

# Chapter 2 Test

For questions 1 to 5, choose the best answer.

1. Which statement is true for the function

$$y = (x - 3)(x + 1)?$$

- A The  $x$ -intercepts are 3 and  $-1$ .
- B The  $x$ -intercepts are  $-3$  and  $1$ .
- C The vertex is  $(1, -3)$ .
- D The axis of symmetry is  $x = 1$ .

2. Which statement is true for the function

$$f(x) = -x^2 + 2x + 3?$$

- A The vertex is at  $(2, 3)$ .
- B The vertex is at  $(-1, 4)$ .
- C The  $y$ -intercept is  $-3$  and the parabola opens downward.
- D The  $y$ -intercept is  $3$  and the parabola opens upward.

3. Which statement is true for the function

$$f(x) = (x + 2)^2 + 5?$$

- A The  $x$ -intercepts are  $2$  and  $-5$ .
- B The  $x$ -intercepts are  $-2$  and  $5$ .
- C The vertex is at  $(2, -5)$ .
- D The vertex is at  $(-2, 5)$ .

4. Which polynomial and factors does this model represent?



- A  $2x^2 + 7x + 6 = (2x + 3)(x + 2)$
- B  $2x^2 + 7x + 6 = (2x + 1)(x + 6)$
- C  $x^2 + 7x + 6 = (x + 2)(x + 3)$
- D  $x^2 + 7x + 6 = (x + 1)(x + 6)$

5. Which is the vertex form of  $2x - x^2$ ?

- A  $-x(x + 2)$
- B  $x(x - 2)$
- C  $-(x - 1)^2 + 1$
- D  $(x - 1)^2 - 1$

6. a) Build or draw an algebra tile area model for the expression  $4x^2 + 4x + 1$ .

b) Use the model to identify the factors of the polynomial.

7. Write each quadratic function in factored form. Then, identify the  $x$ -intercepts.

a)  $f(x) = x^2 - x - 12$

b)  $g(x) = 2x^2 + 9x - 5$

8. Fully factor each expression, if possible. If it is not possible, write *not factorable* and explain why.

a)  $w^2 - 5w - 6$

b)  $4t^2 - 12t + 9$

c)  $27x^2 - 75$

d)  $6y^2 - y - 15$

e)  $2a^3 + 14a^2 + 20a$

f)  $b^2 - b + 1$

9. a) In which form is the function

$$y = 3(x - 2)^2 - 5$$
 expressed? Does this parabola open upward or downward?

b) Find the coordinates of the vertex. Is it a maximum or a minimum? Explain.

c) What is the axis of symmetry?

d) What is the  $y$ -intercept?

e) Graph the function.

f) Identify the intervals for which the function is increasing or decreasing.

10. The path of a football can be modelled by

$$\text{the function } h(t) = -\frac{1}{16}d(d - 56), \text{ where } h \text{ is}$$

the height of the football, in metres, and  $d$  is the horizontal distance from the kicker.

a) Graph this relation.

b) How far down field does the football travel before its first bounce?

c) What is the maximum height reached by the football?

d) At what horizontal distance does it reach this height?