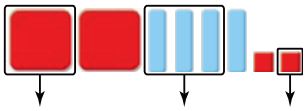
Practice

1. Which polynomial difference is represented by these tiles?



2. Simplify these polynomials. Use algebra tiles.

a) $(5x + 3) - (3x + 2)$ **b)** $(5x + 3) - (3x - 2)$

c) $(5x + 3) - (-3x + 2)$ **d)** $(5x + 3) - (-3x - 2)$

3. Simplify these polynomials. Use algebra tiles.

a) $(3x^2 + 2x + 4) - (2x^2 + x + 1)$ **b)** $(3x^2 - 2x + 4) - (2x^2 - x + 1)$

c) $(3x^2 - 2x - 4) - (-2x^2 + x - 1)$ **d)** $(-3x^2 + 2x - 4) - (2x^2 - x - 1)$

4. Show the opposite of each polynomial using algebra tiles.
Write the opposite polynomial.

a) $3x - 2$ **b)** $-2x^2 + 3x$ **c)** $4x^2 - 7x + 6$ **d)** $-x^2 + 5x - 4$

We can subtract polynomials using paper and pencil.

Example

Subtract: $(5x^2 - 2x + 4) - (7x^2 + 10x - 8)$

Solution

$(5x^2 - 2x + 4) - (7x^2 + 10x - 8)$

To subtract $7x^2 + 10x - 8$, add its opposite $-7x^2 - 10x + 8$.

$(5x^2 - 2x + 4) - (7x^2 + 10x - 8)$

$= 5x^2 - 2x + 4 + (-7x^2 - 10x + 8)$

$= 5x^2 - 2x + 4 - 7x^2 - 10x + 8$

$= 5x^2 - 7x^2 - 2x - 10x + 4 + 8$

$= -2x^2 - 12x + 12$

To check, add the difference to the second polynomial:

$(-2x^2 - 12x + 12) + (7x^2 + 10x - 8)$

$= -2x^2 + 7x^2 - 12x + 10x + 12 - 8$

$= 5x^2 - 2x + 4$

The sum is equal to the first polynomial.

So, the difference is correct.

5. Simplify.

a) $(x + 7) - (x + 5)$ **b)** $(x + 7) - (x - 5)$

c) $(x + 7) - (-x + 5)$ **d)** $(x + 7) - (-x - 5)$

6. Simplify. Check your answers by adding.

a) $(2x^2 - 3) - (x^2 + 1)$ **b)** $(3x^2 + 2x) - (2x^2 + x)$

c) $(7 - 4x^2) - (8 - 2x^2)$ **d)** $(5x - 7x^2) - (2x^2 + 2x)$

Which tools can you use to help you?

7. Simplify. How could you check your answers?

a) $(3x^2 + x - 1) - (x^2 - 2x + 5)$

b) $(x^2 - x + 1) - (x^2 + x - 1)$

c) $(2x^2 + x - 3) - (x^2 - 3x + 4)$

d) $(x - x^3 + 5) - (7 - x + x^3)$

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

f) $(2x^2 - 3x - 5) - (2x^2 - 3x - 5)$

8. **Assessment Focus** John subtracted these polynomials:

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

a) Explain why his solution is incorrect.

$$\begin{aligned}&(2x^2 - 4x + 6) - (3x^2 + 2x - 4)\\ &= 2x^2 - 4x + 6 - 3x^2 + 2x - 4\\ &= 2x^2 - 3x^2 - 4x + 2x + 6 - 4\\ &= -x^2 - 2x + 2\end{aligned}$$

b) What is the correct answer? Show your work.

c) How could you check your answer?

9. **a)** Simplify.

i) $(3x^2 + x) - (2x^2 - 3x)$

ii) $(2x^2 - 3x) - (3x^2 + x)$

iii) $(4x^3 - 5) - (7 + 2x^3)$

iv) $(7 + 2x^3) - (4x^3 - 5)$

v) $(2x - x^3) - (-x^3 + 2x)$

vi) $(-x^3 + 2x) - (2x - x^3)$

b) What patterns do you see in the answers in part a? Explain.

c) Write two polynomials.
Subtract them in different orders.
What do you notice?

10. **a)** **i)** Write a polynomial.

ii) Write the opposite polynomial.

b) Subtract the two polynomials in part a.
What do you notice about your answer?

c) Compare your answer with those of your classmates.
Is there a pattern? Explain.

11. **Take It Further** One polynomial is subtracted from another.
The difference is $-2x^2 + 4x - 5$.
Write two polynomials that have this difference.
How many different pairs of polynomials can you find?

In Your Own Words

What did you find difficult about subtracting two polynomials?
Use examples to show how you overcame this difficulty.