

21. Verbal model: $\boxed{\text{Area}} = \frac{1}{2} \cdot \boxed{\text{Base}} \cdot \boxed{\text{Height}}$

Labels: Base = x

Height = $2x + 4$

Equation: $35 = \frac{1}{2} \cdot x \cdot (2x + 4)$

$70 = 2x^2 + 4x$

$0 = 2x^2 + 4x - 70$

$0 = x^2 + 2x - 35$

$0 = (x + 7)(x - 5)$

$x + 7 = 0$

$x = -7$

reject

$x - 5 = 0$

$x = 5$ feet; base

$2x + 4 = 14$ feet; height

Cumulative Test for Chapters P–3

1. (a) $-2 < 5$

(b) $\frac{1}{3} < \frac{1}{2}$

(c) $|2.3| > -|-4.5|$

3. (a) $t(3t - 1) - 2t(t + 4) = 3t^2 - t - 2t^2 - 8t$
 $= t^2 - 9t$

(b) $3x(x^2 - 2) - x(x^2 + 5) = 3x^3 - 6x - x^3 - 5x$
 $= 2x^3 - 11x$

5. (a) $(2x + 1)(x - 5) = 2x^2 - 10x + x - 5$
 $= 2x^2 - 9x - 5$

(b) $[2 + (x - y)]^2 = 4 + 4(x - y) + (x - y)^2$
 $= 4 + 4x - 4y + x^2 - 2xy + y^2$

6. (a) $12 - 5(3 - x) = x + 3$

$12 - 15 + 5x = x + 3$

$-3 + 5x = x + 3$

$-3 + 5x - x = x + 3 - x$

$3 - 3 + 4x = 3 + 3$

$4x = 6$

$\frac{4x}{4} = \frac{6}{4}$

$x = \frac{3}{2}$

2. “The number n is tripled and the product is decreased by 8,” is expressed by $3n - 8$.

4. (a) $(2a^2b)^3(-ab^2)^2 = (8a^6b^3)(a^2b^4)$
 $= 8a^8b^7$

(b) $\left(\frac{2x^4y^2}{4x^3y}\right)^2 = \left(\frac{xy}{2}\right)^2 = \frac{x^2y^2}{4}$

(b) $1 - \frac{x + 2}{4} = \frac{7}{8}$

$8\left[1 - \frac{x + 2}{4}\right] = \left[\frac{7}{8}\right]8$

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

$8 - 2x - 4 = 7$

$4 - 2x = 7$

$4 - 4 - 2x = 7 - 4$

$-2x = 3$

$\frac{-2x}{-2} = \frac{3}{-2}$

$x = -\frac{3}{2}$

7. (a) $|3x - 5| = 7$

$$3x - 5 = 7 \qquad 3x - 5 = -7$$

$$3x = 12 \qquad 3x = -2$$

$$x = 4 \qquad x = -\frac{2}{3}$$

(b) $2t^2 - 5t - 3 = 0$

$$(2t + 1)(t - 3) = 0$$

$$2t + 1 = 0 \qquad t - 3 = 0$$

$$t = -\frac{1}{2} \qquad t = 3$$

8. (a) $3(1 - x) > 6$

$$3 - 3x > 6$$

$$-3x > 3$$

$$x < -1$$

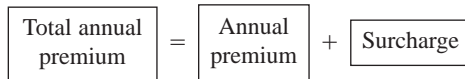
(b) $-12 \leq 4x - 6 < 10$

$$-6 \leq 4x < 16$$

$$-\frac{6}{4} \leq x < 4$$

$$-\frac{3}{2} \leq x < 4$$

9. Verbal model:



Labels: Total annual premium = x

Equation: $x = 1225 + 0.15(1225)$

$$x = 1225 + 183.75$$

$$x = \$1408.75$$

10. $\frac{9}{4.5} = \frac{13}{x}$

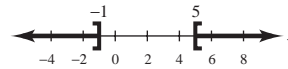
$$9x = 13(4.5)$$

$$x = \frac{13(4.5)}{9}$$

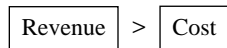
$$x = 6.5$$

11. $x - 2 \leq -3$ or $x - 2 \geq 3$

$$x \leq -1 \qquad x \geq 5$$



12. Verbal model:



Equation: $12.90x \geq 8.50x + 450$

$$4.4x \geq 450$$

$$x \geq 102.27273$$

$$x \geq 103$$

13. $x - y^3 = 0$ does not represent y as a function of x .

14. $f(x) = \sqrt{x - 2}$ $D = x \geq 2$ $x - 2 \geq 0$

$$2 \leq x < \infty$$

15. $f(x) = x^2 - 3x$

(a) $f(4) = 4^2 - 3(4) = 16 - 12 = 4$

(b) $f(c + 3) = (c + 3)^2 - 3(c + 3)$
 $= c^2 + 6c + 9 - 3c - 9$
 $= c^2 + 3c$

$$16. m = \frac{6-0}{4+4} = \frac{6}{8} = \frac{3}{4}$$

$$\begin{aligned} d &= \sqrt{(-4-4)^2 + (0-6)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} \\ &= 10 \end{aligned}$$

$$17. (a) 2x - y = 1$$

$$-y = -2x + 1$$

$$y = 2x - 1$$

$$m = 2$$

$$y - 1 = 2(x + 2)$$

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

$$2x - y + 5 = 0$$

$$(b) 3x + 2y = 5$$

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

$$y = -\frac{3}{2}x + \frac{5}{2}$$

$$m = \frac{2}{3}$$

$$y - 1 = \frac{2}{3}(x + 2)$$

$$y - 1 = \frac{2}{3}x + \frac{4}{3}$$

$$y = \frac{2}{3}x + \frac{7}{3}$$

$$3y = 2x + 7$$

$$2x - 3y + 7 = 0$$

$$18. (a) 3x^2 - 8x - 35 = (3x + 7)(x - 5)$$

$$\begin{aligned} (b) 9x^2 - 144 &= (3x)^2 - (12)^2 \\ &= (3x - 12)(3x + 12) \\ &= 3(x - 4)3(x + 4) \\ &= 9(x - 4)(x + 4) \end{aligned}$$

$$19. (a) y^3 - 3y^2 - 9y + 27 = y^2(y - 3) - 9(y - 3)$$

$$= (y - 3)(y^2 - 9)$$

$$= (y - 3)(y - 3)(y + 3)$$

$$(b) 8t^3 - 40t^2 + 50t = 2t(4t^2 - 20t + 25)$$

$$= 2t[(2t)^2 - 2(2t)(5) + 5^2]$$

$$= 2t(2t - 5)^2$$

$$20. 4x + 3y - 12 = 0$$

$$4(0) + 3y - 12 = 0$$

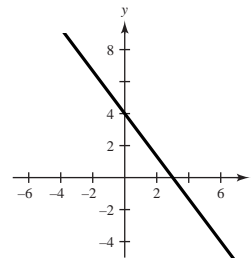
$$3y = 12$$

$$y = 4 \quad (0, 4)$$

$$4x + 3(0) - 12 = 0$$

$$4x = 12$$

$$x = 3 \quad (3, 0)$$



$$21. y = 1 - (x - 2)^2$$

