SECTION 5

Time — 25 minutes

18 Questions

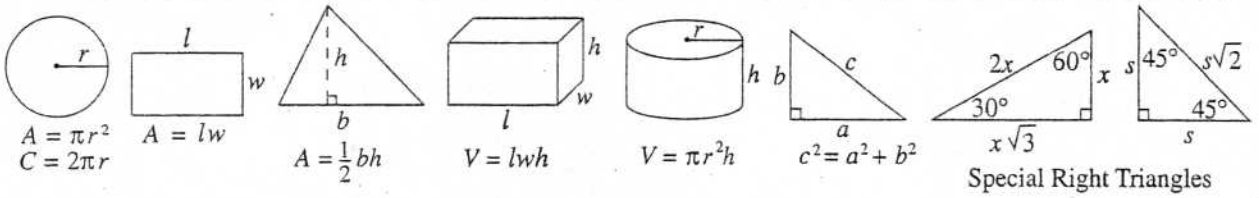
Turn to Section 5 of your answer sheet to answer the questions in this section.

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 1-8, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$A = \pi r^2$ $C = 2\pi r$ $A = lw$ $A = \frac{1}{2}bh$ $V = lwh$ $V = \pi r^2 h$ $c^2 = a^2 + b^2$

Special Right Triangles

The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

DISTANCE TRAVELED BY A MIGRATORY BIRD			
Hours	5	10	t
Miles	249	498	996

1. In the table above, the total distance traveled by a particular migratory bird was recorded after various numbers of hours in flight. If migratory birds travel at a constant speed, what is the value of t ?

(A) 12
(B) 15
(C) 20
(D) 25
(E) 50

2. If $y^2 = \sqrt{x}$ and $y = 3$, what is the value of x ?

(A) 81
(B) 27
(C) 9
(D) 3
(E) −3

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3. A circular pizza is sliced into 12 equal pieces by cutting from the center to the edge of the pizza. If Doug eats 2 slices, what is the sum of the degree measures of the slices he eats?

(A) 20
(B) 60
(C) 120
(D) 220
(E) 240

4. Nora has 10 fewer than twice the number of CDs that Deborah has. If n represents the number of Nora's CDs, and d represents the number of Deborah's CDs, which of the following is a correct equation relating n and d ?

(A) $n = 2d - 10$
(B) $n = 2(d - 10)$
(C) $n = 10 - 2d$
(D) $n = 2(10 - d)$
(E) $n = 10 - (d + 2)$

5. $\dfrac{2x^2 + x - 28}{x^2 - 3x - 28} =$

(A) $\dfrac{2x - 7}{x - 7}$

(B) $\dfrac{2x + 1}{x - 3}$

(C) $\dfrac{x - 2}{x + 14}$

(D) $-\dfrac{2}{3}$

(E) The expression cannot be simplified.

6. Malik's collectibles consist of 5 baseball cards with an average value of 6 dollars each, 3 rare coins worth a total of 12 dollars, and 2 old comic books of unknown value. The information in which of the following statements would allow Malik to figure out the average value of his collectibles?

I. The total value of his collectibles
II. What percent greater the average value of a baseball card is than the average value of a rare coin
III. The sum of the average values of the baseball cards, rare coins, and comic books

(A) I only
(B) II only
(C) I and II
(D) I and III
(E) I, II, and III

7. If $2^{4x-4} = 16^5$, what is the value of $2x$?

(A) 2.25
(B) 4.5
(C) 5.5
(D) 6
(E) 12

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SECTION 5 (Answers)

1. **C** Set up a proportion and solve for t: $\frac{10}{498} = \frac{t}{996}$. Cross-multiply to get $966 \times 10 = 498 \times t$. So, $498t = 9960$. Divide by 498 to get $t = \frac{9960}{498} = 20$. This problem can also be solved by estimating. Because 996 is twice as big as 498, t is twice as big as 10. Only (C) is close to twice the value of 10.

2. **A** Because we know that $y = 3$, we can substitute 9 for y^2 in the first equation: $9 = \sqrt{x}$. Square both sides and get $x = 81$, which is (A).

3. **B** Divide 360 degrees (in a circle) by 12 to get 30 degrees for each slice. If Doug eats two of these slices, he will have eaten $2 \times 30 = 60$, answer choice (B).

4. **A** If Nora had twice the number of CDs that Deborah has, it would be represented as $n = 2d$. Because Nora has 10 fewer than that number, we get $n = 2d - 10$.

5. **A** The numerator factors to $(x + 4)(2x - 7)$, and the denominator factors to $(x + 4)(x - 7)$. Cancel the like terms to get $\frac{2x-7}{x-7}$.

6. **D** The information in statements I and III would give enough information to figure the average value of all the collectibles. Dividing the total value of all the collectibles (statement I) by the total number of collectibles would yield the average value of the collectibles. Subtracting the average value of the baseball cards and rare coins from the sum total of the average values (statement III) would yield the average value of the comic books. Using that value, the total value, and then the average, all of the collectibles could be determined. Statement II is of no use: We still need to know the value of the comic books in order to calculate the total average value of the collectibles.

7. **E** $16^5 = (2^4)^5 = 2^{20}$. So, $2^{4x-4} = 2^{20}$. Thus, $4x - 4 = 20$, so $x = 6$ and $2x = 12$.

8. **B** Test out the answers! The graphs intersect where $f(x) = f(x - 1)$. Start with (C). If $x = \frac{3}{4}$, then $x - 1 = -\frac{1}{4}$. Putting these values into the function, you get $3\left(\frac{3}{4}\right)^2 \neq 3\left(-\frac{1}{4}\right)^2$. To get them equal, or even closer, you need a smaller number. Try (B) and it works: $3\left(\frac{1}{2}\right)^2 = 3\left(-\frac{1}{2}\right)^2$. You can also use your calculator to graph the functions.