

## SECTION 3

Time — 25 minutes

20 Questions

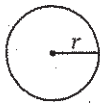
Turn to Section 3 (page 4) of your answer sheet to answer the questions in this section.

**Directions:** For this section, 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

- The use of a calculator is permitted.
- All numbers used are real numbers.
- 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.
- 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

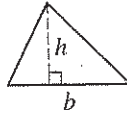


$$A = \pi r^2$$

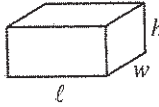
$$C = 2\pi r$$



$$A = \ell w$$



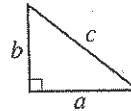
$$A = \frac{1}{2}bh$$



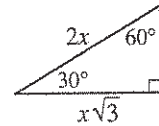
$$V = \ell wh$$



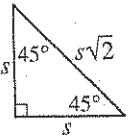
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



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.

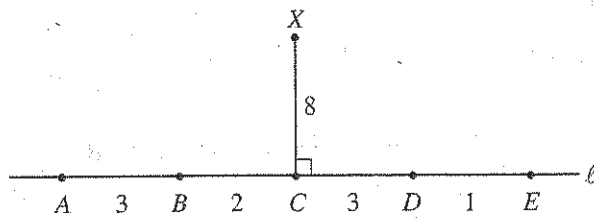
1. If  $2x + 3 = 9$ , what is the value of  $4x - 3$ ?

(A) 5  
(B) 9  
(C) 15  
(D) 18  
(E) 21

2. There are 8 sections of seats in an auditorium. Each section contains at least 150 seats but not more than 200 seats. Which of the following could be the number of seats in this auditorium?

(A) 800  
(B) 1,000  
(C) 1,100  
(D) 1,300  
(E) 1,700

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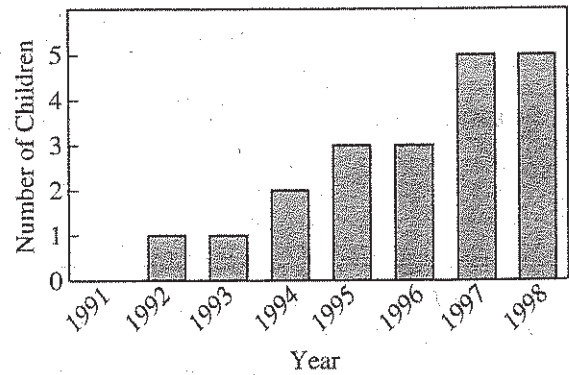


Note: Figure not drawn to scale.

3. In the figure above,  $\overline{XC}$  is perpendicular to  $\ell$ . Which of the following line segments (not shown) has the greatest length?

- (A)  $\overline{XA}$   
 (B)  $\overline{XB}$   
 (C)  $\overline{XC}$   
 (D)  $\overline{XD}$   
 (E)  $\overline{XE}$

CHILDREN IN THE JACKSON FAMILY

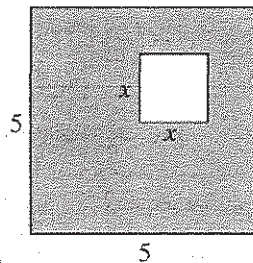


4. The graph above shows how the Jackson family continued to grow between 1991 and 1998 by indicating the total number of children in the family at the end of each year. The Jacksons have one set of twins who were born to Mrs. Jackson one year in July. During what year were the twins born?
- (A) 1993  
 (B) 1994  
 (C) 1996  
 (D) 1997  
 (E) 1998

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5. The average (arithmetic mean) of  $x$  and  $y$  is 5 and the average of  $x$ ,  $y$ , and  $z$  is 8. What is the value of  $z$ ?

(A) 19  
(B) 14  
(C) 13  
(D) 11  
(E) 3



6. In the figure above, a small square is inside a larger square. What is the area, in terms of  $x$ , of the shaded region?

(A)  $2x - 10$   
(B)  $10 - 2x$   
(C)  $25 - 2x$   
(D)  $x^2 - 25$   
(E)  $25 - x^2$

7. If  $rstv = 1$  and  $stuv = 0$ , which of the following must be true?

(A)  $r < 1$   
(B)  $s < 1$   
(C)  $t > \frac{1}{2}$   
(D)  $u = 0$   
(E)  $v = 0$

8. During a game, the blue team scored one-sixth of its points in the first quarter, one-fourth in the second quarter, one-third in the third quarter, and the remaining points in the fourth quarter. If its total score was 36, how many points did the blue team score in the fourth quarter?

(A) 6  
(B) 8  
(C) 9  
(D) 12  
(E) 25

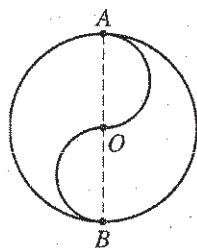
9. If  $2^{2x} = 8^{x-1}$ , what is the value of  $x$ ?

(A) 2  
(B) 3  
(C) 4  
(D) 5  
(E) 6

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10. If 4 less than 3 times a certain number is 2 more than the number, what is the number?

(A) -1  
 (B) -3  
 (C) 1  
 (D) 2  
 (E) 3



11. The circle above has center  $O$  and diameter  $AB$ . The two semicircles have diameters  $OA$  and  $OB$ . If the circumference of the circle is  $36\pi$ , what is the length of the curved path from  $A$  to  $B$  through  $O$ ?

(A)  $6\pi$   
 (B)  $9\pi$   
 (C)  $18\pi$   
 (D)  $24\pi$   
 (E)  $36\pi$

$x$	$f(x)$
0	$a$
1	24
2	$b$

12. The table above shows some values for the function  $f$ . If  $f$  is a linear function, what is the value of  $a + b$ ?

(A) 24  
 (B) 36  
 (C) 48  
 (D) 72  
 (E) It cannot be determined from the information given.

3, 5, -5, ...

13. The first term in the sequence of numbers shown above is 3. Each even-numbered term is 2 more than the previous term and each odd-numbered term, after the first, is  $-1$  times the previous term. For example, the second term is  $3 + 2$ , and the third term is  $(-1) \times 5$ . What is the 55th term of the sequence?

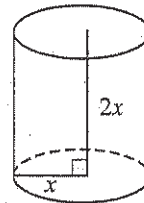
(A) -5  
 (B) -3  
 (C) -1  
 (D) 3  
 (E) 5

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14. In the  $xy$ -plane, the equation of line  $\ell$  is  $y = 2x + 5$ .

If line  $m$  is the reflection of line  $\ell$  in the  $x$ -axis, what is the equation of line  $m$ ?

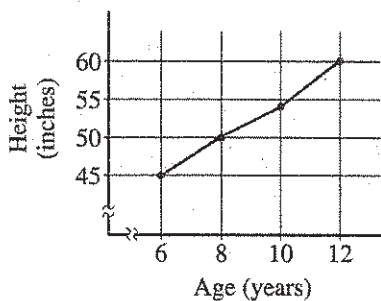
- (A)  $y = -2x - 5$   
 (B)  $y = -2x + 5$   
 (C)  $y = 2x - 5$   
 (D)  $y = -\frac{1}{2}x - 5$   
 (E)  $y = -\frac{1}{2}x + 5$



16. Which of the following has the same volume as the cylinder shown above with radius  $x$  and height  $2x$ ?

- (A) A cylinder with radius  $2x$  and height  $x$   
 (B) A cylinder with radius  $2\pi x$  and height  $x$   
 (C) A cube with edge  $2x$   
 (D) A cube with edge  $2\pi x$   
 (E) A rectangular solid with dimensions  $x$ ,  $2x$ ,  $\pi x$

ELINA'S HEIGHT



15. The graph above shows Elina's height in inches from the age of 6 to the age of 12. Elina's height at the age of 12 was what percent greater than her height at the age of 6?

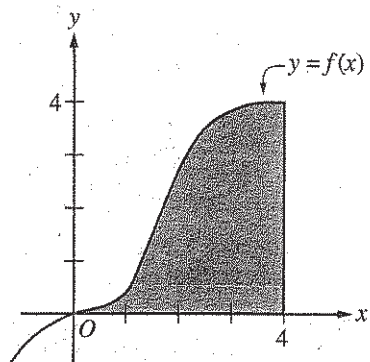
- (A) 15%  
 (B) 25%  
 (C)  $33\frac{1}{3}\%$   
 (D) 50%  
 (E)  $66\frac{2}{3}\%$

17. If  $a + 2(x + 1) = s$ , what is  $x + 1$ , in terms of  $s$  and  $a$ ?

- (A)  $\frac{s}{2a}$   
 (B)  $\frac{s - a}{2}$   
 (C)  $\frac{s + a}{2}$   
 (D)  $\frac{s}{2} - a$   
 (E)  $\frac{s}{2} + a$

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18. The shaded region in the figure above is bounded by the  $x$ -axis, the line  $x = 4$ , and the graph of  $y = f(x)$ .

If the point  $(a, b)$  lies in the shaded region, which of the following must be true?

- I.  $a \leq 4$
- II.  $b \leq a$
- III.  $b \leq f(a)$

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

19. At a bottling company, machine  $A$  fills a bottle with spring water and machine  $B$  accepts the bottle only if the number of fluid ounces is between  $11\frac{7}{8}$  and  $12\frac{1}{8}$ . If machine  $B$  accepts a bottle containing  $n$  fluid ounces, which of the following describes all possible values of  $n$ ?

- (A)  $|n - 12| = \frac{1}{8}$
- (B)  $|n + 12| = \frac{1}{8}$
- (C)  $|n - 12| < \frac{1}{8}$
- (D)  $|n + 12| < \frac{1}{8}$
- (E)  $|n - 12| > \frac{1}{8}$

20. The least integer of a set of consecutive integers is  $-25$ . If the sum of these integers is 26, how many integers are in this set?

- (A) 25
- (B) 26
- (C) 50
- (D) 51
- (E) 52

**STOP**

If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section in the test.