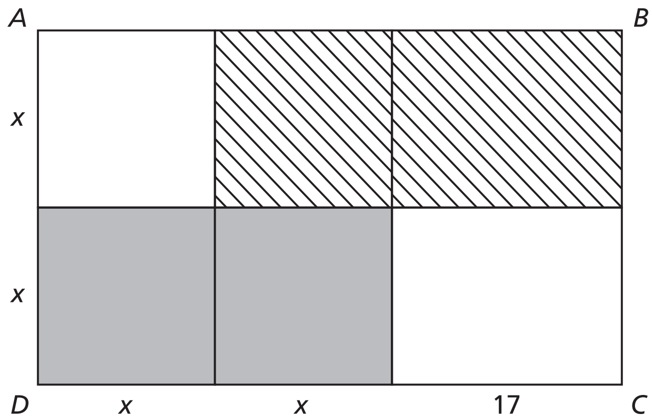
Name ____ Date ___________ Class ___________

Additional Practice

1. Refer to the diagram below to answer parts (a)–(f).



a. Write an expression for the area of the diagonally shaded region.

b. Write an expression for the area of the gray region.

c. Write an expression for the total area of the white regions.

d. Write an expression for the difference in areas between the diagonally shaded region and the gray region.

e. Write an expression for the perimeter of rectangle $ABCD$.

f. Write an expression for the area of rectangle $ABCD$.

Draw and label a rectangle whose area is represented by the expression. Then write an equivalent expression in expanded form.

2. $(x + 1)(x + 5)$ **3.** $3x(x - 4)$ **4.** $(x + 6)(x + 2)$

For Exercises 5–10, write the expression in factored form. You may want to draw a rectangle to illustrate the area represented by the expression.

5. $x^2 + 2x + 9x + 18$ **6.** $x^2 + 4x$

7. $x^2 + 12x + 36$ **8.** $x^2 + 2x + 7x + 14$

9. $x^2 + 7x + 12$ **10.** $x^2 + 12x + 27$

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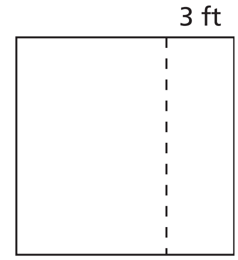
Additional Practice *(continued)*

11. Serena and Chuck had a large square piece of cardboard for designing a poster advertising the upcoming drama club fund-raiser. They decided to trim 3 feet from the length of the cardboard.



Suppose each side of the original square of cardboard had a length of x feet.

a. Write an expression for the area of the strip that Serena and Chuck trimmed from the large piece.

b. Write an expression for the area of the remaining piece of cardboard.

c. Write an expression for the perimeter of the strip that Serena and Chuck trimmed from the large piece.

d. Write an expression for the perimeter of the remaining piece of cardboard.

e. The perimeter of the original piece of cardboard was 36 feet.

i. What is the area of the strip that Serena and Chuck trimmed from the large piece?

ii. What is the area of the remaining piece of cardboard?

iii. What is the perimeter of the remaining piece of cardboard?

12. A square has sides of length x centimeters. A new rectangle is made by increasing one dimension by 2 centimeters and decreasing the other dimension by 2 centimeters.

a. Make a table showing the area of the square and the area of the new rectangle for whole number x values from 0 to 10.

b. Which values for the area are not reasonable? Explain.

c. On the same set of axes, graph the (x, area) data for both the square and the rectangle. Graph only those values for which the area is positive.

d. Write an equation for the area of the original square and an equation for the area of the new rectangle. Use these equations to label the graphs you made in part (c).

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13. A square has sides of length x centimeters. A new rectangle is made by increasing one dimension by 2 centimeters.

a. Make a sketch to show how the square is transformed into the new rectangle.

b. Make a table showing the area of the square and the area of the new rectangle for whole number x values from 0 to 10.

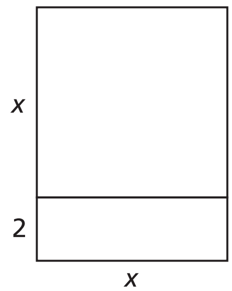
c. On the same set of axes, graph the (x, area) data for both the square and the rectangle.

d. Write an equation for the area of the original square and an equation for the area of the new rectangle.

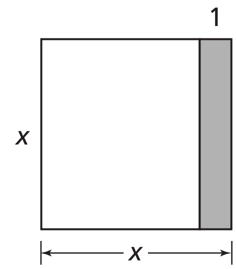
Additional Practice *(continued)*

Write two expressions, one in factored form and one in expanded form, for the area of the unshaded region in each rectangle.

14.



15.



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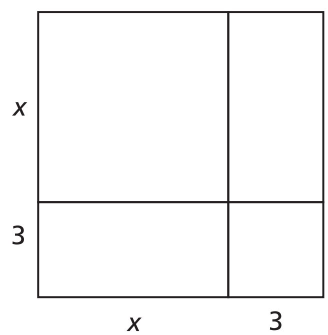
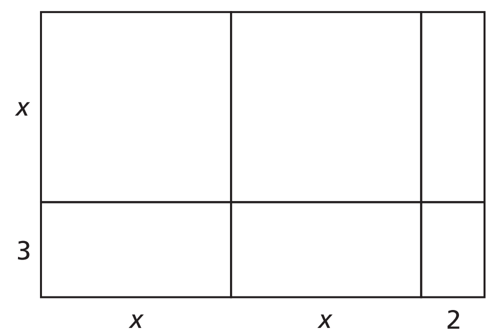


17.



Additional Practice *(continued)*

For Exercises 18–21, draw and label a rectangle whose area is represented by the expression. Write an equivalent expression in factored form.

18. $x^2 + 4x$

19. $x^2 + x + x + 1$

20. $x^2 + 3x + 2$

21. $x^2 + 2x + 1$

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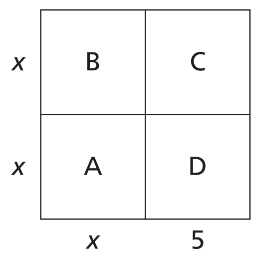
Additional Practice: Digital Assessments

22. Which of the following statements about the rectangle are true? *Select all that apply*.



- ☐ The area of region D is $5x$.
- ☐ The combined area of regions A and B is $4x$.
- ☐ The perimeter of region D is $10 + 2x$.
- ☐ The combined area of regions A, B, C, and D is $2x^2 + 10x$.
- ☐ The difference of the areas of regions C and D is 0.

23. Use the values from the bank to write each expression in factored form. Values may be used more than once.

1	2	3	4	5	6
8	12	15	20	24	x

a. $x^2 + 2x + 4x + 8 = (x + \boxed{})(x + \boxed{})$

b. $x^2 + 8x + 15 = (x + \boxed{})(x + \boxed{})$

c. $x^2 + 8x + 12 = (x + \boxed{})(x + \boxed{})$

d. $x^2 + 6x = (\boxed{})(x + \boxed{})$

e. $x^2 + 3x + 8x + 24 = (x + \boxed{})(x + \boxed{})$

24. Tyler has a square garden frame that measures x meters on each side. He makes a second frame, but increases the dimensions of one side by 1 meter and the other side by 3 meters. Circle the expression or dimensions that make each statement true.

a. In factored form, the expression for the area of the second frame is $\begin{bmatrix} 8 + 4x \\ 4 + 2x \\ (1 + x)(3 + x) \\ x(3x) \end{bmatrix}$.

b. If the dimensions of the first frame were 5 meters by 5 meters, the dimensions of the second frame would be $\begin{bmatrix} \text{4 by 2} \\ \text{6 by 8} \\ \text{6 by 6} \\ \text{8 by 8} \end{bmatrix}$ meters.

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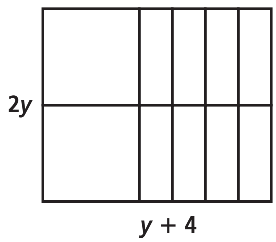
Skill: Writing Expressions in Expanded Form

Investigation 2

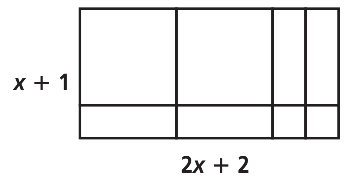
Frogs, Fleas, and Painted Cubes

Find the area of each rectangle.

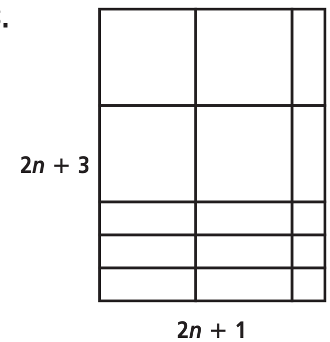
1.



2.



3.



Use the Distributive Property to write each expression in expanded form.

4. $x(x+2)$

5. $3b(b-5)$

6. $2x^2(x+9)$

7. $2(a^2+8a+1)$

8. $2x^2(4x+1)$

9. $3l(l^2+4l-6)$

10. $(x+2)(x+3)$

11. $(x+5)(x+1)$

12. $(x+4)(x+5)$

13. $(x+7)(x+2)$

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

15. $(x+8)(x-3)$

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Skill: Factoring Expressions

Investigation 2

Frogs, Fleas, and Painted Cubes

Use the Distributive Property to factor each expression.

1. $x^2+8x+16$

2. d^2+8d+7

3. y^2+6y+8

4. b^2-2b-3

5. s^2-4s-5

6. $x^2+12x+32$

7. $x^2-9x+20$

8. x^2-5x+6

9. a^2+3a+2

10. p^2-8p+7

11. d^2+6d+5

12. n^2+n-6

13. $x(a+2)-2(a+2)$

14. $3(x+y) + a(x+y)$

15. $m(x-3) - k(x-3)$

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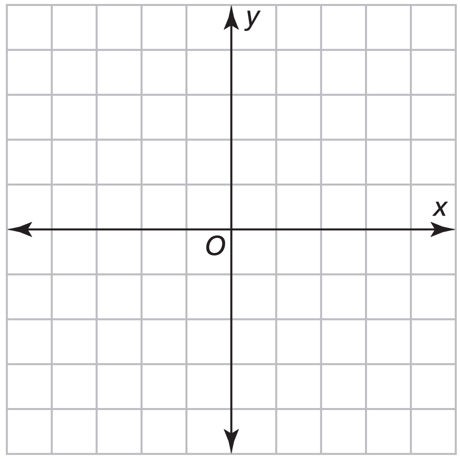
Skill: Graphs of Parabolas

Investigation 2

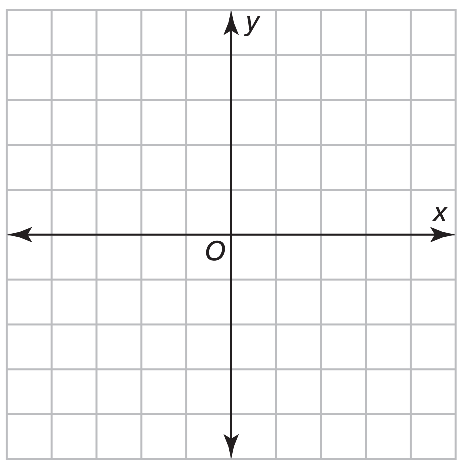
Frogs, Fleas, and Painted Cubes

Graph each function. Label the axis of symmetry, the vertex, and the *y*-intercept.

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



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



3. $y = x^2 + 10x + 14$