Digital SAT Practice Test 29

1. If $2b - 1 = 5$, what is the value of $2b^2 - 1$?

(A) 15　　(B) 17　　(C) 24　　(D) 25

2. In the figure, points P, Q, R, S, and T lie on the same line, and R is the center of the large circle. If the three smaller circles are congruent and the radius of the large circle is 6, what is the radius of one of the smaller circles?

(A) 1　　(B) 2　　(C) 3　　(D) 4

3. In a writer's workshop, there are half as many men as women. If there are 24 total men and women in the writer's workshop, how many men are there?

4. Jeri has edited $\dfrac{1}{5}$ of her term paper. If she has edited 15 pages, how many pages does she have left to edit?

(A) 45　　(B) 50　　(C) 60　　(D) 75

5. 7, 12, 22, 42, 82

Which of the following gives a rule for finding each term in the sequence after the first?

(A) Add 5 to the preceding number.

(B) Add 5 to the sum of all of the preceding terms.

(C) Double the preceding term and then subtract 2 from the result.

(D) Add 14 to the preceding term and divide that result by 2.

6. If $3 - \dfrac{1}{b} = \dfrac{3}{2}$, what is the value of b?

7. The figure shows a rectangular box with dimensions 3, 4, and 5. What is the longest length of a diagonal of one of the faces of this box?

(A) $\sqrt{24}$

(B) $\sqrt{41}$

(C) $\sqrt{50}$

(D) $\sqrt{60}$

8. Which of the following points is NOT on the graph of the line $-2x - 3y = 36$ in the xy-plane?

(A) $(-9, 6)$ (B) $(-24, 4)$ (C) $(6, -16)$ (D) $(12, -20)$

9. During a coyote repopulation study, researchers determine that the equation $P = 250(1.32)^t$ describes the population P of coyotes t years after their introduction into a new region. Which of the following gives the values of I, the initial population of coyotes, and r, the annual percent increase in this population?

(A) I = 250, r = 32%

(B) I = 250, r = 132%

(C) I = 330, r = 32%

(D) I = 330, r = 132%

10. Which of the following is equal to $\dfrac{1}{\sqrt{3}+1}$?

(A) $\dfrac{\sqrt{3}}{2} - \dfrac{1}{2}$

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

(C) $\dfrac{\sqrt{3}}{4} - \dfrac{1}{4}$

(D) $\dfrac{\sqrt{3}}{4} + \dfrac{1}{4}$

11. The square of a positive number is 0.24 greater than the number itself. What is the number?

12. Which of the following could be the x-intercept and y-intercept of a line that is perpendicular to the line $3x + 6y = 0$?

(A) $(-6, 0)$ and $(0, 3)$

(B) $(3, 0)$ and $(0, -6)$

(C) $(3, 0)$ and $(0, 6)$

(D) $(6, 0)$ and $(0, 3)$

13. The function f is defined by the equation $f(x) = x - x^2$. Which of the following represents a quadratic with no real zeros?

(A) $f(x) + \dfrac{1}{2}$

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

(C) $f\left(\dfrac{x}{2}\right)$

(D) $f\left(x - \dfrac{1}{2}\right)$

14. The function f is a quadratic function with zeros at $x = 1$ and $x = 5$. The graph of $y = f(x)$ in the xy-plane is a parabola with a vertex at $(3, -2)$. What is the y-intercept of this graph?

15. In the xy-plane, the graph of the line $y = \dfrac{15}{4}$ intersects the graph of the equation $y = x^2 + x$ at two points. What is the distance between these two points?

(A) $\dfrac{3}{2}$

(B) $\dfrac{5}{2}$

(C) $\dfrac{15}{4}$

(D) 4

16. If $i^{2k} = 1$, and $i = \sqrt{-1}$, which of the following must be true about k?

(A) k is a multiple of 4.

(B) k is a positive integer.

(C) When 2k is divided by 4, the remainder is 1.

(D) k/2 is an integer.

17. When graphed in the xy-plane, the line $y = mx - 4$ intersects the x-axis at an angle of θ. If $m > 0$, $0° < \theta < 90°$, and $\cos\theta = \dfrac{3}{\sqrt{58}}$, what is the value of m?

18. For all numbers x and y, let z be defined by the equation $z = |2^2 - x^2 - y^2| + 2^2$. What is the smallest possible value of z?

(A) 0   (B) 4   (C) 8   (D) 16

19. If the polynomial $P(x)$ has factors of 12, $(x - 5)$, and $(x + 4)$, which of the following must also be a factor of $P(x)$?

(A) $2x^2 + 8$ (B) $4x^2 - 20$ (C) $6x^2 - 6x - 120$ (D) $x^2 - 10x + 25$

20. If $f(x) = -x + 7$ and $g(f(x)) = 2x + 1$, what is the value of $g(2)$?

(A) –11   (B) –5   (C) 5   (D) 11

21. What number is 40% greater than the sum of 40 and 80?

22. A researcher is trying to estimate the daily amount of time undergraduate computer science majors spend on nonrecreational computer activities. She surveys 120 students. The mean is 210 minutes per day, with a standard deviation of 16.5 minutes. Which subject group would most likely yield a smaller margin of error?

(A) 240 randomly selected computer science majors

(B) 240 randomly selected liberal arts majors

(C) 80 randomly selected computer science majors

(D) 80 randomly selected liberal art majors

23. If $a = \dfrac{1}{2}b$ and $2a + 4b = 20$, what is the value of b?

(A) 2.5   (B) 4   (C) 5   (D) 15

24. The spinner for a board game has 10 sectors, numbered 1 through 10. It is spun 20 times and the results summarized in the table. What is the median value of these 20 spins?

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

25. The table shows ordered pairs that correspond to the function $h(x) = \dfrac{x^2}{2} + k$. What is the value of k?

26. A 48-gram serving of breakfast cereal contains 8 grams of sugar. How many grams of sugar are there in a 57-gram serving of the same cereal?

(A) 9.5   (B) 10.5   (C) 11.5   (D) 12.5

27. The graph shows the number of applicants and finalists for a statewide college scholarship program over four consecutive years. For which year was the ratio of finalists to applicants the greatest?

(A) 2010   (B) 2011   (C) 2012   (D) 2013

28. If $y^3 = 20$ and $z^2 = 10$, what is the value of $(yz)^6$?

(A) 2×10^5 (B) 4×10^4 (C) 2×10^5 (D) 4×10^5

29. $hx + 4y = -3$. The equation above is the equation of a line in the xy-plane, and h is a constant. If the slope of this line is -13, what is the value of h?

30. If the sum of a, b, and c is three times the sum of a and b, which of the following expresses the value of a in terms of b and c?

(A) $\dfrac{(c-2b)}{2}$

(B) $\dfrac{(2b-c)}{2}$

(C) $\dfrac{(c-3b)}{3}$

(D) $\dfrac{(3b-c)}{3}$

31. In the figure, BCDE is a rectangle, $AC = 14$, $BC = 12$, and $EC = 13$. What is the value of $\tan x$?

(A) 0.4   (B) 0.6   (C) 1.3   (D) 2.5

32. Which of the following binomials is a factor of $x^2 - 6x + 8$?

(A) $x - 4$ (B) $x + 4$ (C) $x + 2$ (D) $x - 8$

33. Let the function f be defined by $f(x) = 2 - |x - 4|$ for all real values of x. What is the greatest possible value of f?

(A) -2   (B) 2   (C) 4   (D) 6

34. If $\dfrac{3}{b} - \dfrac{2}{5} = 1$, what is the value of b?

(A) $\dfrac{5}{7}$

(B) $\dfrac{6}{5}$

(C) $\dfrac{15}{7}$

(D) 5

35. The sum of two numbers is four times their difference. The smaller of these numbers is 15. What is the greater number?

36. For the function f, $f(1) = 4$ and $f(2) = 13$. Which of the following equations could describe f?

(A) $f(x) = x^2 + 3$

(B) $f(x) = x^2 + 9$

(C) $f(x) = 2x^2 + 2$

(D) $f(x) = 3x^2 + 1$

37. Which of the following is NOT equivalent to $12b^2$?

(A) $(6b)(6b)$

(B) $12b(b)$

(C) $\left(b\sqrt{12}\right)^2$

(D) $6b^2 + 6b^2$

38. If m is a number chosen randomly from the set {2, 3, 4, 6} and n is a number chosen randomly from the set {1, 2, 3, 4}, what is the probability that mn is a multiple of 12?

(A) $\dfrac{1}{16}$

(B) $\dfrac{1}{8}$

(C) $\dfrac{1}{4}$

(D) $\dfrac{1}{2}$

39. If $0 < x < 2\pi$ and $5\cos x = \sqrt{5}$, what is the value of $\sin^2\left(\dfrac{x}{3}\right)$?

40. If $y = 3x + 4$ and $x < 3$, which of the following represents all the possible values of y?

(A) $y > 7$　　　(B) $y < 13$　　　(C) $7 < y < 13$　　　(D) $y > 13$

41. If $g(x + 1) = x^2 + 2x + 4$ for all values of x, which of the following is equal to $g(x)$?

(A) $x^2 + 4$　　　(B) $x^2 + 3$　　　(C) $(x - 1)^2 + 4$　　　(D) $(x - 1)^2 + 3$

42. In the figure, the circle with center O has a circumference of 50, and $AB = BC$. What is the length of arc AB?

43. A: 2, 7, 12, 17, 22, ... B: 5, 15, 25, 35, 45, ...

Two sequences, A and B, follow the patterns shown above. If the nth term of sequence A is 72, what is the nth term of sequence B?

(A) 125　　　(B) 135　　　(C) 145　　　(D) 155

44. A website received 2,100 visitors in July from both subscribers and nonsubscribers. If the ratio of subscribers to nonsubscribers among this group was 2:5, how many more nonsubscribers visited the site in July than subscribers?

(A) 126　　　(B) 630　　　(C) 900　　　(D) 1,260