

12-8

Exploring Polynomials

What You'll Learn

- 1 To write variable expressions
- 2 To simplify polynomials

How many big squares?

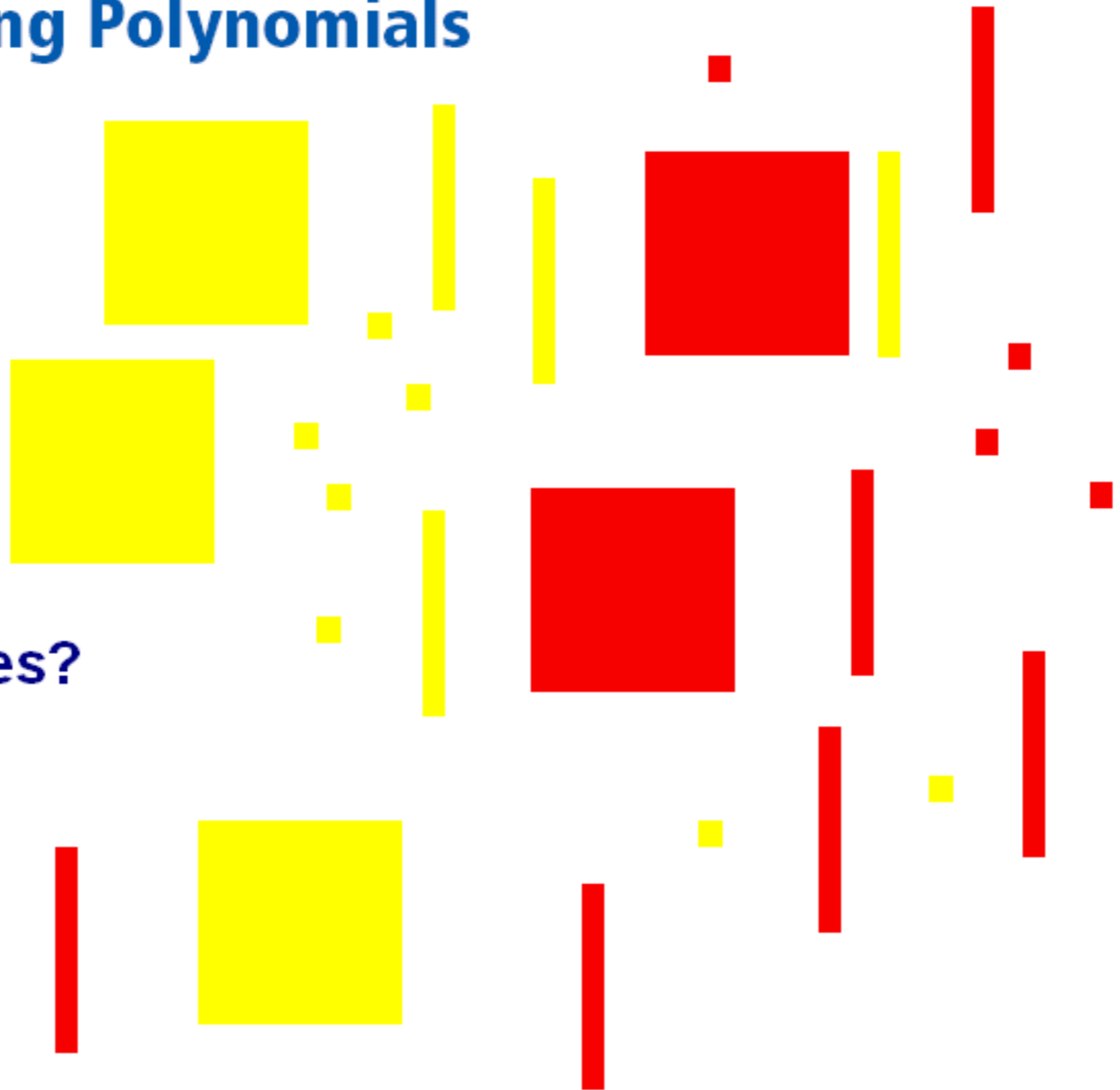
5

How many sticks?

10

How many stones?

11



12-8

Exploring Polynomials

Suppose the yellows
are positive,
and the reds are
negative.
Now...

How many big squares?

1

How many sticks?

-2

How many stones?

3

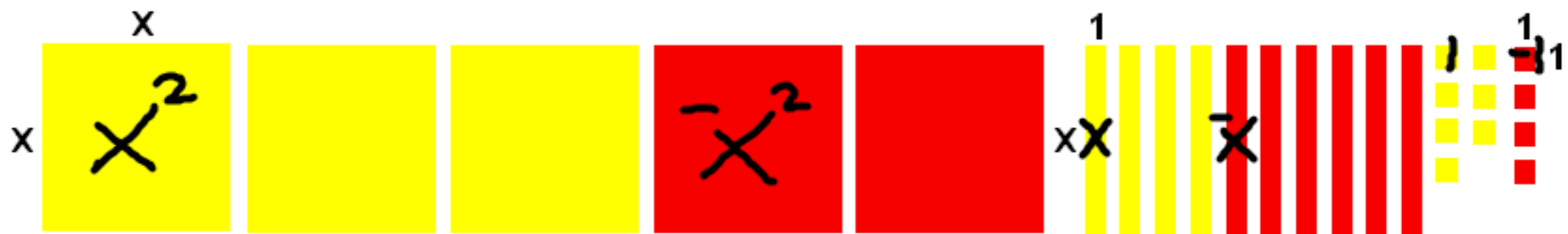
(take out 'zero' pairs and see what's left.)

12-8

Exploring Polynomials

The pieces are named after their sizes...

This is how to write the expression in ALGEBRAIC form:



$$3x^2 + -2x^2 + 4x + -6x + 7 + -4$$

Note these two facts:

- Terms are separated by addition or subtraction.
- Similar terms can be combined to simplify the expression.

$$(3x^2 + -2x^2) + (4x + -6x) + (7 + -4)$$

EXERCISES

For more practice, see *Extra Practice*.

Write a variable expression for each model.



$$-2x^2 + 1x + -2$$



$$1x^2 + 3x + -5$$



$$2x^2 + -2x + 3$$

EXERCISES

For more practice, see *Extra Practice*.

Write and simplify the polynomial represented by each model.



$$-2x^2 + 3x + 1x^2 + 5 + -3x + -2$$

reorder: $-2x^2 + 1x^2 + 3x + -3x + 5 + -2$

$$\boxed{-1x^2 + 3}$$



$$2x^2 + -1x^2 + 1x + -3x + 2 + -3$$

$$1x^2 + -2x + -1$$

Simplify $2x^2 - 3x + 5 + 2x$

Step 1) Add-opp and re-order the terms...

$$2x^2 + -3x + 2x + 5$$

Step 2) Combine similar terms...

$$2x^2 + -1x + 5$$

EXERCISES

 For more practice, see *Extra Practice*.

Use properties to simplify each polynomial.

8. $3x^2 - 8 + 2x - 4x + 3 - 5x^2$

$$-2x^2 - 2x - 5$$

9. $3x^2 + 6x - 2 - 4x$

$$3x^2 + 2x - 2$$

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

$$5x^2 - 5x + 3$$

11. $4x^2 - 7x - 3x^2 + 9x - 1$

$$x^2 + 2x - 1$$

EXERCISES

 For more practice, see *Extra Practice*.

Simplify each polynomial.

18. $-5n + 2n + k + k + 10n$

$$7n + 2k$$

19. $13 + g - 3r + 10g + 14r$

$$11g + 11r + 13$$

20. $11c + 9b - 7 - 16b + c - 2$

$$12c - 7b - 9$$

21. $9t - p^3 + t + 7t^3 + 7p^3 - 2t^3$

$$6p^3 + 5t^3 + 10t$$