

IF NONE OF THE ANSWERS GIVEN IS CORRECT CHOOSE NOTA!

1. What is the remainder when $y^3 + 8y^2 + 14y - 3$ is divided by $y + 4$?

- a) -11 b) 0 c) 3 d) 5 e) NOTA

2. Find $f^{-1}(x)$ if $f(x) = 6x - 11$.

- a) $-6x + 11$ b) $\frac{1}{6x-11}$ c) $\frac{1}{6}x + \frac{11}{6}$ d) $\frac{1}{6}x - \frac{11}{6}$ e) NOTA

3. $2\ln a + \ln(2a) - \frac{3}{4}\ln a^4 =$

- a) $\ln 2$ b) $\ln a$ c) $\ln\left(\frac{4}{a}\right)$ d) $\ln(2a^6)$ e) NOTA

4. Write the equation of the line perpendicular to $2x + 4y = 3$ through the point $(-1, 1)$.

- a) $x - 2y = -3$ b) $4x - 2y = 5$ c) $2x + y = -1$ d) $2x - y = -3$ e) NOTA

5. Lenora combines jogging and walking for exercise. One day she jogged and walked for a total of 1 hour and covered 4.2 miles. Her jogging speed was 5mi/hr and her walking speed was 3mi/hr. How much time did she spend walking?

- a) 22.5 min b) 24 min c) 26.5 min d) 28 min e) NOTA

6. Find the area of a trapezoid with height of $3x$ and bases of $2x + 3$ and $4x - 5$.

- a) $6x^2 - 3x$ b) $18x^2 - 6x$ c) $12x^3 + 3x^2 - 22.5x$ d) $9x^2 + 3x$ e) NOTA

7. Which of the following statements is true for all values of $a, b,$ and c ?

- a) $(a - b) - c = a - (b - c)$ b) $a + (b + c) = a + (c + b)$
 c) $(a - b)^2 = a^2 - b^2$ d) If $a^2 = b^2$, then $a = b$. e) NOTA

8. If $f(x) = \frac{x+3}{x-1}$, find $f(a + 1)$ given that $a \neq 0$.

- a) $\frac{a+3}{a-1} + 1$ b) $\frac{a+3}{a-1}$ c) $1 + \frac{4}{a}$ d) 4 e) NOTA

9. If $i = \sqrt{-1}$, then $\begin{bmatrix} 4i & 2+i \\ 6 & 4-i \end{bmatrix} \cdot \begin{bmatrix} -3i & \frac{1}{2i} \\ 2-i & i \end{bmatrix} =$

a) $\begin{bmatrix} 17 & 1+2i \\ 7-24i & 1+i \end{bmatrix}$

b) $\begin{bmatrix} 4-13i & 1+2i \\ 7-24i & 1+7i \end{bmatrix}$

c) $\begin{bmatrix} 17 & -1+4i \\ 9-24i & 1+i \end{bmatrix}$

d) $\begin{bmatrix} 4-13i & -1+4i \\ 8-18i & 1+i \end{bmatrix}$

e) NOTA

10. If -2 , 4 , $2 + \sqrt{3}$, and $3 - 2i$ are solutions of a polynomial equation with rational coefficients what is the lowest possible degree of the equation?

a) 4

b) 5

c) 7

d) 8

e) NOTA

11. Given the equation $y = \frac{3}{2}(x^2 - 2x - 3)$, which of the following statements is false?

a) It's graph is a parabola opening upward.

b) It's minimum value is $\frac{-9}{2}$.

c) It's x intercepts are -1 and 3 .

d) It's axis of symmetry is $x = 1$. e) NOTA

12. The area of a rectangle is $2ax - bx + cx + 2ay - by + cy$ and its width is $x + y$. Which of the following represents its length?

a) $2ax - by + c$

b) $2a + b + c$

c) $4a - 2b + 2c$

d) $2a - b + c$

e) NOTA

13. One of the rules in the card game cribbage is "score two points for every different combination of cards that total 15". A dealt hand has four 5's and one 10. How many points, for totals of 15, is this hand worth?

a) 8

b) 10

c) 14

d) 16

e) NOTA

14. If $\sqrt[3]{\frac{1}{x}} - a = \frac{-2}{3}$, solve for x .

a) $\left(a - \frac{2}{3}\right)^3$

b) $\frac{27}{(3a-2)^3}$

c) $\frac{27a^3-8}{9}$

d) $\frac{27a^3-8}{27}$

e) NOTA

15. The area of a circle varies directly as the square of its radius. If the radius is tripled, the area

a) triples

b) increases by a factor of 6

c) increases by a factor of 9

d) increases by a factor of 27

e) NOTA

16. Find the midpoint on the number line for the solution of $|2x - 5| \leq 17$.

- a) -1.5 b) 0 c) 2.5 d) 5.5 e) NOTA

17. Find k such that the y -intercept of the line with the equation $2x + 5ky + 10 = 0$ is -4 .

- a) -2 b) -0.5 c) 2 d) 5 e) NOTA

18. If a , b , and c are consecutive integers which of the following is false?

- a) $a + c$ is even. b) $b + c$ is odd. c) $\frac{abc}{3}$ is an integer. d) bc is odd. e) NOTA

19. $a \oplus b = a^2b - ab^2$. $5 \oplus -2 =$

- a) -70 b) -30 c) 30 d) 70 e) NOTA

20. A shipping container, rectangular on all sides, must have a volume of at least 90 ft^3 . Its width must exceed its height by 4 ft and its length must be 13 ft less than twice its width. If the height must be an integral value find the smallest possible dimension of the container's width.

- a) 3 b) 4 c) 5 d) 8 e) NOTA

21. Evaluate $\frac{8 \cdot 4 - 3 \cdot 5 - 2(-1) - (-1)}{-3 \cdot 2 + 1}$.

- a) -4 b) -2.8 c) $-\frac{20}{9}$ d) -5 e) NOTA

22. If $2^{2x-3} = 8$ and $\log(2y + 1) = 1$, find $\frac{x}{y}$.

- a) 0 b) $\frac{2}{3}$ c) $\frac{11}{9}$ d) $\frac{27}{2}$ e) NOTA

23. $\frac{13x-9}{x^2-x-6}$ was obtained by adding the fractions $\frac{A}{x-3}$ and $\frac{B}{x+2}$. What is the product of A and B ?

- a) 20 b) 28 c) 36 d) 42 e) NOTA

24. If two integers are added the result is 15. If the squares of the integers are added the sum is 125. Find the product of the integers.

- a) 15 b) 25 c) 50 d) 100 e) NOTA

25. The table contains some ordered pairs of a function. The relationship is best described as

x	0.25	1	2	4	8
y	-1	0	0.5	1	1.5

- a) linear b) quadratic c) cubic d) exponential e) logarithmic

26. The expression $\sqrt{a^2 + b^2}$ is equal to

- a) $a + b$ b) $|a| + |b|$ c) $(a + b)(a - b)$ d) $\sqrt{a^2} + \sqrt{b^2}$ e) NOTA

27. If the discriminant of $ax^2 + bx + c = 0$ is 35, where a, b, and c are real numbers, which of the following is true?

- a) It can be factored into binomials with integral coefficients.
 b) The product of the roots is 35.
 c) It has two different real roots.
 d) It has no complex roots.
 e) NOTA

28. A circle has its center at (2, -3) and passes through the point (5, -1). What is the length of the radius of the circle?

- a) $\sqrt{5}$ b) $\sqrt{13}$ c) 5 d) $3\sqrt{7}$ e) NOTA

29. What is the eighth term of $\left(2a + \frac{1}{\sqrt{2a}}\right)^{12}$?

- a) $1584a\sqrt{2a}$ b) $6336a\sqrt{2a}$ c) $3168a^5$ d) $12,672a^7$ e) NOTA

30. Given the ellipse $x^2 + 4y^2 = 36$ which of the following statements is false?

- a) The graph of $x - 2y = 6$ intersects it twice. b) The length of the major axis is 12.
 c) The foci are at $(\pm\sqrt{3}, 0)$. d) The point $(4\sqrt{2}, 1)$ is on the ellipse.
 e) NOTA