7.3 Start Thinking

Consider the expression $(x + 3)(x - 3)$. Use the FOIL method to simplify the expression. Explain why the result has only two terms rather than three, as is typical. Explain how the terms are related to the original expression. Change the number three in the expression to another number and simplify again. Is your previous explanation still true?

Consider the expressions $(x + 3)(x + 3)$ and $(x - 3)(x - 3)$. Without simplifying, how many terms would you expect in your answer? Why? How could you rewrite these expressions before simplifying?

7.3 Warm Up

Simplify.

1. $(x - 2)(x - 2)$

2. $(y - 2)(y + 9)$

3. $(z - 2)(z - 6)$

4. $(3x + 4)(x + 6)$

5. $(4x - 6)(4x - 10)$

6. $(4a + b)(3a + 6b)$

7.3 Cumulative Review Warm Up

Write an absolute value equation that has the given solutions.

1. $x = 9$ and $x = 17$

2. $x = 3$ and $x = 8$

3. $x = 5$ and $x = 16$

4. $x = -3$ and $x = 10$

5. $x = -5$ and $x = 3$

6. $x = -2$ and $x = 1$

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7.3 Practice A

In Exercises 1–9, find the product.

1. $(x + 7)^2$

2. $(2w - 3)^2$

3. $(4q + 2)^2$

4. $(n + 4)(n - 4)$

5. $(v - 7)(v + 7)$

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

7. $(6 + a)(6 - a)$

8. $\left(\frac{1}{3} + p\right)\left(\frac{1}{3} - p\right)$

9. $(x + 2y)(x - 2y)$

In Exercises 10–12, use special product patterns to find the product.

10. $19 \bullet 21$

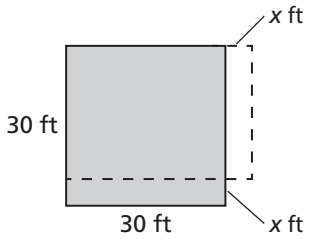
11. $49 \bullet 51$

12. 33^2

13. Describe and correct the error in finding the product.

$$\times \quad (x - 5)^2 = x^2 - 5^2$$
$$= x^2 - 25$$

14. A contractor modifies the size of a kitchen.



a. The area of the room after the modification is represented by $(30 + x)(30 - x)$. Find the product.

b. Use the polynomial in part (a) to find the area when $x = 6$. Which room has the larger area, the original room or the new room? Explain.

In Exercises 15 and 16, find the product.

15. $(x^2 + 5)(x^2 - 5)$

16. $(y^4 - 2)^2$

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7.3 Practice B

In Exercises 1–9, find the product.

1. $(-6p + 3)^2$

2. $(3c - d)^2$

3. $(5x + 2y)^2$

4. $(9 + 4q)(9 - 4q)$

5. $\left(\frac{2}{3} + g\right)\left(\frac{2}{3} - g\right)$

6. $(3m + 8n)(3m - 8n)$

7. $(8 - 3u)(8 + 3u)$

8. $(-c + 9)(-c - 9)$

9. $(-3s - 7t)(-3s + 7t)$

In Exercises 10–12, use special product patterns to find the product.

10. 27^2

11. 40.5^2

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

13. Describe and correct the error in finding the product.

$$(x + 5)(x - 5) = x^2 + 5^2$$
$$= x^2 + 25$$

14. A circular helicopter landing pad has a radius of 200 feet. Inside the circular pad, red paint covers the outer area evenly, with a width of x feet. White paint covers the inner area.

a. Write a polynomial that represents the area of the circle that is painted white. Write your answer in terms of π.

b. Use the polynomial in part (a) to find the area of the circle that is painted white when $x = 100$.

In Exercises 15 and 16, find the product.

15. $\left(3x^2 + 7y^2\right)^2$

16. $\left(z^4 - 3w^3\right)\left(z^4 + 3w^3\right)$

17. Find k so that $25x^2 + 40x + k$ is the square of a binomial.

18. Find two numbers a and b such that $(a - b)^2 < (a + b)(a - b) < (a + b)^2$. Find two numbers a and b such that this is not true.

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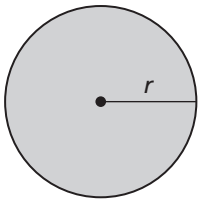
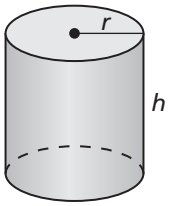
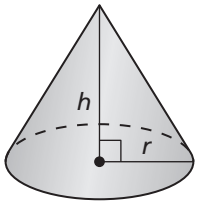
7.3 Enrichment and Extension

Area and Volume

Area of Circle: $A = \pi r^2$ Volume of a Cylinder: $V = \pi r^2 h$ Volume of a Cone: $V = \frac{1}{3}\pi r^2 h$

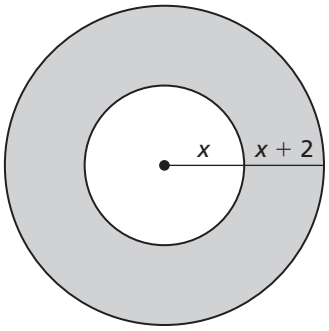






In Exercises 1–3, write an algebraic expression for the shaded area.

1.



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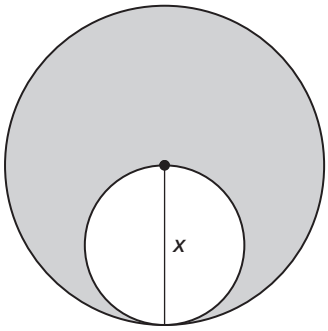

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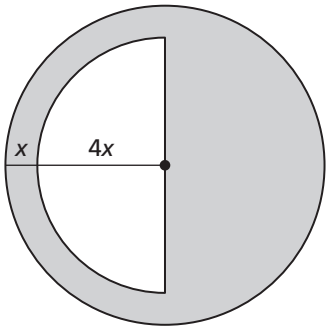
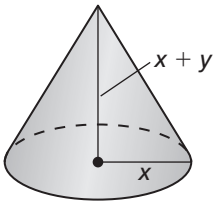


In Exercises 4–6, write an algebraic expression for the volume of the figure.

4.



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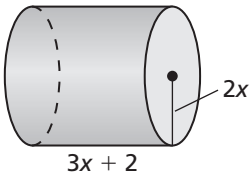

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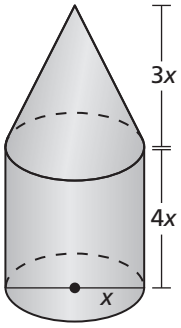
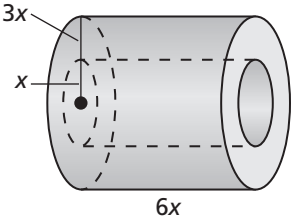
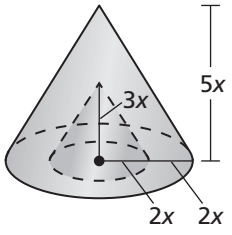


In Exercises 7 and 8, write an algebraic expression for the volume of the figure with a hole in it.

7.



8.



Name_____ Date _____

7.3 Puzzle Time

What Does The Invisible Man Rub Into His Face Before He Retires?

Write the letter of each answer in the box containing the exercise number.

Find the product.

1. $(x + 7)^2$

2. $(x - 5)^2$

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

4. $(-14 - x)^2$

5. $(x + 9)(x - 9)$

6. $(3x - 4)(3x + 4)$

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

8. $(x + 10y)(x - 10y)$

9. $\left(x + \frac{4}{5}\right)\left(x - \frac{4}{5}\right)$

10. $(4x - 9y)(4x + 9y)$

11. $(-6x - 7y)(-6x + 7y)$

12. $(-8x + 3y)(-8x - 3y)$

13. The area of a billboard sign is represented by $(x + 12)^2$ square feet. Find this product.

14. The length of a picture frame is $(x - 6)$ inches. The width of the picture frame is $(x + 6)$ inches. Find the area of the picture frame.

Answers

R. $9x^2 - 16$

N. $x^2 - \frac{16}{25}$

A. $x^2 - 10x + 25$

C. $64x^2 - 9y^2$

I. $x^2 - 81$

E. $16x^2 - 81y^2$

N. $x^2 + 14x + 49$

V. $x^2 + 24x + 144$

S. $36x^2 - 49y^2$

G. $x^2 - 100y^2$

H. $36x^2 - 36x + 9$

M. $x^2 - 36$

A. $x^2 + 28x + 196$

I. $\frac{4}{9} - x^2$

13	4	9	7	11	3	5	1	8		12	6	10	2	14