$ |
| 4. $12x^2 - 75$ | 5. $36 - 121x^2$ | 6. $98 - 18x^2$ |
| 7. $x^2 - y^2$ | 8. $4x^2 - 25y^2$ | 9. $72x^2 - 162y^2$ |

Factor the expression.

- | | |
|------------------------|------------------------|
| 10. $x^2 - 2x + 1$ | 11. $x^2 + 8x + 16$ |
| 12. $x^2 + 30x + 225$ | 13. $4x^2 + 4x + 1$ |
| 14. $9x^2 - 24x + 16$ | 15. $3x^2 - 36x + 108$ |
| 16. $9x^2 + 6x + 1$ | 17. $18x^2 + 12x + 2$ |
| 18. $36x^2 - 84x + 49$ | 19. $25x^2 - 20x + 4$ |
| 20. $18x^2 - 60x + 50$ | 21. $25x^2 + 70x + 49$ |

Factor the expression. Tell which special product factoring pattern you used.

- | | |
|-----------------------------|-------------------------|
| 22. $x^2 - 25$ | 23. $x^2 + 18x + 81$ |
| 24. $25x^2 - 49$ | 25. $32 - 18x^2$ |
| 26. $2x^2 - 40x + 200$ | 27. $-2x^2 + 36x - 162$ |
| 28. $196 - 4x^2$ | 29. $-192 + 147x^2$ |
| 30. $x^2 + x + \frac{1}{4}$ | 31. $32x^2 - 162y^2$ |

Factor the expression completely.

- | | |
|------------------------------|-----------------------------|
| 32. $-7x^3 + 28x^2 - 21x$ | 33. $3x^3 - 12x$ |
| 34. $-2x^4 - 12x^3 - 18x^2$ | 35. $4x^4 + 16x^3 - 20x^2$ |
| 36. $18x^3 - 288x$ | 37. $-9x^4 + 24x^3 - 16x^2$ |
| 38. $50x^3 + 160x^2 + 128x$ | 39. $18x^3 - 33x^2 - 30x$ |
| 40. $x^4 + x^3 - 12x - 12$ | 41. $x^3 - 3x^2 + x - 3$ |
| 42. $6x^4 + 5x^3 - 24x - 20$ | 43. $3x^3 - x^2 - 21x + 7$ |

Cumulative Assessment

For use after Topics 1-5

Evaluate the expression. Write your answer in simplest form.

1. $-15 - 23$

2. $(-2)(5)(-6)$

3. $5^2 \div (9 - 4) + 31$

4. $\frac{7}{12} - \frac{10}{12}$

5. $-\frac{4}{9} \cdot \frac{3}{2}$

6. $(5.24)(-2.1)$

Simplify the expression.

7. $\sqrt{36}$

8. $\sqrt{45}$

9. $\frac{1}{2}\sqrt{90}$

10. $\sqrt{24} \cdot \sqrt{54}$

11. $-\sqrt{\frac{28}{49}}$

12. $-18\sqrt{32} + \sqrt{72}$

Evaluate the expression when $x = -4$ and $y = 3$.

13. $5x(6 - y)$

14. $\frac{2y^2}{x^2}$

15. $(x - y)^3$

Simplify the expression.

16. $(2x^2y)^3 \cdot (x^5y^3)^2$

17. $\frac{15x^2y^3}{2x^{-5}y^0} \cdot \frac{8y^{-2}x^4}{3x^{-2}y^5}$

18. $\left(\frac{16a^4b^{-2}}{4a^0b^5}\right)^3$

Solve the equation or inequality.

19. $13 + x = -2$

20. $3(x + 4) = 3x + 16$

21. $-65 = 5x$

22. $\frac{x}{16} = -4$

23. $x - 23 < 15$

24. $-14 \geq -7x$

Solve the proportion.

25. $\frac{8}{3x} = \frac{24}{9}$

26. $\frac{4 + x}{18} = \frac{x}{9}$

27. $\frac{21}{7 - 2x} = \frac{3}{5x + 1}$

Plot the triangle with the given vertices in a coordinate plane.

28. $A(-2, 4), B(5, 1), C(-4, -1)$

29. $A(4, 8), B(2, -8), C(-2, -6)$

Find the slope, x-intercept, and y-intercept of the graph of the equation. Then graph the equation.

30. $y = -7x + 2$

31. $x + 2y = -6$

32. $-4x + 2y = 16$

Factor the expression.

33. $x^2 - 20x + 99$

34. $2x^2 - 2x - 24$

35. $-3x^7 + 42x^3$

36. $45x - 80x^3$

37. $9x^4 - 30x^3 + 25x^2$

38. $-12x^3 - 2x^2 + 24x$