

## SAT Preparation Exercises (Chapter 5)

### I. MULTIPLE-CHOICE QUESTIONS

In 1–18, select the letter of the correct answer.

- If the base of a triangle is  $4x^2$ , and the height is  $2x^3$ , which of the following represents the area?
 

(A)  $4x^5$             (B)  $4x^6$             (C)  $4x^3$   
 (D)  $8x^5$             (E)  $8x^6$
- If the bases of a trapezoid are  $x$  and  $2x$ , and the height is  $2x$ , which of the following represents the area?
 

(A)  $6x^3$             (B)  $6x^2$             (C)  $3x^3$   
 (D)  $3x^2$             (E)  $6x$
- If Mary drives  $x^2y^2$  miles at a rate of  $xy^2$  miles per hour, which of the following represents the number of hours she drove?
 

(A) 1            (B)  $x$             (C)  $x^2y^4$   
 (D)  $x^3y^4$             (E)  $2x^2y^2$
- If  $x^2$  is the same as  $8x$  increased by 50% of  $8x$ , which of the following could be a value of  $x$ ?
 

(A) 4            (B) 8            (C) 12  
 (D) 16            (E) 18
- The product of  $4x$  and  $5x$  gives the same result as the sum of  $10x^2$  and which of the following?
 

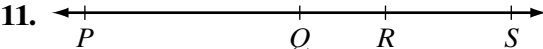
(A)  $2x^2$             (B)  $2x$             (C)  $10x^2$   
 (D)  $10x$             (E) 10
- How many integers from 95 through 99 can be expressed as  $xy^2$ , where  $x$  and  $y$  are integers greater than 1?
 

(A) 4            (B) 3            (C) 2  
 (D) 1            (E) 0
- If  $x + 3$  is an even integer, then which of the following is an odd integer?
 

(A)  $(x + 3)(x + 4)$             (B)  $(x + 3)^2$   
 (C)  $(x + 4)(x + 5)$             (D)  $(x + 4)^2$   
 (E) None of these
- What is the average (arithmetic mean) of  $3(5x^2 + 2)$  and  $7(5x^2 + 2)$ ?
 

(A)  $10x^2 + 20$             (B)  $x^2 + 8$   
 (C)  $25x^2 + 10$             (D)  $40x^2 + 16$   
 (E)  $50x^2 + 20$
- If  $x + y^2 = 6$  and  $y = -2$ , evaluate  $x^2 - y$ .
 

(A) 6            (B)  $-6$             (C) 2  
 (D)  $-2$             (E) 0
- If  $x$  is 10, which of the following has the same value as  $2(x^3 + x)$ ?
 

(A)  $2.2 \times 10^2$             (B)  $2.02 \times 10^2$   
 (C)  $2.2 \times 10^3$             (D)  $2.02 \times 10^3$   
 (E)  $22 \times 10^3$
- 

In the figure above,  $PR$  is  $4x + 5$ ,  $RS$  is  $2x + 3$ , and  $Q$  is the midpoint of  $\overline{PS}$ . What is 2 less than the value of  $QR$ ?

(A)  $6x + 8$             (B)  $3x + 4$             (C)  $2x + 2$   
 (D)  $2x - 2$             (E)  $2x - 4$
- If  $x \neq 0$ , then  $\frac{(x^4)^4}{x^4} =$ 

(A) 1            (B)  $x^2$             (C)  $x^4$   
 (D)  $x^8$             (E)  $x^{12}$
- If  $3^n = 81$ , what is the value of  $4^{n-1}$ ?
 

(A) 12            (B) 16            (C) 64  
 (D) 128            (E) 256

14. If  $x^2 = 36$ , then  $x^3 =$   
 (A)  $-216$  only (B)  $18$  only  
 (C)  $216$  only (D)  $-216$  or  $216$   
 (E)  $7,776$  only

15. If  $2^x = 8$ , then  $2^{-3x} =$   
 (A)  $-512$  (B)  $-27$  (C)  $\frac{1}{512}$   
 (D)  $\frac{1}{64}$  (E)  $\frac{1}{8}$

16. If  $x^7 = m$  and  $x^4 = 5w$ , which of the following represents  $w$ ?  
 (A)  $\frac{1}{x^3}$  (B)  $\frac{m}{x^3}$  (C)  $\frac{m}{5x^3}$   
 (D)  $\frac{1}{5x^3}$  (E)  $\frac{x^3}{5m}$

17. The following definitions are for integers  $n$  greater than 1.

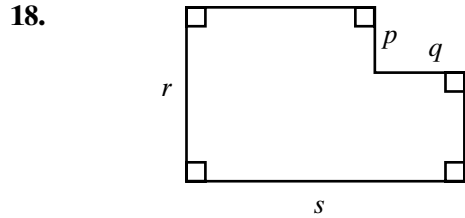
$$\textcircled{n} = n^2 + n$$

$$\triangle n = n^2 - n$$

If  $t$  is an integer greater than 1, then

$$\triangle t + 1 =$$

- (A)  $\textcircled{t}$   
 (B)  $\textcircled{t} + 1$   
 (C)  $\textcircled{t} - 1$   
 (D)  $\triangle t + 1$   
 (E)  $\triangle t - 1$



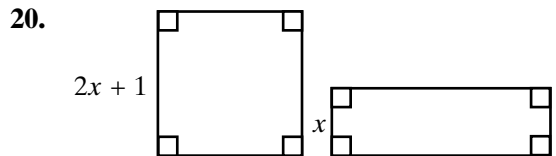
Which of the following is equal to the perimeter of the figure above?

- (A)  $r + s + p + q$   
 (B)  $2(r + s)$   
 (C)  $2(r + s) - (p + q)$   
 (D)  $2(r + s) + (p + q)$   
 (E)  $2(p + q) - (r + s)$

## II. STUDENT-PRODUCED RESPONSE QUESTIONS

In questions 19–25, you are to solve the problem.

19. The measure of one side of a square is  $x + 4$ . How many square units are in the square if  $x = 3$ ?



The square and the rectangle above have the same perimeters. What is the area of the rectangle when  $x = 0.2$ ?

21. The side of a rhombus is  $x + 5$  and the side of a square is  $x + 2$ . How much is twice the difference between the perimeters of these quadrilaterals when  $x = 15$ ?
22. If  $4^n = 64$ , then what is the value of  $(\frac{1}{2})^{-n}$ ?
23. If  $5^x = 125$ , what is  $4^{3x - 5}$ ?
24. If  $7,000 \times 90,000 = 6.3 \times 10^n$ , what is the value of  $n$ ?
25. If  $y = x + 1$ , what is the value of  $(y + 3)^3 - (x + 4)^3$ ?