**Section 3.2 Investigating Quadratic Functions in Standard Form**

Section 3.2   Page 174   Question 1

a) The function $f(x) = 2x^2 + 3x$ is quadratic, since it is a polynomial of degree two.

b) The function $f(x) = 5 - 3x$ is not quadratic, since it is a polynomial of degree one.

c) The function $f(x) = x(x + 2)(4x - 1)$ is not quadratic, since when expanded it is a polynomial of degree three.

d) The function $f(x) = (2x - 5)(3x - 2)$ is quadratic, since when expanded it is a polynomial of degree two.

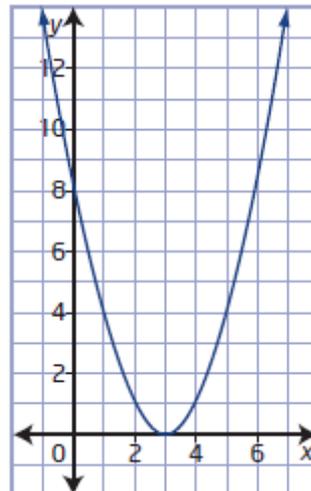**Section 3.2   Page 174   Question 2**

a) The coordinates of the vertex are $(-2, 2)$.
The equation of the axis of symmetry is $x = -2$.
The x-intercepts are -3 and -1, and the y-intercept is -6.
The graph has a maximum value of 2, since the parabola opens downward.
The domain is $\{x \mid x \in R\}$ and the range is $\{y \mid y \leq 2, y \in R\}$.
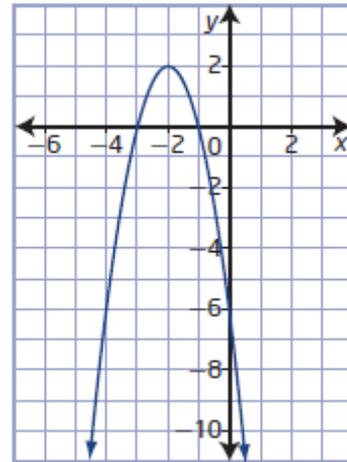
b) The coordinates of the vertex are $(6, -4)$.
The equation of the axis of symmetry is $x = 6$.
The x-intercepts are 2 and 10, and the y-intercept is 5.
The graph has a minimum value of -4, since the parabola opens upward.
The domain is $\{x \mid x \in R\}$ and the range is $\{y \mid y \geq -4, y \in R\}$.
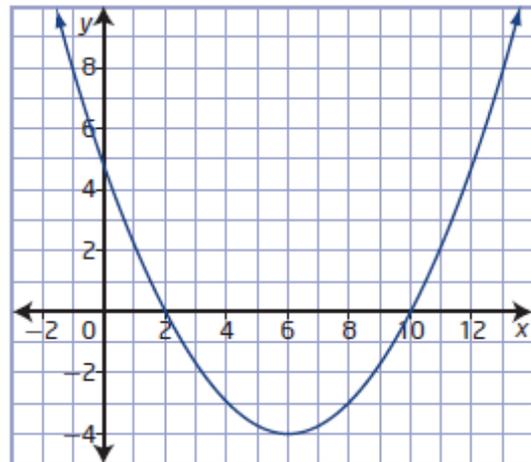
c) The coordinates of the vertex are (3, 0).
The equation of the axis of symmetry is $x = 3$.
The x-intercept is 3, and the y-intercept is 8.
The graph has a minimum value of 0, since the parabola opens upward.
The domain is $\{x \mid x \in R\}$ and the range is $\{y \mid y \ge 0, y \in R\}$.

Section 3.2   Page 174   Question 3

a) Expand $f(x) = 5x(10 - 2x)$ and write in standard form.
$f(x) = 5x(10 - 2x)$
$f(x) = 50x - 10x^2$
$f(x) = -10x^2 + 50x$

b) Expand $f(x) = (10 - 3x)(4 - 5x)$ and write in standard form.
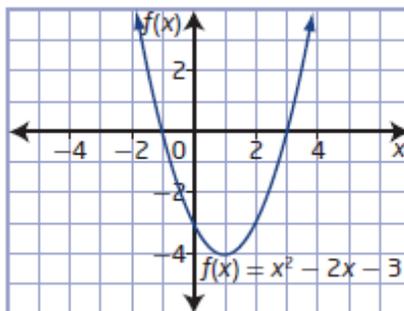$f(x) = (10 - 3x)(4 - 5x)$
$f(x) = 40 - 50x - 12x + 15x^2$
$f(x) = 15x^2 - 62x + 40$

Section 3.2   Page 174   Question 4

a)

x	$f(x) = x^2 - 2x - 3$
-1	$f(-1) = (-1)^2 - 2(-1) - 3$
	$= 0$
0	$f(0) = 0^2 - 2(0) - 3$
	$= -3$
1	$f(1) = 1^2 - 2(1) - 3$
	$= -4$
2	$f(2) = 2^2 - 2(2) - 3$
	$= -3$
3	$f(3) = 3^2 - 2(3) - 3$
	$= 0$

vertex: (1, –4)
axis of symmetry: $x = 1$
opens upward
minimum value: –4
domain: $\{x \mid x \in R\}$
range: $\{y \mid y \ge -4, y \in R\}$
x-intercepts: –1 and 3
y-intercept: –3