Chapter 3 BLM Answers

BLM 3–1 Prerequisite Skills

1. a) 18   **b)** 14   **c)** 21   **d)** 24   **e)** 20   **f)** 45

2. a) $\frac{26}{21}$ **b)** $\frac{1}{36}$ **c)** $\frac{18}{25}$

   d) $\frac{1}{3}$ **e)** $-\frac{9}{35}$ **f)** $-\frac{69}{56}$

3. a) −16   **b)** 13   **c)** 30   **d)** −12   **e)** 9   **f)** 0

4. a) 9   **b)** 1   **c)** 38.73

   d) −6.40   **e)** 3   **f)** −4.58

5. a) $2x$ **b)** $3z$ **c)** $4xz$

   d) $7x^2y^2$ **e)** $10z^2$ **f)** $2a^2b^4c$

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

   c) $-4x(3x-2)$ **d)** $3(x^2+6)$

7. a) $(x+2)(x+1)$ **b)** $(x+7)(x-6)$

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

   e) $(x+8)(x-8)$ **f)** $(2x+1)(x-1)$

   g) $(3x-1)(x+2)$ **h)** $(3x-4)(2x-3)$

   i) $(3x+5)^2$ **j)** $4(x^2+9)(x+3)(x-3)$

**8. a)** upward; (1.5, −0.25); $x=1.5$; $y=2$; $x=1, x=2$
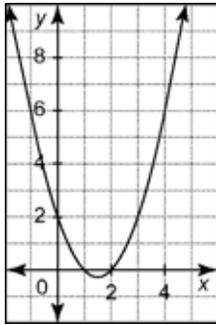
b) downward; (0, 16); $x=0$; $y=16$; $x=-4, x=4$
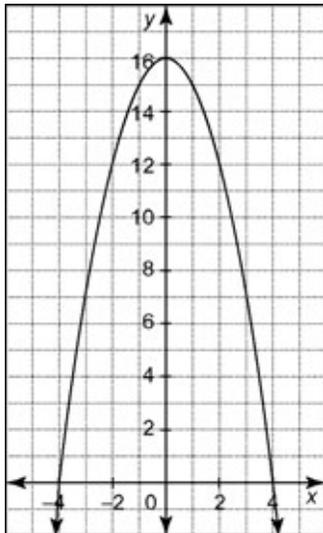

c) downward; (3, 1); $x=3$; $y=-3.5$
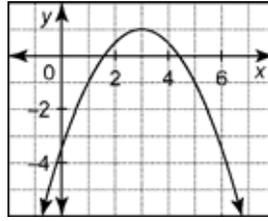
d) upward; (−1, −5); $x=-1$; $y=-3$
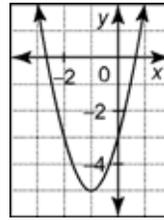
BLM 3–3 Section 3.1 Complete the Square

1. a) True   **b)** False   **c)** True   **d)** True   **e)** True

2. a) $y=(x+4)^2-13$ **b)** $y=(x-1)^2+6$

   c) $y=(x-2)^2-5$ **d)** $y=(x+5)^2-27$

   e) $y=(x+3)^2-5$ **f)** $y=(x-3)^2$

3. a) $y=2(x-\frac{1}{5})^2+\frac{1}{25}$ **b)** $y=4(x+\frac{1}{3})^2$

   c) $y=\frac{1}{2}(x+3)^2+\frac{27}{2}$ **d)** $y=\frac{3}{5}(x+1)^2-\frac{28}{5}$

   e) $y=-(x+\frac{1}{7})^2+\frac{1}{49}$ **f)** $y=-\frac{5}{2}(x+1)^2+\frac{11}{4}$

4. a) 1   **b)** 16   **c)** $\frac{25}{4}$ **d)** $-\frac{49}{4}$ **e)** −3   **f)** $\frac{9}{16}$

5. a) (−3, −4), minimum   **b)** (1, 9), minimum

   c) (4, 16), maximum   **d)** (6, 38), maximum

   e) (−3, 40), maximum   **f)** (1, −4), minimum

6. a)
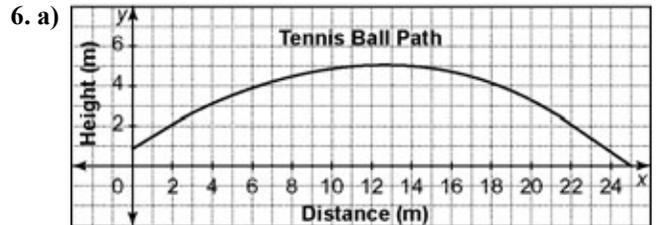
   b) 6 m   **c)** 12 m   **d)** 0.8 m

7. a) $3.56   **b)** 114 cakes   **c)** $405.84

8. $y=(x+\frac{k}{2})^2$

BLM 3–5 Section 3.2 The Quadratic Formula

1. a) True   **b)** False   **c)** True   **d)** True

2. a) $x=-1$

   b) $x=1, x=\frac{5}{3}$

c) $x = -\dfrac{1}{4}, x = -1$

d) $x = -\dfrac{9}{2} + \dfrac{\sqrt{41}}{2}, x = -\dfrac{9}{2} - \dfrac{\sqrt{41}}{2}$

e) $x = -\dfrac{3}{2} + \dfrac{\sqrt{13}}{2}, x = -\dfrac{3}{2} - \dfrac{\sqrt{13}}{2}$

f) $x = \dfrac{7}{5}, x = 1$

3. a) $x = -1.7, x = 4$ **b)** $x = -2.34, x = 0.47$
   c) $x = -2.83, x = 0.83$ **d)** $x = 0.92, x = 8.15$
   e) $x = -0.66, x = 0.5$ **f)** $x = -3, x = -2.33$
4. a) 4.5 m   **b)** 0.9 m   **c)** 1.5 s
5. a) 0.32 s   **b)** 0.038 m or 3.8 cm
6. a) $a = 1.7$ cm   **b)** $h = 2.7$ cm
7. a) approximately 6.28 cm   **b)** approximately 5.56 cm

BLM 3–6 Section 3.3 Real Roots of Quadratic Equations

1. a) False   **b)** False   **c)** False   **d)** True
2. a) 2   **b)** 0   **c)** 1   **d)** 0   **e)** 2   **f)** 2
3. D
4. a) 1   **b)** 0   **c)** 2   **d)** 0   **e)** 2   **f)** 1

5. a) $x = -1, x = \dfrac{1}{2}$ **b)** $x = -7, x = 3$

   c) $x = -2, x = \dfrac{3}{4}$ **d)** $x = 2, x = 3$

   e) $x = 0, x = \dfrac{2}{3}$ **f)** $x = -1, x = \dfrac{6}{7}$

6. a)

$x = -3, x = 2$

b)

No x-intercepts

c)
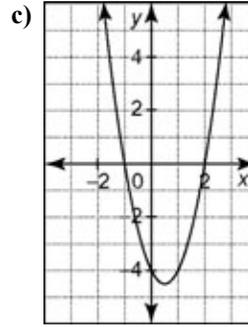
$x = -1, x = 2$

7. a) $x = -5, x = 6$ **b)** $x = -1, x = 3$
**8. a)** $w^2 - 8w + 20 = 0$ **b)** -16
   **c)** No   **d)** 4 m by 5 m
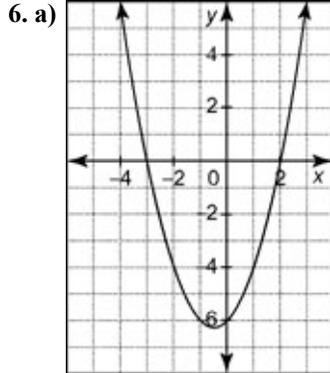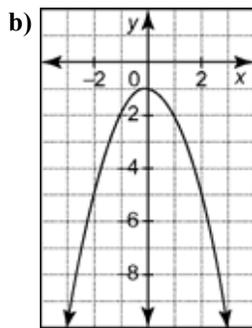
BLM 3–7 Section 3.4 Multiple Forms of Quadratic Functions

**1. a)** $y = (x - 2)(x - 7)$; $y = 14$; $(4.5, -6.25)$; $x = 4.5$
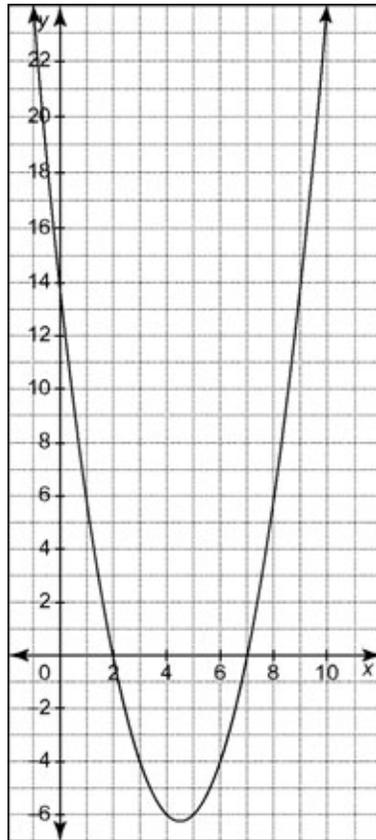
b) $y = -(2x - 6)(x + 1)$; $y = 6$; $(1, 8)$; $x = 1$
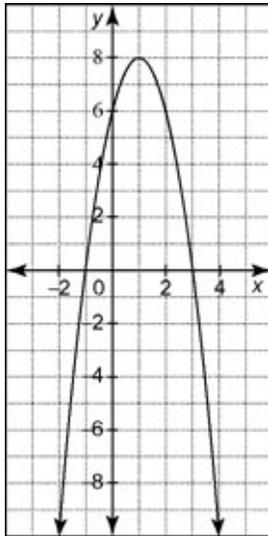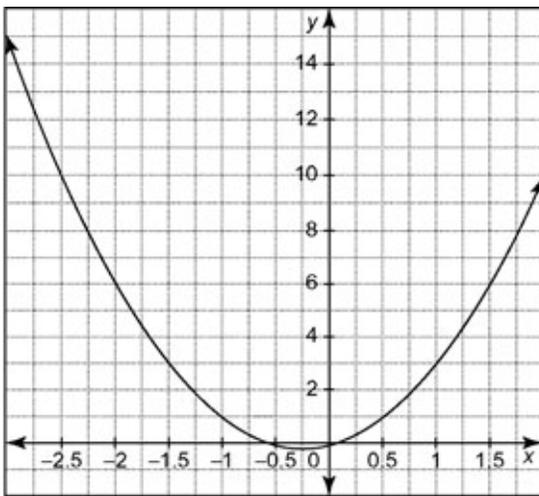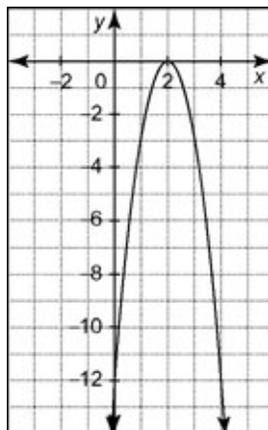
2. a) $x = 1.61$, $x = -3.94$; $y = -5.7$; $(-1.17, -6.92)$; $x = -1.17$

c) $y = x(2x + 1)$; $y = 0$; $(-0.25, -0.125)$; $x = -0.25$
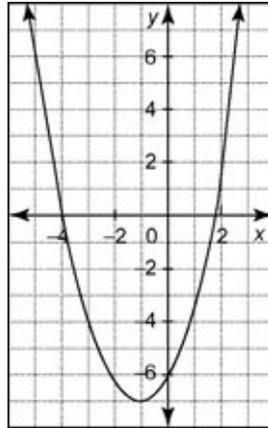
b) $x = 0.19$, $x = 1.31$; $y = -\dfrac{1}{8}$; $(0.75, 0.16)$; $x = 0.75$
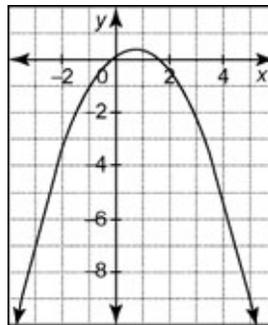
c) $x = -1.50$, $x = 0.94$; $y = \dfrac{19}{5}$; $(-0.28, 4.01)$; $x = -0.28$

d) $y = 3(x - 2)^2$; $y = -12$; $(2, 0)$; $x = 2$
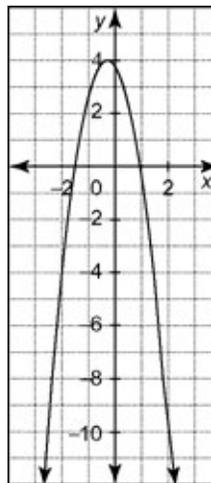
3. a) $x = -4$, $x = -2$; $(-3, -1)$; positive when $x < -4$ and $x > -2$; negative when $-4 < x < -2$; increasing when $x > -3$; decreasing when $x < -3$

b) $x = -1$, $x = -\dfrac{1}{3}$; $(-\dfrac{2}{3}, \dfrac{1}{3})$; positive when $-1 < x < -\dfrac{1}{3}$; negative when $x < -1$ and $x > -\dfrac{1}{3}$; increasing when $x < -\dfrac{2}{3}$; decreasing when $x > -\dfrac{2}{3}$

c) $x = -1$, $x = 1\frac{1}{8}$; $(\frac{1}{16}, 18\frac{1}{16})$; positive when

$-1 < x < 1\frac{1}{8}$; negative when $x < -1$ and $x > 1\frac{1}{8}$;

increasing when $x < \frac{1}{16}$; decreasing when $x > \frac{1}{16}$

d) $x = \frac{3}{2}$; $(\frac{3}{2}, 0)$; positive for all values of x; never

negative; increasing when $x > \frac{3}{2}$; decreasing

when $x < \frac{3}{2}$

e) $x = -\frac{2}{5}$; $(-\frac{2}{5}, 0)$; never positive; negative for all

values of x; increasing when $x < -\frac{2}{5}$; decreasing

when $x > -\frac{2}{5}$

4. a) 1 s   **b)** 2 s   **c)** 1 m   **d)** 3 m
**5. a)** 20 m   **b)** 10 m   **c)** 11 m

BLM 3–9 Section 3.5 Model With Quadratic Equations

1. a) $y = -(x - 3)^2 + 1$
   **b)** $y = -2(x - 1)^2 + 7$
   **c)** $y = \frac{1}{3}(x - 1)^2 + 1$

2. a)
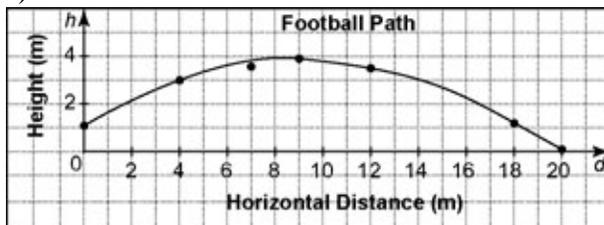
   **b)** $(9, 4)$ **c)** $y = -\frac{1}{27}(x - 9)^2 + 4$

3. a)
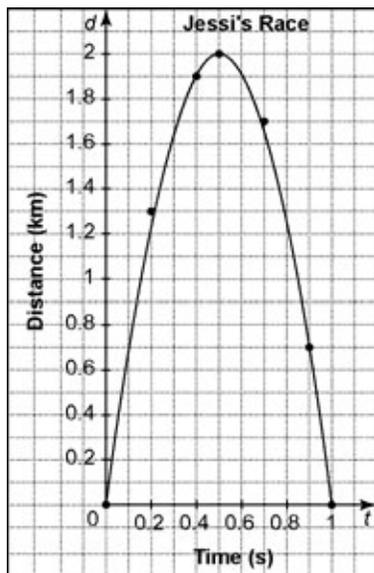
   b) $(0.5, 2)$ **c)** $y = -8(x - 0.5)^2 + 2$

4. a)
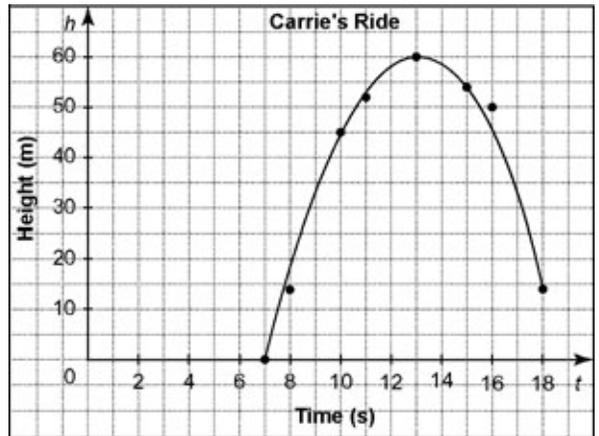
   b) $(13, 60)$ **c)** $y = -\frac{5}{3}(x - 13)^2 + 60$

5. a)
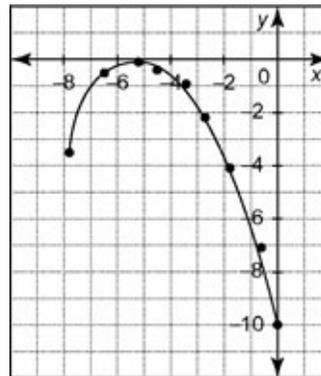
   b) $(-5, 0)$ **c)** $y = -\frac{2}{5}(x + 5)^2$

6. a)
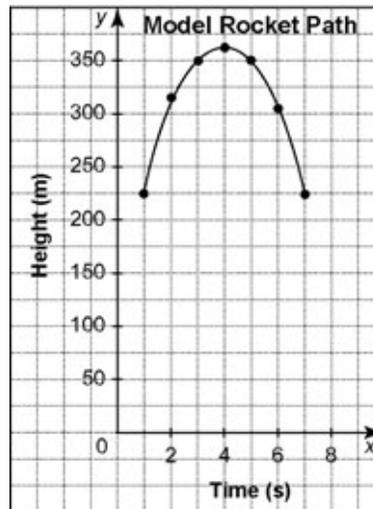

   b) 367 m   **c)** 115 m
   d) $y \doteq -15.51x^2 + 123.27x + 121.57$; x represents the
      time the rocket has been in the air, y represents the
   height of the rocket
   e) 8.8 s

7. a)
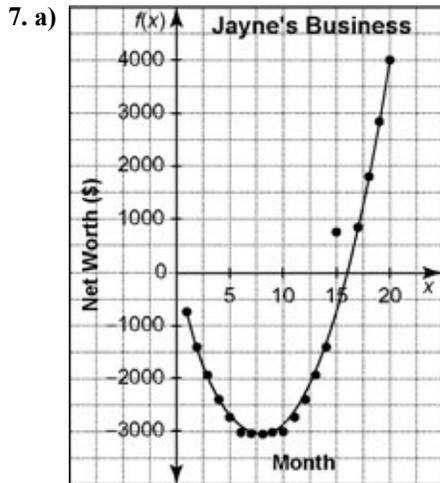
b) month 15   **c)** $f(x) = 50(x - 8)^2 - 3200$
**d)** approximately 21 months

BLM 3–10 Chapter 3 Review

1. a) $y = \dfrac{1}{5}(x + 5)^2 + 3$

b) $y = -(x - 2)^2 - 9$

c) $y = -8(x + \dfrac{3}{8})^2 + \dfrac{49}{8}$

2. a) $\dfrac{121}{128}$ **b)** $\dfrac{11}{20}$ **c)** $\dfrac{35}{16}$

3. a) $x = -0.74, x = 2.24$
  b) $x = 0.10, x = 1.28$
  c) $x = -1.79, x = 2.79$

4. a) $x = \dfrac{1}{2} + \dfrac{\sqrt{6}}{2}, x = \dfrac{1}{2} - \dfrac{\sqrt{6}}{2}$

  b) $x = -1 + \dfrac{5}{2}, x = -1 - \dfrac{5}{2}$

5. a) 1   **b)** 0   **c)** 0   **d)** 2   **e)** 1   **f)** 0
6. a) $x = -0.5, x = 3$ **b)** $x = 0.5, x = 1$
  c) $x = 1.13, x = 3.54$ **d)** $x = -1.40, x = 0.24$
7. a) $x = -6, x = -2; y = -12; (-2, -16); x = -2$

  b) $x = -0.5, x = -1; y = -1; -\dfrac{3}{4}, \dfrac{1}{8}; x = -\dfrac{3}{4}$

  c) $x = -6, x = -2; y = -12; (-2, -16); x = -2$

  d) $x = -1, x = -5; y = -\dfrac{25}{8}; (-3, \dfrac{20}{8}); x = -3$

8. positive, when $x < -4$ and $x > 1$, negative, when $-4 < x < 1$,
increasing, when $x > -1.5$, decreasing, when $x < -1.5$
9. a)
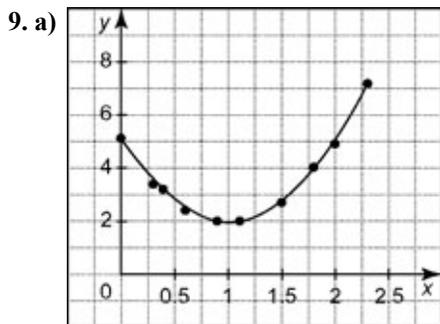
  b) $(1, 2)$ **c)** $y = 3(x - 1)^2 + 2$

BLM 3–12 Chapter 3 Practice Test

1. D   **2.** B   **3.** D   **4.** C

5. $y = \dfrac{16}{25}(x + 5)^2 + 5$

6. a) $y = -\dfrac{1}{2}(x - 1)^2 + 2$ **b)** $x = 1$

  c) when $x < 1$ **d)** when $-1 < x < 3$
7. a) 4 m   **b)** 4 m   **c)** 9.7 m   **d)** 2 m
8. a) $R(x) = (75 - 5x)(30 + 6x)$
  b) $3000   **c)** $50   **d)** 0 customers
9. a)
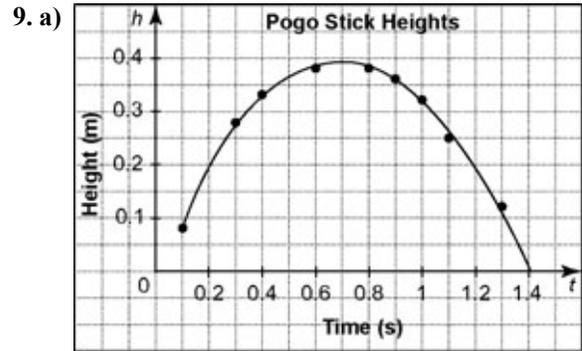
  b) $(0.7, 0.39)$ **c)** $y = 0.8(x - 0.7)^2 + 0.39$
  d) approximately 0.1 s and 1.3 s

BLM 3–13 Chapter 3 Test

1. C   **2.** B   **3.** D   **4.** A

5. a) $2; x = \dfrac{3}{5}, x = 1$

  b) No real roots
  c) $1; x = -2$
6. a) x-intercepts: -1 and 7, y-intercept: -7, vertex: $(3, -16)$,
   equation of the axis of symmetry: $x = 3$
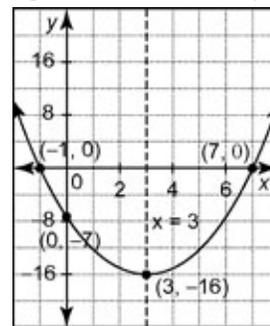
  b) x-intercepts: -3 and 3, y-intercept: 18, vertex: $(0, 18)$,
    equation of the axis of symmetry: $x = 0$
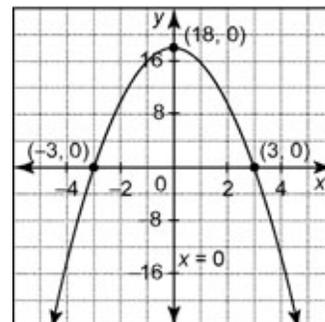
7. a) $x = -4, x = \dfrac{1}{3}$ **b)** $x = \dfrac{4}{5}, x = 2$

  c) $x = 0, x = 9$ **d)** $x = -\dfrac{6}{7}, x = 2$

8. a)
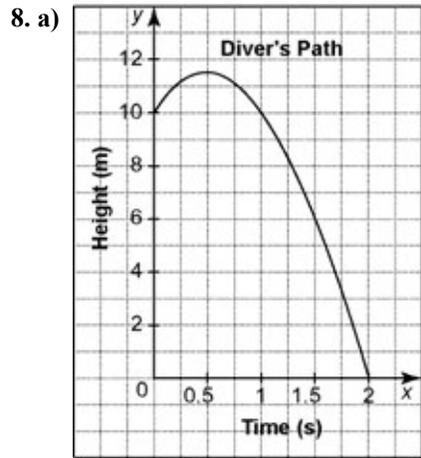
b) 13.75 m; 0.5 s   **c)** 10 m

9. a) $(4.00 - 0.20x)$ and $(60 + 10x)$
  b) $R = (4.00 - 0.20x)(60 + 10x)$, or $R = -2x^2 + 28x + 240$
  c) \$2.60
  d) No, the student council will only raise \$238 after paying for the oranges.

10. a) 2.5 m; 4 m   **b)** 8 m   **c)** $2 < d < 6$
  d) Yes; for example, the ball is 1.055 m high when it is 0.6 m from the player, which is greater than the height of the net.