CHAPTER 5

Chapter Standardized Test

TEST-TAKING STRATEGY When checking your answer to a question, try using a method different from the one you used to get the answer. If you use the same method to find *and* check an answer, you may make the same mistake twice.

1. MULTIPLE CHOICE What is the vertex of the graph of $y = 2(x - 3)^2 - 7$?

Ⓐ $(3, 7)$ Ⓑ $(3, -7)$ Ⓒ $(-3, -7)$

Ⓓ $(-3, 7)$ Ⓔ $(2, 3)$

2. MULTIPLE CHOICE What is a correct factorization of $4x^2 + 4x - 35$?

Ⓐ $(4x + 5)(x - 7)$ Ⓑ $(4x - 5)(x + 7)$

Ⓒ $(2x + 5)(2x - 7)$ Ⓓ $(2x + 35)(2x - 1)$

Ⓔ $(2x - 5)(2x + 7)$

3. MULTIPLE CHOICE What are the zeros of $y = x^2 - 13x + 40$?

Ⓐ $-5, -8$ Ⓑ $5, -8$ Ⓒ $4, 10$

Ⓓ $5, 8$ Ⓔ $-4, -10$

4. MULTIPLE CHOICE What are all solutions of $4(x - 1)^2 - 3 = 25$?

Ⓐ 3 Ⓑ 8 Ⓒ $1 \pm \sqrt{7}$

Ⓓ $0.5, 3$ Ⓔ $1 \pm 2\sqrt{7}$

5. MULTIPLE CHOICE What does the product $(-12 + 8i)(10 - i)$ equal?

Ⓐ $-128 + 68i$ Ⓑ $-128 + 92i$

Ⓒ $-112 + 68i$ Ⓓ $-112 + 92i$

Ⓔ $-120 - 8i^2$

6. MULTIPLE CHOICE If $x^2 + 8x + c$ is a perfect square trinomial, what is the value of c?

Ⓐ 4 Ⓑ 8 Ⓒ 16

Ⓓ 32 Ⓔ 64

7. MULTIPLE CHOICE How many real and imaginary solutions does the equation $3x^2 + 2x - 7 = 0$ have?

Ⓐ 2 real solutions, no imaginary solutions

Ⓑ 1 real solution, no imaginary solutions

Ⓒ 1 real solution, 1 imaginary solution

Ⓓ no real solutions, 2 imaginary solutions

Ⓔ no real solutions, 1 imaginary solution

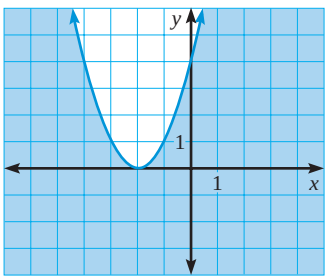
8. MULTIPLE CHOICE What is the solution of $x^2 + 7x - 8 > 0$?

Ⓐ $x = -8$ or $x = 1$ Ⓑ $x < -8$ or $x > 1$

Ⓒ $-8 < x < 1$ Ⓓ $x < -1$ or $x > 8$

Ⓔ $-1 < x < 8$

9. MULTIPLE CHOICE Which quadratic inequality is graphed?

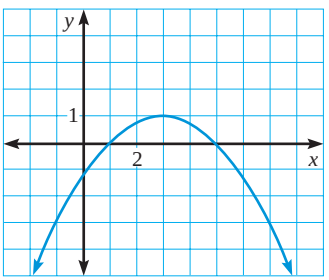


Ⓐ $y \geq x^2 + 2$ Ⓑ $y \leq x^2 + 2$

Ⓒ $y \geq x^2 - 2$ Ⓓ $y \leq (x + 2)^2$

Ⓔ $y \leq (x - 2)^2$

10. MULTIPLE CHOICE Which quadratic function *cannot* be represented by the graph shown?



Ⓐ $y = -\frac{1}{4}(x - 1)(x - 5)$

Ⓑ $y = -\frac{1}{4}(x - 3)^2 + 1$

Ⓒ $y = -\frac{1}{4}x^2 + \frac{3}{2}x - \frac{5}{4}$

Ⓓ $y = -\frac{1}{4}(x^2 - 6x + 5)$

Ⓔ $y = -\frac{1}{4}(x + 1)(x + 5)$

QUANTITATIVE COMPARISON **In Exercises 11 and 12, choose the statement that is true about the given quantities.**

(A) The quantity in column A is greater.

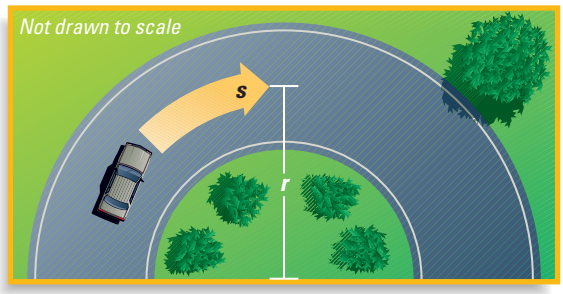
(B) The quantity in column B is greater.

(C) The two quantities are equal.

(D) The relationship cannot be determined from the given information.

	Column A	Column B
11.	$\lvert -3 + 2i \rvert$	$\lvert 1 - 4i \rvert$
12.	Discriminant of $x^2 - 7x - 24 = 0$	Discriminant of $5x^2 - 14x + 10 = 0$

13. MULTI-STEP PROBLEM An engineer designing a curved road must make the curve's radius large enough so that car passengers are not pulled to one side as they round the curve at the posted speed limit. The minimum radius r (in feet) that should be used is given by $r = 0.334s^2$ where s is the expected speed of traffic (in miles per hour).



a. If the expected speed of traffic around a curve is 30 miles per hour, what should the minimum radius of the curve be?

b. How fast can a car comfortably round a curve with a radius of 400 feet?

c. Consider a semicircular curve, as shown in the diagram. The radius of the curve is measured from the center of the semicircles formed by the road's inner and outer edges to a point on the road halfway between these edges. Write an equation giving the area A of the pavement needed for the road as a function of the radius r. Assume the road is 24 feet wide.

d. Use your answer from part (c) to write an equation giving the area A of pavement needed as a function of the expected speed s of traffic.

e. CRITICAL THINKING What type of function is the function from part (c)? What type of function is the function from part (d)?

14. MULTI-STEP PROBLEM You and your friend are playing tennis. Your friend lobs the ball high into the air, hitting it 3 feet above the court with an initial vertical velocity of 40 feet per second. You back up and prepare to hit an overhead smash to win the point.

a. Use the model $h = -16t^2 + v_0t + h_0$ to write an equation giving the height of the lobbed tennis ball as a function of time.

b. At what time t does the ball reach its maximum height above the court? What is the maximum height?

c. If you plan to hit the smash when the ball falls to a height of 8 feet above the court, how long do you have to prepare for the shot?

d. If you plan to hit the smash when the ball is between 6 feet and 9 feet above the court (inclusive), what are your possible preparation times?

e. Suppose you hit the smash when the ball is 8 feet above the court. It takes 0.1 second for the ball you smashed to hit the court on your friend's side of the net. What was the ball's initial vertical velocity coming off your racket?