Choose NOTA if no other answer listed is correct.

1. If $\sin\theta = \frac{1}{2}$ and $90^0 \le \theta \le 180^0$, then $\tan 2\theta =$

A) $\sqrt{3}$ B) $-\sqrt{3}$ C) $\frac{1}{\sqrt{3}}$ D) $-\frac{1}{\sqrt{3}}$ E) NOTA

2. A solution of y if $y = \sqrt{2-2y}$ is which of the following:

A) $\sqrt{3}-1$ B) $-\sqrt{3}+1$ C) $\frac{1}{2}$ D) 1 E) NOTA

3. If triangle ABC is made up of the points A(0,0), B(3,4), and C(3,-4), what is the area of triangle ABC?

A) 25 B) 8 C) 12 D) $\frac{25}{2}$ E) NOTA

4. Find the values of x and y if $\begin{bmatrix} 12 & -8 \\ 15 & -10 \end{bmatrix} = \begin{bmatrix} 4 \\ 5 \end{bmatrix} \begin{bmatrix} x & y \end{bmatrix}$.

A) $x=1$ and $y=-2$ B) $x=-2$ and $y=3$ C) $x=3$ and $y=-2$ D) $x=-3$ and $y=-2$ E) NOTA

5. What type of conic is the equation: $x^2 - 4x - 4 = y^2 + 4y$?

A) Circle B) Ellipsoid C) Hyperbola D) Parabola E) NOTA

6. What are the equations of the asymptotes of the graph $f(x) = \frac{-4x+3x^2-1}{x^2-6x+8}$?

A) $x=2$, $x=4$ and $y=3$ B) $x=2$, $x=4$ C) $x=3$, $x=2$, $x=4$ D) $x=-2$, $x=4$ and $y=3$ E) NOTA

7. The half-life of a 10-kilogram substance is 5 years. Rounded to the nearest year, how many years will have passed if only 100grams of the substance remains?

A) 30 years B) 34 years C) 33 years D) 32 years E) NOTA

8. If $a = \log_{16}25$ and $b = \log_{16}36$, express $\log_2 30$ in terms of a and b..

A) a+b B) 2a-b C) 2b-2a D) 2a+2b E) NOTA

9. Triangle ABC has AB = 9, BC = 7, and $\angle B = 60°$, what is the area of triangle ABC?

A) $\frac{63}{4}$ B) $\frac{63\sqrt{3}}{4}$ C) 67 D) 63 E) NOTA

10. A rectangular park is 15 meters longer then it is wide. The park is surrounded by a walkway of width 6 meters. The combined area of the park and the walkway is 19,240,000 square centimeters. Find the length of the park to the nearest meter.

A) 41 B) 40 C) 4100 D) 4000 E) NOTA

11. If the complex number 2 – 6i is a zero of $f(x) = x^4-3x^3+34x^2+48x-80$, find the sum of the other three zeros.

A) -1+6i B) 6i C) 2+6i D) 1+6i E) NOTA

12. If $Q = d(2)^t$ and $Q<0$ and $d>0$, then t =

A) $\frac{\ln Q - \ln d}{\ln 2}$ B) $\frac{\ln Q + \ln d}{\ln 2}$ C) $\frac{\ln 2 - \ln d}{\ln Q}$ D) ln 2 E) NOTA

13. How many petals does the polar graph $r = -2\cos 2\theta$ have?

A) 1 B) 2 C) 3 D) 4 E) NOTA

14. Triangle FUN has $\angle F = 42°$, UN = 14, and NF = 19 what is $\angle N$ to the nearest tenth of a degree?

A) 72.8 B) 65.2 C) 72.7 D) 65.3 E) NOTA

15. If 2004 radians are converted to degrees, what would be the result rounded to the nearest hundredth?

A) 114820.74 B) 114820.76 C) 114800 D) 114820 E) NOTA

16. What is the angle created between the vectors (10,5) and (35,9) to the nearest tenth of a degree?

A) 10.7 B) 12.1 C) 20.2 D) 15.9 E) NOTA

17. If two circles of the same radius intercept, but do not have the same center, what is the largest number of points on the circles that they can share?

A) 0 B) 1 C) 2 D) 4 E) NOTA

18. What is x to the nearest tenth if $3^{5x-9} = 17$?

A) 3.2 B) 2.3 C) 2.2 D) 1.7 E) NOTA

19. The complex number 8 cis 330° is equivalent to which of the following:

A) $4\sqrt{3} - 4i$ B) $-4\sqrt{3} + 4i$ C) $4\sqrt{3} + 4i$ D) $-4\sqrt{3} - 4i$ E) NOTA

20. $\sum_{n=0}^{\infty}\left(\frac{1}{4}\right)^{2n} =$

A) $\frac{16}{15}$ B) $\frac{15}{16}$ C) 1 D) 1.2 E) NOTA

21. What is the range of the equation $f(x) = 3\cos x + \cos^2 x$?

A) $[-2,3]$ B) $[-4,2]$ C) $[-4,4]$ D) $[0,4]$ E) NOTA

22. How many positive integral divisors of 2004 are there?

A) 10 B) 12 C) 8 D) 14 E) NOTA

23. What is the unit vector of vector $\vec{A} = \langle 1,2,2 \rangle$?

A) $\langle 1,1,1 \rangle$ B) $\langle 1,2,3 \rangle$ C) $\left\langle \frac{1}{3}, \frac{2}{3}, \frac{2}{3} \right\rangle$ D) $\left\langle \frac{1}{5}, \frac{2}{5}, \frac{2}{5} \right\rangle$ E) NOTA

24. Find $(1 - i)^{24}$:

A) 4096 B) 4096i C) 2048+2048i D) 4096-4096i E) NOTA

25. Find $a \times b$ if $a = 5i - 6j + k$ and $b = 3j + 4k$.

A) $-27i - 20j + 15k$ B) $-27i + 20j + 15k$ C) $-4i - 3j + 38k$ D) $27i + 20j - 15k$ E) NOTA

26. Evaluate the limit: $\lim_{x \to \infty} \frac{15x^3 + 3x - 2}{5x^3 - 15x^2 + 7x}$.

A) 0 B) Does not Exist C) 3 D) 1 E) NOTA

27. If $M = \begin{bmatrix} 5 & -1 \\ .3 & 7 \end{bmatrix}$ then $M^{-1} =$

A) $\begin{bmatrix} 7 & -1 \\ -.3 & 5 \end{bmatrix}$ B) $\frac{1}{35.3}\begin{bmatrix} 7 & 1 \\ -.3 & 5 \end{bmatrix}$ C) $\begin{bmatrix} 5 & 1 \\ -.3 & 7 \end{bmatrix}$ D) $\begin{bmatrix} 7 & 1 \\ -.3 & 5 \end{bmatrix}$ E) NOTA

28. What is the domain of $f(x) = \ln\left(1 - \sqrt{x-2}\right)$?

A) [0,2] B) [2,3) C) $(3, \infty)$ D) (2,3] E) NOTA

29. Which of the following is equivalent to tan x:

A) $\frac{\sec x}{\csc x}$ B) $\frac{\cot x}{\csc x}$ C) $\frac{\csc x}{\sec x}$ D) $1 + \sin^2 x$ E) NOTA

30. What is the radius of the circle with the equation $x^2 - 4x + y^2 + 14y + 44 = 0$?

A) 1 B) 7 C) 2 D) 3 E) NOTA