

Unit 3 Assessment • Modeling and Analyzing Quadratic Functions

1. Which of the following equations represents a parabola that reaches its *maximum* value at (5, 13)?

- A. $y = (x + 5)^2 - 13$
- B. $y = (x - 5)^2 + 13$
- C. $y = -(x + 5)^2 - 13$
- D. $y = -(x - 5)^2 + 13$

2. Quincy is using function notation to describe quadratic functions. Which represents the quadratic function that exhibits the following key features?

axis of symmetry: $x = -3$

leading coefficient: 4

y-intercept: -7

- A. $f(x) = 4x^2 + 6x - 56$
 - B. $f(x) = 4x^2 - 6x + 56$
 - C. $f(x) = 4x^2 + 24x - 7$
 - D. $f(x) = 4x^2 - 24x + 7$
3. The distance that a rocket travels in t seconds when launched with initial velocity v and acceleration a is given by the formula $d = \frac{1}{2}at^2 + vt$.
- Which of the following expresses this relationship in terms of the acceleration?

- A. $a = \frac{2d - v}{t}$
- B. $a = \frac{2(d - v)}{t}$
- C. $a = \frac{2(d - vt)}{t^2}$
- D. $a = \frac{2d - vt}{t^2}$

4. The product of two consecutive positive odd integers is k . Rachel uses the following steps to solve for k .

Step 1: $(x)(x + 1) = k$

Step 2: $x^2 + x - k = 0$

Step 3: $x = \frac{-1 - \sqrt{1 + 4k}}{2}$,
 $x = \frac{-1 + \sqrt{1 + 4k}}{2}$

Step 4: Reject extraneous solution

$$x = \frac{-1 - \sqrt{1 + 4k}}{2}$$

because x must be positive.

Which best describes Rachel's error?

- A. Rachel's error is in Step 1; her factors should be (x) and $(x + 2)$.
 - B. Rachel's error is in Step 2; the final term k should be added instead of subtracted.
 - C. Rachel's error is in Step 3; the term $4k$ should be subtracted in each discriminant.
 - D. Rachel's error is in Step 4; she does not have enough information to determine whether either solution is extraneous.
5. Which represents the fully factored form of the following quadratic expression?

$$6x^2 - 13x - 5$$

- A. $(x - 1)(5x - 12)$
- B. $(3x - 5)(3x + 1)$
- C. $(2x - 3)(4x - 1)$
- D. $(2x - 5)(3x + 1)$