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**Online Homework**

**Focused Exercises for Math SAT**

**Skill Set 4: Two or More Variables**

Many of the problems in this exercise set came from The College Board, writers of the SAT exam.

1. 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)  $v = 0$
2. If  $5t = 45$  and  $tk = 1$ , what is the value of  $k$ ?
- (A)  $\frac{1}{45}$
  - (B)  $\frac{1}{9}$
  - (C)  $\frac{1}{5}$
  - (D) 5
  - (E) 9
3. If  $xr = v$ ,  $v = kr$ , and  $rv \neq 0$ , which of the following is equal to  $k$ ?
- (A) 1
  - (B)  $\frac{1}{x}$
  - (C)  $x - 1$
  - (D)  $x$
  - (E)  $x + 1$

4. If  $2r = 5s$  and  $5s = 6t$ , what does  $r$  equal in terms of  $t$ ?
- (A)  $\frac{12}{25}t$
- (B)  $\frac{6}{5}t$
- (C)  $3t$
- (D)  $15t$
- (E)  $30t$
5. If  $(x + y)^2 = x^2 + y^2$ , which of the following statements must also be true?
- I.  $x = 0$
- II.  $(x - y)^2 = x^2 + y^2$
- III.  $xy = 0$
- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) II and III
6. If  $5y + 2x = 23$  and  $x = y + 1$ , what is the value of  $y$ ?
7. 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)  $\frac{s}{2} + a$

8. If  $x^2 + y^2 = 73$  and  $xy = 24$ , what is the value of  $(x + y)^2$  ?
- (A) 73
  - (B) 97
  - (C) 100
  - (D) 121
  - (E) 144
9. If  $18\sqrt{18} = r\sqrt{t}$ , where  $r$  and  $t$  are positive integers and  $r > t$ , which of the following could be the value of  $rt$  ?
- (A) 18
  - (B) 36
  - (C) 108
  - (D) 162
  - (E) 324
10. If  $x^2 - y^2 = 77$  and  $x + y = 11$ , what is the value of  $x$  ?
11. If  $x + 3 = a$ , then  $2x + 6 =$
- (A)  $a + 3$
  - (B)  $a + 6$
  - (C)  $2a$
  - (D)  $2a + 3$
  - (E)  $2a + 6$
12. If  $xy = 10$ , what is the value of  $2 \cdot \frac{x}{y} \cdot y^2$  ?
- (A) 5
  - (B) 8
  - (C) 10
  - (D) 12
  - (E) 20
13. If  $x + y = 30$  and  $x > 8$ , then which of the following must be true?
- (A)  $y > 0$
  - (B)  $y < 22$
  - (C)  $y = 22$
  - (D)  $y > 22$
  - (E)  $x < 30$

14. If  $ab + b = a + 2c$ , what is the value of  $b$  when  $a = 2$  and  $c = 3$  ?
15. If  $n = 3p$ , for what value of  $p$  is  $n = p$  ?
- (A) 0
- (B)  $\frac{1}{3}$
- (C) 1
- (D) 3
- (E)  $n$  can never equal  $p$
16. If  $x^2 - y^2 = 10$  and  $x + y = 5$ , what is the value of  $x - y$  ?
17. If  $a \times k = a$  for all values of  $a$ , what is the value of  $k$  ?
- (A)  $-a$
- (B)  $-1$
- (C) 0
- (D) 1
- (E)  $a$
18. If  $x = k(k - 2)$ , then  $x + 1 =$
- (A)  $k^2 - k$
- (B)  $k^2 - 3k$
- (C)  $k^2 - 2k + 1$
- (D)  $k^2 + 2k + 1$
- (E)  $k^2 - 1$
19. If  $a(x + y) = 45$  and  $ax = 15$ , what is the value of  $ay$  ?
- (A) 3
- (B) 5
- (C) 15
- (D) 25
- (E) 30

20. If  $k(2x + 3)(x - 1) = 0$  and  $x > 1$ , what is the value of  $k$ ?
- (A)  $\frac{-3}{2}$
- (B) 0
- (C)  $\frac{2}{3}$
- (D) 1
- (E) 2
21. If  $4x = 6u = 5v = 7w > 0$ , which of the following is true?
- (A)  $x < v < u < w$
- (B)  $x < u < v < w$
- (C)  $x < v < w < u$
- (D)  $w < u < v < x$
- (E)  $u < v < w < x$
22. If  $xy = 7$  and  $x - y = 5$ , then  $x^2y - xy^2 =$
- (A) 2
- (B) 12
- (C) 24
- (D) 35
- (E) 70
23. If  $2x + z = 2y$  and  $2x + 2y + z = 20$ , what is the value of  $y$ ?
- (A) 5
- (B) 8
- (C) 10
- (D) 15
- (E) It cannot be determined from the information given.
24. If  $3x + n = x + 1$ , what is  $n$  in terms of  $x$ ?
- (A)  $4x + 1$
- (B)  $2x + 1$
- (C)  $2 - x$
- (D)  $1 - 2x$
- (E)  $1 - 4x$

25. If  $x - y = 8$ ,  $y = 3z$ , and  $z = 2$ , what is the value of  $x$ ?

- (A)  $-14$
- (B)  $-2$
- (C)  $2$
- (D)  $3$
- (E)  $14$

26. If  $4(x + y)(x - y) = 40$  and  $x - y = 20$ , what is the value of  $x + y$ ?

27. If  $2x + y = 7$  and  $y = 5x$ , then  $x =$

- (A)  $\frac{1}{7}$
- (B)  $\frac{5}{7}$
- (C)  $1$
- (D)  $\frac{7}{5}$
- (E)  $7$

28. If  $x^2 = y^3$  and  $x = 8$ , what is the value of  $y$ ?

- (A)  $2$
- (B)  $4$
- (C)  $5$
- (D)  $6$
- (E)  $12$

29. If  $y = 1 + \frac{1}{x}$  and  $x > 1$ , then  $y$  could equal

(A)  $\frac{1}{7}$

(B)  $\frac{5}{7}$

(C)  $\frac{9}{7}$

(D)  $\frac{15}{7}$

(E)  $\frac{19}{7}$

30. If  $a + 2a + 3a = 3b - 3$  and if  $b = 1$ , what is the value of  $a$ ?

(A) 0

(B)  $\frac{1}{6}$

(C) 1

(D) 3

(E) 6



31. If  $x = 2y$ ,  $y = 4z$ ,  $2z = w$ , and  $w \neq 0$ , then  $\frac{x}{w} =$
- (A)  $\frac{1}{4}$
  - (B)  $\frac{1}{2}$
  - (C) 1
  - (D) 2
  - (E) 4
32. If  $x^2 + y^2 = 2xy$ , then  $x$  must equal
- (A)  $-1$
  - (B) 0
  - (C) 1
  - (D)  $-y$
  - (E)  $y$
33. If  $2x - 3y = 8$ , what is the value of  $4(2x - 3y)$  ?
- (A) 32
  - (B) 16
  - (C) 12
  - (D) 4
  - (E) 2
34. If  $y = 5x$  and the value of  $x$  is increased by 4, then the value of  $y$  will increase by how much?
- (A) 1
  - (B) 4
  - (C) 5
  - (D) 9
  - (E) 20

35. If  $x$  is  $\frac{2}{3}$  of  $y$  and  $y$  is  $\frac{3}{5}$  of  $z$ , what is the value of  $\frac{x}{z}$  ?
- (A)  $\frac{2}{5}$
- (B)  $\frac{5}{8}$
- (C)  $\frac{9}{10}$
- (D)  $\frac{10}{9}$
- (E)  $\frac{5}{2}$
36. If  $2x + y = 14$  and  $4x + y = 20$ , what is the value of  $3x + y$  ?
37. If  $x = 2y$  and  $y = \frac{10}{z}$ , what is the value of  $x$  when  $z = 4$  ?
- (A)  $\frac{5}{4}$
- (B)  $\frac{5}{2}$
- (C) 5
- (D) 8
- (E) 20
38. If  $xy = 10$ ,  $yz = 30$ , and  $y^2 = \frac{1}{9}$ , what is the value of  $xz$  ?

39. If  $x - 3 < 2$  and  $y + 1 < -3$ , then the value of  $x + y$  could be

- (A) 0
- (B) 1
- (C) 2
- (D) 4
- (E) 8

40. If  $x = -2$  and  $y = -3$ , what is the value of  $x^2(x - y)$  ?

- (A)  $-20$
- (B)  $-4$
- (C)  $4$
- (D)  $8$
- (E)  $20$