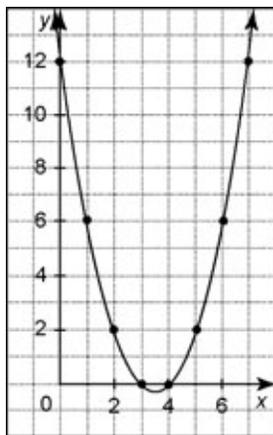


Chapter 2 BLM Answers

Prerequisite Skills

1. a)

x	y
0	12
1	6
2	2
3	0
4	0
5	2
6	6
7	12

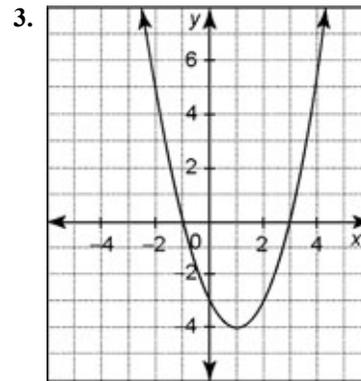


b) parabola; quadratic function

x	y	First Differences	Second Differences
0	12	-6	
1	6	-4	2
2	2	-2	2
3	0	0	2
4	0	2	2
5	2	4	2
6	6	6	2
7	12		

The second differences are constant.

2. a) 3 and 4 b) 12 c) upward
d) $x = 3.5$ e) $(3.5, -0.25)$

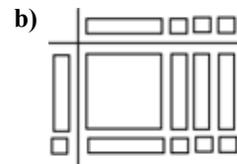


4. $6x - 3$



5. a) $4x + 12$ b) $-3y + 15$ c) $x^2 + 7x$
d) $6m^2 - 8$ e) $6x^2 + 12x - 6$ f) $-k^2 + 2k - 3$

6. a) i) ii)



- c) $x^2 + 4x + 3$
7. a) $x^2 + 8x + 15$ b) $u^2 - u - 6$ c) $k^2 - 25$
d) $2p^2 - 2p - 24$ e) $4g^2 + 20g + 25$ f) $9d^2 - 6d + 1$
8. a) $7x - 16$ b) $-7v^2 - 8v$ c) $2y^2 + y - 13$ d) $4n^2 - 2n + 7$

9. a) b)

- c) 3, $x + 2$
d) Since the area of the rectangle is $3x + 6$,
 $3x + 6 = 3(x + 2)$.

10. a) $2x + 6 = 2(x + 3)$

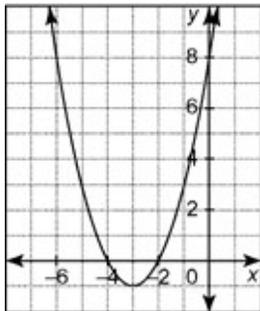
b) $3x + 12 = 3(x + 4)$

11. a) $2(x + 8)$ b) $6(h - 6)$ c) $c(c + 3)$
d) $3y(y - 3)$ e) $3(m^2 + 3m + 2)$ f) $2(r^2 + 2r - 4)$
12. a) $(x + 2)(x + 1)$ b) $(m - 8)(m - 1)$ c) $(y + 3)^2$
d) $(p + 3)(p - 2)$

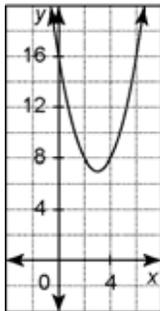
Section 2.1 Quadratic Functions: Exploring Forms

1. A, F standard form; B, D vertex form; C, E factored form
2. A a) $a = 1, b = 6, c = 8$ b) opens upward
c) minimum d) 8

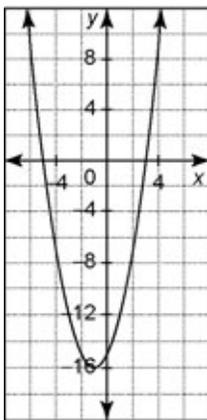
- F a) $a = -1, b = 1, c = -3$ b) opens downward
 c) maximum d) -3
3. C a) opens upward b) 3 and -5 c) $(-1, -16)$
 d) minimum e) $x = -1$ f) -15
- E a) opens downward b) -1 and -5 c) $(-3, 4)$
 d) maximum e) $x = -3$ f) -5
4. B a) opens upward b) $(3, 7)$ c) minimum
 d) $x = 3$ e) 16
- D a) opens downward b) $(4, 1)$ c) maximum
 d) $x = -4$ e) -33
5. a) A $y = x^2 + 6x + 8$



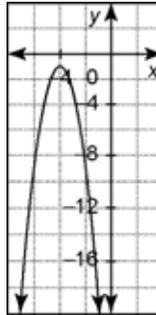
B $y = (x-3)^2 + 7$



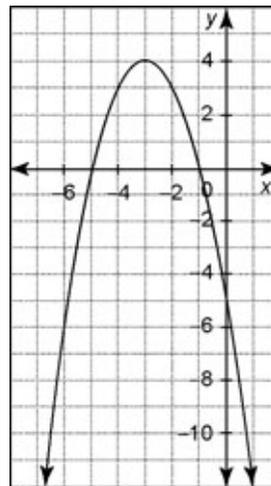
C $y = (x-3)(x+5)$



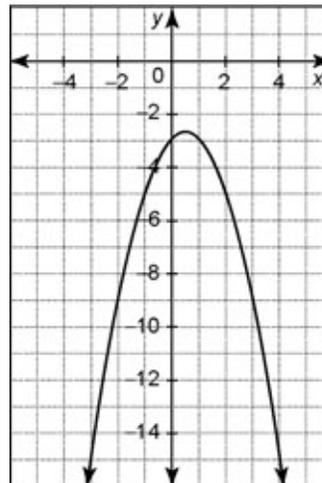
D $y = -2(x+4)^2 - 1$



E $y = -(x+1)(x+5)$



F $y = -x^2 + x - 3$



- b) A i) positive for $x < -4$ and $x > -2$; negative for $-4 < x < -2$
 ii) increasing for $x > -3$; decreasing for $x < -3$
- B i) positive for all x ii) increasing for $x > 3$; decreasing for $x < 3$
- C i) positive for $x < -5$ and $x > 3$; negative for $-5 < x < 3$
 ii) increasing for $x > -1$; decreasing for $x < -1$

D i) negative for all x **ii)** increasing for $x < -4$;
decreasing for $x > -4$

E i) negative for $x < -5$ and $x > -1$; positive for
 $-5 < x < 1$

ii) increasing for $x < -3$; decreasing for $x > -3$

F i) negative for all x **ii)** increasing for $x < 0.5$;
decreasing for $x > 0.5$

6. **a)** $y = \frac{1}{4}(x-4)^2 - 2$ **b)** $y = 2(x-3)(x-7)$

c) $y = -(x+2)^2 + 4$

7. Answers may vary.

a) approximately 25 m **b)** approximately 130 m

c) $y = \frac{1}{153}x(x-130)$

Section 2.2 Quadratic Functions: Comparing Forms

1. **a)** $3x - 27$ **b)** $-4b^2 - 8b$ **c)** $12k^2 - 18k - 6$ **d)** $12q^2 - 15$

2. **a)** $x^2 + 3x - 10$ **b)** $12g^2 - 5g - 2$ **c)** $4w^2 - 9$

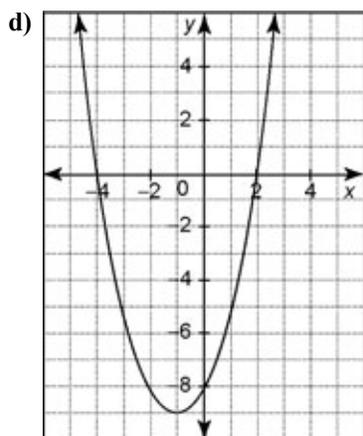
d) $16n^2 - 24n + 9$ **e)** $9g^2 + 6g + 1$ **f)** $16f^2 - 40f + 25$

g) $y^2 + 5y - 9$ **h)** $-3v^2 + 26v - 49$

3. **a) i)** opens upward **ii)** 2 and -4 **iii)** $(-1, -9)$

iv) minimum **v)** $x = -1$

b) $y = x^2 + 2x - 8$ **c) i)** $a = 1, b = 2, c = -8$ **ii)** -8

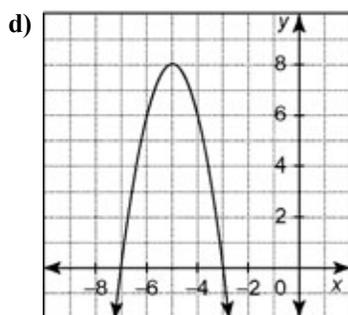


4. **a) i)** opens downward **ii)** -3 and -7 **iii)** $(-5, 8)$

iv) maximum **v)** $x = -5$

b) $y = -2x^2 - 20x - 42$ **c)** $a = -2, b = -20, c = -42$

ii) -42

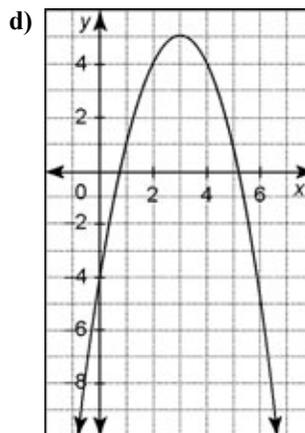


5. **a) i)** opens downward **ii)** $(3, 5)$

iii) maximum **iv)** $x = 3$

b) $y = -x^2 + 6x - 4$

c) i) $a = -1, b = 6, c = -4$ **ii)** -4

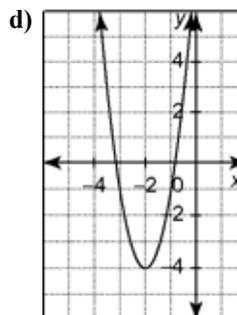


6. **a) i)** opens upward **ii)** $(-2, -4)$

iii) minimum **iv)** $x = -2$

b) $y = 3x^2 + 12x + 8$

c) i) $a = 3, b = 12, c = 8$ **ii)** 8

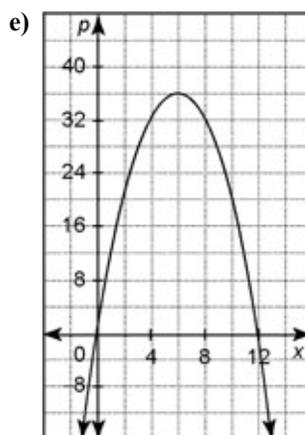


7. **a)** factored form; it is equivalent to $p = -(x-0)(x-12)$

b) 0 and 12

c) $p = -x^2 + 12x$

d) $(6, 36)$; maximum



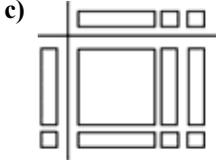
8. **a)** 36 **b)** 20.25 **c)** 0.0625

9. **a)** $x^2 + (x-6)^2$, or $2x^2 - 12x + 36$ **b)** 3, -3

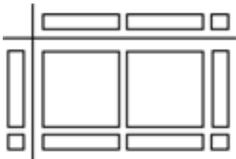
10. 25 m by 50 m

Section 2.3 Factor Quadratic Expressions of the Form $ax^2 + bx + c$

1. a) $(x + 3)(x + 1)$ b) $(b + 2)(b + 4)$ c) $(p + 5)(p + 1)$
 d) not factorable e) $(w + 2)(w + 6)$
2. a) $(y - 15)(y + 2)$ b) $(k + 3)(k + 8)$ c) not factorable
 d) $(m - 6)(m + 8)$ e) $(a - 3)(a - 4)$
3. a) $2(y - 10)(y + 1)$ b) $3(m + 5)(m + 1)$
 c) $2(q^2 + 2q + 8)$; $q^2 + 2q + 8$ is not factorable
 d) $5(n + 3)(n - 1)$ e) $3(d - 4)(d + 3)$
4. Answers may vary. For example,
 a) $x^2 + 3x + 2$ b) $(x + 1)(x + 2)$



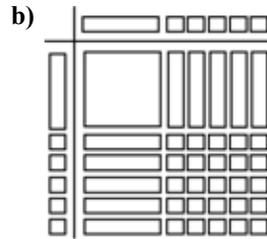
5. Answers may vary. For example,
 a) $x^2 + x + 2$
 b) If $x^2 + x + 2 = (x + a)(x + b)$, then $a + b = 1$ and $a \times b = 2$. a and b must be both positive (1 and 2) or both negative (-1 and -2) for their product to be 2. Since $1 + 2 \neq 1$ and $(-1) + (-2) \neq 1$, the trinomial $x^2 + x + 2$ is not factorable.
6. a) $(x + 3)(2x + 1)$ b) $(k + 3)(3k + 1)$ c) $(2y + 5)(y + 1)$
 d) not factorable e) $(2b + 3)(2b + 1)$
7. a) $(3e + 4)(e + 2)$ b) $(2g + 3)(g + 3)$ c) $(2k - 1)(k + 5)$
 d) $9(m^2 - m + 1)$; $m^2 - m + 1$ is not factorable
 e) $(12p + 1)(p - 2)$
8. a) $2(w + 2)(w + 3)$ b) $4(w + 2)(w + 3)$
 c) $3(x + 3)(x - 2)$ d) $2(m + 5)(m - 3)$
 e) $6(a + 1)(a - 2)$
9. Answers may vary. For example,
 a) $2x^2 + 3x + 1$
 b) Multiply two binomials $x + 1$ and $2x + 1$, and simplify. $(x + 1)(2x + 1) = 2x^2 + 3x + 1$



10. Answers may vary. For example, trinomials that cannot be factored may be more common since it is unlikely that three coefficients chosen at random will make a factorable trinomial.

Section 2.4 Select and Apply Factoring Strategies

1. a) $(x + 5)^2$ b) $(k - 6)^2$ c) $(2v + 7)^2$ d) $(10h + 1)^2$
2. Answers may vary. For example,
 a) $(x + 5)(x + 5) = x^2 + 5x + 5x + 25 = x^2 + 10x + 25$

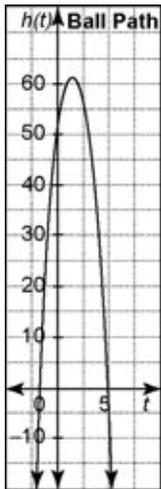


3. a) $(x + 8)(x - 8)$ b) $(p + 11)(p - 11)$
 c) $(2w + 3)(2w - 3)$ d) $(6m + 13)(6m - 13)$
4. Answers may vary. For example,
 a) $(x + 8)(x - 8) = x^2 + 8x - 8x - 64 = x^2 - 64$
5. a) $2(x + 3)^2$ b) $3(w + 4)(w - 4)$
 c) $(k^2 + 4)(k + 2)(k - 2)$ d) $n(n + 3)(n - 3)$
 e) $2(2v + 1)^2$ f) $3p(p - 5)^2$
 g) $(3b + 5)(3b - 5)$ h) $3(y + 2)(y - 2)$
 i) $(3c + 2)^2$ j) $(x^2 + 25)(x + 5)(x - 5)$
 k) $7(y^2 + 3y + 5)$; $y^2 + 3y + 5$ is not factorable
 l) $(3d + 4)(2d - 5)$ m) $3(3x + 1)(x - 2)$
 n) $5(f - 7)^2$ o) not factorable
 p) $7(b + 3)(b - 3)$ q) $11(q + 5)(q - 4)$
 r) $(3h + 2)(5h - 4)$ s) $5m(2m + 3)(2m - 3)$
 t) $9(a + 2)^2$
6. Answers may vary. For example,
 a) $2(x + 3)(x + 3) = 2(x^2 + 3x + 3x + 9)$
 $= 2(x^2 + 6x + 9)$
 $= 2x^2 + 12x + 18$
 b) $3(w^2 + 4w - 4w - 16) = 3(w^2 - 16)$
 $= 3w^2 - 48$
7. a) $y = (x + 5)^2$
 b) one; there is only one binomial factor $x + 5$ that can be zero
8. a) $y = (x + 4)(x - 4)$
 b) the y -axis, because it is midway between $x = -4$ and $x = 4$
9. Answers may vary. For example,
 a) $3x^2 - 12$ b) $3x^2 - 12 = 3(x^2 - 4) = 3(x + 2)(x - 2)$
10. Answers may vary. For example,
 a) $3x^2 - 12x + 12$
 b) factor out the greatest common factor:
 $3x^2 - 12x + 12 = 3(x^2 - 4x + 4)$; factor the perfect square trinomial: $3(x^2 - 4x + 4) = 3(x - 2)^2$

Section 2.5 Solve Quadratic Equations by Factoring

1. a) 0, 5 b) -2, 9 c) -9, -1.5 d) $\frac{1}{3}$, -2.5
 e) 4, -2 f) 1, -5
2. a) -3 b) 4, -4 c) 2, 3 d) 7, -1
 e) -1, -20 f) 5, -5 g) 8, -1 h) -2, 0.5
 i) 5, 10 j) 2.5, -2.5 k) -0.5, -10 l) $\frac{1}{3}$, 4
 m) $-\frac{2}{3}$ n) 1, 4 o) 5, -1 p) $\frac{2}{3}$, $\frac{1}{2}$
 q) $-\frac{1}{3}$, 2 r) 5, -4 s) $\frac{1}{2}$, $\frac{1}{6}$ t) $\frac{1}{2}$, $\frac{1}{3}$

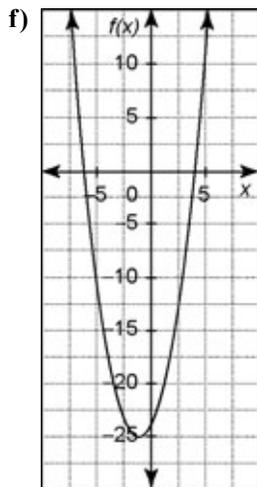
3. a) 5 and -2; -2 s is inadmissible; the ball lands on the ground after 5 s.
 b) The part of the graph for which $t < 0$ has no meaning.



4. Answers may vary. For example,
 a) $y = x^2 + x - 6$
 b) Multiply $(x - 2)$ by $(x + 3)$.
 c) Any multiple of $x^2 + x - 6$, such as $2x^2 + 2x - 12$, has the same zeros.
 5. 6 and 7
 6. 11 m by 14 m
 7. a) after 1 s and after 3 s; the ball is at 15 m on its way up in the air and on its way back down
 b) 20 m c) 4 s
 8. $n = 10$
 9. 11 m by 24 m

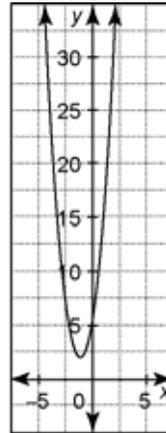
Chapter 2 Review

1. a) factored form; opens upward b) -6 and 4
 c) $(-1, -25)$; minimum, because the parabola opens upward
 d) $x = -1$ e) -24



- f) g) i) positive for $x < -6$ and $x > 4$; negative for $-6 < x < 4$
 ii) increasing for $x > -1$; decreasing for $x < -1$

2. a) vertex form; opens upward
 b) $(-1, 2)$; minimum, because the parabola opens upward
 c) $x = -1$ d) 5
 e)

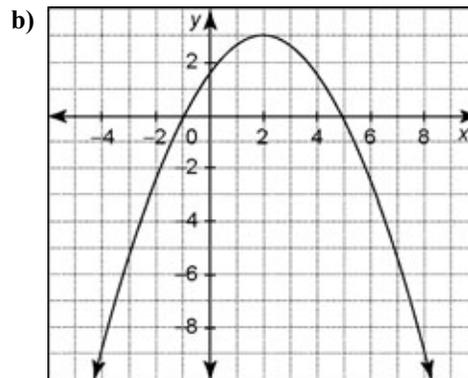


- f) increasing for $x > -1$; decreasing for $x < -1$
 3. a) standard form
 b) $a = 1, b = -6, c = 10$; opens upward c) 10

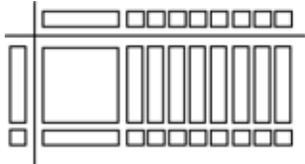
d)

x	$f(x)$
-2	26
-1	17
0	10
1	5
2	2
3	1
4	2
5	5
6	10
7	17
8	26

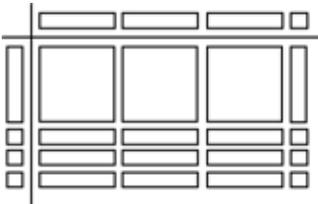
- e) i) no x -intercepts ii) $(3, 1)$
 f) minimum, because the parabola opens upward
 4. a) $y = -\frac{1}{3}(x - 5)(x + 1)$



5. a) i) $y = x^2 - x - 12$ ii) $a = 1, b = -1, c = -12$ iii) -12
 b) i) $y = x^2 - 2x + 6$ ii) $a = 1, b = -2, c = 6$ iii) 6
 6. a) $-x - 17$ b) $3y^2 + 14y - 12$ c) $4a^2 - 24a + 13$
 d) $5b^2 - 8b + 3$ e) $-5p^2 + 2p + 2$ f) $8q$
 7. Answers may vary. For example,
 a) $y = (x + 4)(x - 4)$ b) $y = x^2 - 16$
 c) $a = 1, b = 0, c = -16$ d) -16
 8. Answers may vary. For example,
 a) $y = 2(x + 5)^2 - 1$ b) $y = 2x^2 + 20x + 49$
 c) $a = 2, b = 20, c = 49$ d) 49
 9. a) $(x + 8)(x + 1)$



b) $(3x + 1)(x + 3)$



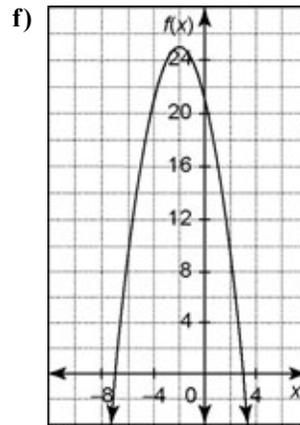
10. a) $(y + 9)(y - 2)$ b) $(k - 7)(k + 2)$ c) $(3v + 1)(v + 1)$
 d) $(2n - 3)(2n + 1)$ e) not factorable f) $(2x - 3)(4x + 1)$
 11. a) $2(x + 2)(x - 5)$ b) $y(3y - 1)(y + 2)$
 12. a) $f(x) = (x + 10)(x - 1)$; -10 and 1
 b) $y = (2x - 1)(x - 3)$; 0.5 and 3
 13. Answers may vary. For example,
 a)
 b) $2x^2 + 8x + 6$; $(2x + 2)(x + 3)$
 14. a) $(x + 4)(x + 4)$
 b) Both factors are the same, so the product is the square of the binomial $x + 4$.
 15. Answers may vary. For example, $(2x + 1)^2 = 4x^2 + 4x + 1$
 16. a) $(x - 9)^2$ b) $(2m + 3)^2$
 c) $(n + 5)(n - 5)$ d) $(3v + 10)(3v - 10)$
 17. a) $3(w + 6)(w - 6)$ b) $4(g + 4)(g + 11)$
 c) $4(3n + 5)(n - 1)$ d) $2k(k + 2)^2$
 18. a) $2, 12$ b) $1, -1.5$ c) $-5, -\frac{1}{3}$
 d) $\frac{1}{2}, -\frac{1}{2}$ e) $2, \frac{1}{5}$ f) $1, -\frac{1}{2}$
 19. 14 and 9
 20. 9 m by 9 m
 21. 13 cm
 22. 7 cm and 17 cm

Chapter 2 Practice Test

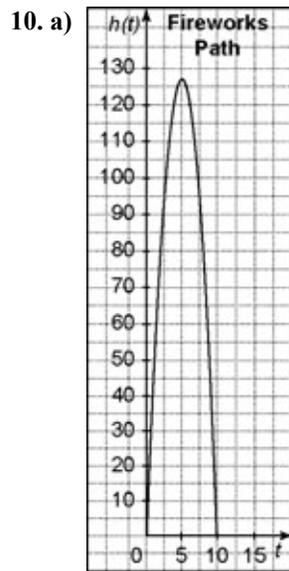
1. C 2. B 3. C 4. C 5. D



- b) $(4x + 3)(x + 1)$
 7. a) $f(x) = 4x^2 - 24x + 20$; 20 b) $g(x) = -2x^2 - 12x - 75$; -75
 8. a) $25(k - 2)(k + 2)$ b) $(n + 7)^2$
 c) $(t - 9)(t + 5)$ d) $2(x - 5)^2$
 e) not factorable; the parabola opens upward and has a minimum of 1 , so it never has a value of 0 ; there are no x -intercepts
 f) $2y(y + 7)(y - 7)$
 9. a) factored form; opens downward b) 3 and -7
 c) $(-2, 25)$; maximum, because the parabola opens downward
 d) $x = -2$ e) 21



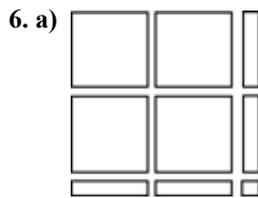
- g) i) positive for $-7 < x < 3$; negative for $x < -7$ and $x > 3$
 ii) increasing for $x < -2$; decreasing for $x > -2$



- b) 127 m c) 2 m d) about 10 s

Chapter 2 Test

1. D 2. B 3. D 4. A 5. C



b) $(4x + 1), (4x + 1)$

7. a) $(x - 4)(x + 3)$; 4 and -3 b) $(2x - 1)(x + 5)$; $\frac{1}{2}$ and -5

8. a) $(w + 1)(w - 6)$ b) $(2t - 3)^2$ c) $3(3x + 5)(3x - 5)$

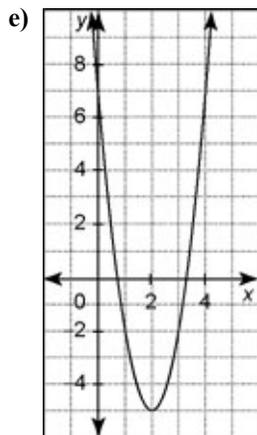
d) $(2y + 3)(3y - 5)$ e) $2a(a + 2)(a + 5)$

f) not factorable; the parabola opens upward and has a minimum of 0.75 , so it never has a value of 0 ; there are no x -intercepts

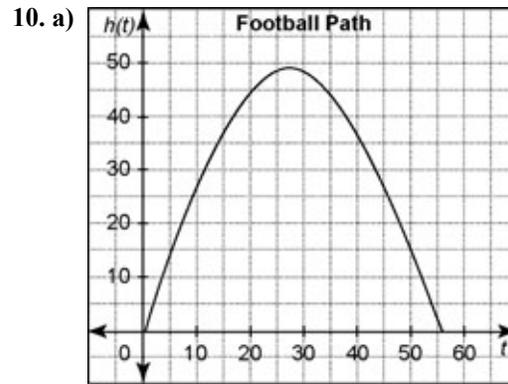
9. a) vertex form; opens upward

b) $(2, -5)$; minimum, because the parabola opens upward

c) $x = 2$ d) 7



f) increasing for $x > 2$; decreasing for $x < 2$



b) 56 m c) 49 m d) 28 m