

4.1 Adding and Subtracting Polynomials

Solutions

Simplify by combining like terms.	
<p>1. $3x + 23x$ $= (3 + 23)x = \boxed{26x}$</p>	<p>2. $15x + 5x$</p>
<p>3. $2x + 7 + 8x + 3$ $= 2x + 8x + 7 + 3 = \boxed{10x + 10}$</p>	<p>4. $3x + 2 + 5x + 12$</p>
<p>5. $3x^2 - x + 5x^2 + 12 + 3x - 6$ $= 3x^2 + 5x^2 + (-x) + 3x + (-6) + 12$ $= \boxed{8x^2 + 2x + 6}$</p>	<p>6. $-5x^2 + 4x + 8x^2 - 8 + 2x - 4$</p>
Simplify by adding the polynomials.	
<p>7. $(5x + 3) + (-8x + 7)$ $= 5x + -8x + 3 + 7$ $= \boxed{-3x + 10}$</p>	<p>8. $(8x - 3) + (4x + 6)$</p>
<p>9. $(2x^2 + 5x - 11) + (4x^2 - x + 7)$ $= 2x^2 + 5x + -11 + 4x^2 + -x + 7$ $= 2x^2 + 4x^2 + 5x + -x + -11 + 7$ $= 6x^2 + 4x + -4$ $= \boxed{6x^2 + 4x - 4}$</p>	<p>10. $(3x^2 - 7x - 4) + (x^2 + 3x + 5)$</p>
Answers: 1. $26x$; 3. $10x + 10$; 5. $8x^2 + 2x + 6$; 7. $-3x + 10$; 9. $6x^2 + 4x - 4$	

Simplify by subtracting the polynomials

11. $(7x + 8) - (2x + 3)$

$$= (7x + 8) + -(2x + 3)$$

$$= 7x + 8 + -2x + -3$$

$$= 7x + -2x + 8 + -3$$

$$= 5x + 5$$

12. $(3x - 2) - (2x + 1)$

13. $(3x^2 + 5x + 2) - (x^2 + x - 3)$

$$= (3x^2 + 5x + 2) + -(x^2 + x - 3)$$

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

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

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

14. $(4x^2 - 3x + 6) - (2x^2 + 2x - 1)$

Find the indicated sum or difference

15. Find the sum of

$(3x^2 - 8x + 1)$ and $(x^2 + 8x - 4)$

$$= (3x^2 - 8x + 1) + (x^2 + 8x - 4)$$

$$= 3x^2 + -8x + 1 + x^2 + 8x + -4$$

$$= 3x^2 + x^2 + -8x + 8x + 1 + -4$$

$$= 4x^2 + -3$$

$$= 4x^2 - 3$$

16. Find the sum of

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

17. Find the difference of

$(3x^2 - 5x - 4)$ and $(x^2 + 5x - 4)$

$$= (3x^2 - 5x - 4) - (x^2 + 5x - 4)$$

$$= (3x^2 + -5x + -4) + -(x^2 + 5x + -4)$$

$$= 3x^2 + -5x + -4 + -x^2 + -5x + 4$$

$$= 3x^2 + -x^2 + -5x + -5x + -4 + 4$$

$$= 2x^2 + -10x$$

$$= 2x^2 - 10x$$

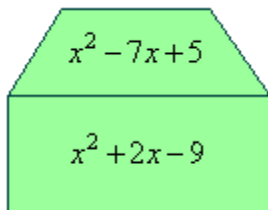
18. Find the difference of

$(4x^2 + x - 9)$ and $(-4x^2 + 7x - 5)$

Answers: 11. $5x + 5$; 13. $2x^2 + 4x + 5$; 15. $4x^2 - 3$; 17. $2x^2 - 10x$

Simplify.

19. Find the total area of the shape below.

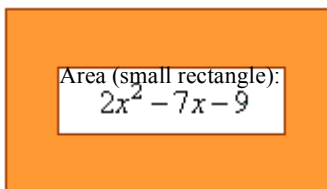


Total area of shaded region =

$$\begin{aligned}
 \text{Area} &= (x^2 - 7x + 5) + (x^2 + 2x - 9) \\
 &= x^2 + -7x + 5 + x^2 + 2x + -9 \\
 &= x^2 + x^2 + -7x + 2x + 5 + -9 \\
 &= 2x^2 + -5x + -4 \\
 &= \boxed{2x^2 - 5x - 4}
 \end{aligned}$$

20. Find the area of the shaded region below.

Area (large rectangle): $2x^2 + 13x + 15$



Area of shaded region =

Area (small rectangle):
 $2x^2 - 7x - 9$

21. A lawn mower manufacturer can approximate its costs for producing x lawn mowers in one week as follows:

Material cost: $-0.003x^2 + 20x$

Labor cost: $0.002x^2 + 18x + 200$

(a) Write the polynomial that represents the total material and labor costs.

$$\begin{aligned}
 &= -0.003x^2 + 20x + 0.002x^2 + 18x + 200 \\
 &= -0.003x^2 + 0.002x^2 + 20x + 18x + 200 \\
 &= \boxed{-0.001x^2 + 38x + 200}
 \end{aligned}$$

(b) Calculate the cost of producing 100 lawn mowers.

$$\begin{aligned}
 &= -0.001x^2 + 38x + 200 \\
 &= -0.001 \cdot 100^2 + 38 \cdot 100 + 200 \\
 &= -0.001 \cdot 10000 + 3800 + 200 \\
 &= -10 + 3800 + 200 \\
 &= \boxed{\$3990}
 \end{aligned}$$

(c) Calculate the cost of producing 200 lawn mowers.

$$\begin{aligned}
 &= -0.001x^2 + 38x + 200 \\
 &= -0.001 \cdot 200^2 + 38 \cdot 200 + 200 \\
 &= -0.001 \cdot 40000 + 7600 + 200 \\
 &= -40 + 7600 + 200 \\
 &= \boxed{\$7760}
 \end{aligned}$$

22. A vacuum cleaner manufacturer can approximate its costs producing for x vacuum cleaners in one week as follows:

Cost: $0.01x^2 + 51.5x + 250$

Revenue: $-0.17x^2 + 350x$

(a) Write the polynomial that represents the profit.

(b) Calculate the profit from producing 10 vacuum cleaners.

(c) Calculate the profit from producing 20 vacuum cleaners.

Answers: 19. $2x^2 - 5x - 4$; 21. (a) $-0.001x^2 + 38x + 200$, (b) \$3990, (c) \$7760