

If no correct answer is given, choose E. NOTA

- The sum of the positive prime number divisors of 1998 is
A. 42 B. 43 C. 116 D. 117 E. NOTA
- Consider a pair of distinct, parallel, nonvertical lines. The product of the slopes of these lines is always
A. -1 B. 0 C. greater than 0 D. a perfect square E. NOTA
- The Y intercept of the graph of $f(x) = x^3 - 9x^2 + 9x - 8$ is
A. -9 B. -8 C. 8 D. 9 E. NOTA
- The X-intercept of the graph of $f(x) = x^3 - 9x^2 + 9x - 8$ is
A. -9 B. -8 C. 8 D. 9 E. NOTA
- If $f(x) = x^3 - 9x^2 + 9x - 8$, then $f(-x) =$
A. $-x^3 - 9x^2 - 9x - 8$ B. $x^3 + 9x^2 - 9x - 8$ C. $-x^3 + 9x^2 - 9x + 8$
D. $-x^3 - 9x^2 - 9x + 8$ E. NOTA
- When the quadratic equation $px^2 + qx + r = 0$ is solved using the quadratic formula, the discriminant is
A. $\sqrt{p^2 - 4qr}$ B. $p^2 - 4qr$ C. $\sqrt{q^2 - 4pr}$ D. $q^2 - 4pr$ E. NOTA
- P has coordinates (a,b). P is first reflected about the line $y = x$, then reflected about the X-axis, and then reflected about the Y-axis. Call this final position Q. The coordinates of Q are
A. (-a,-b) B. (b,-a) C. (-b,-a) D. (a,-b) E. NOTA

8. Suppose a committee of six is chosen at random from a group of seven women and eight men. What is the probability, correct to the nearest hundredth, that the committee is made up of three men and three women?
- A. 0.35 B. 0.37 C. 0.39 D. 0.47 E. NOTA
9. Pipe A can fill a given tank in 40 minutes. Pipe B can fill that same tank in 40 minutes. Pipe C can fill it in 30 minutes. If pipes A and B work together for 4 minutes and then pipe C is also turned on, how long does it take to fill the tank?
- A. 9 min. 6 sec. B. 9 min. 36 sec. C. 9 min. 40 sec. D. 9 min 45 sec. E. NOTA
10. When x^3 is divided by $x^2 + 2x + 1$, the remainder is
- A. $-5x - 2$ B. $-3x - 2$ C. $3x - 2$ D. $3x + 2$ E. NOTA
11. The value of $\log_{19} 98$ correct to the nearest tenthousandth is
- A. 1.5571 B. 1.5572 C. 1.5573 D. 1.5774 E. NOTA
12. The polynomial $P(x)$ has zeros $1 + 9i$ and $9 + 8i$. The degree of $P(x)$ is
- A. 0 B. 2 C. 4 D. 4 or more E. NOTA
13. In order to rationalize the expression $\frac{a+b}{\sqrt[3]{a} + \sqrt[3]{b}}$, multiply both numerator and denominator by
- A. $\sqrt[3]{a} - \sqrt[3]{b}$ B. $\sqrt[3]{a^2} - \sqrt[3]{b^2}$ C. $\sqrt[3]{a^2} - \sqrt[3]{ab} + \sqrt[3]{b^2}$
- D. $\sqrt[3]{a^2} - 2\sqrt[3]{ab} + \sqrt[3]{b^2}$ E. NOTA
14. $(x^2 + x - 3)(x^2 + 2x + 3) = Ax^4 + Bx^3 + Cx^2 + Dx + E$. $A - B + C - D + E =$
- A. -6 B. -3 C. 3 D. 6 E. NOTA
15. The measure of the acute angle formed by the graph of $4x - 5y = 9$ and the X-axis, correct to the nearest degree is
- A. 30 B. 35 C. 39 D. 42 E. NOTA

16. $\sum_{n=0}^{\infty} \left(\frac{2}{7}\right)^n =$

A. $\frac{2}{5}$

B. $\frac{7}{5}$

C. $\frac{8}{5}$

D. $\frac{11}{5}$

E. NOTA

17. The graphs of $2y = x+3$ and $xy = 5$ intersect in two points. The sum of the y-coordinates of these intersection points is

A. 1.5

B. 1.75

C. 2.25

D. 2.5

E. NOTA

18. $\begin{vmatrix} 2 & -3 & 1 \\ 1 & k & -2 \\ 3 & -5 & -1 \end{vmatrix} = 0$ under the condition $k =$

A. -5

B. -3

C. -2

D. -1

E. NOTA

19. If $f(x) = x^2 + x$ then $\frac{f(x+h) - f(x)}{h} =$

A. 1

B. h

C. $2x + h$

D. $2x + h + 1$

E. NOTA

20. $i = \sqrt{-1}$. $(1-i)^{11} =$

A. $-32 - 32i$

B. $-32 + 32i$

C. $32 - 32i$

D. $32 + 32i$

E. NOTA

21. Let d equal the distance from the point with coordinates (a,b) to the graph of the line with equation $Ax + By + C = 0$. $d =$

A. $\frac{|aA + bB + C|}{\sqrt{A^2 + B^2}}$

B. $\frac{|aA + bB + C|}{\sqrt{a^2 + b^2}}$

C. $\frac{|bA + aB + C|}{\sqrt{A^2 + B^2}}$

D. $\frac{|bA + aB + C|}{\sqrt{a^2 + b^2}}$

E. NOTA

22. Suppose y varies directly as x and inversely as z , and $y = 12$ when $x = 8$ and $z = 2$. When $x = 3$ and $z = 6$, the value of y is

A. 1.5

B. 8

C. 15

D. 18

E. NOTA

23. Which of the following is an even function?

- A. $f(x) = |2x + 2|$ B. $f(x) = 4x^3$ C. $f(x) = (x + 2)^2$ D. $f(x) = |\log_3 x|$ E. NOTA

24. Which of the following statements is/are true relative to the entries in Pascal's Triangle?

I. The sum of the entries in the n th row is 2^{n-1} .

II. Each odd numbered row contains an odd number of entries.

III. For $0 < k < n$, the k th entry in the n th row is ${}_{n-1}C_{k-1}$.

- A. I only B. I and III only C. II and III only D. I, II, and III E. NOTA

25. $(-1)^{(x^2+3x-5)} = 1$ if and only if the value of $x^2 + 3x - 5$ is

- A. zero B. a positive integer C. an even positive integer D. an even integer E. NOTA

26. The domain of $f(x) = \sqrt{x^3 + 5x^2 - x - 5}$ is

- A. $\{x: x \geq 0\}$ B. $\{x: x \geq 1\}$ C. $\{x: -5 \leq x \leq -1\}$
D. $\{x: -5 \leq x \leq -1 \text{ or } x \geq 1\}$ E. NOTA

27. If $\begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 7 \end{bmatrix}$ then $x + y$ equals

- A. 2 B. 3 C. 4 D. 7 E. NOTA

28. The radius of the circle defined by the equation $x^2 + y^2 - 14x + 10y + 70 = 0$ is

- A. 1 B. 2 C. 3 D. 4 E. NOTA

29. If the expression $\frac{2n!}{(n! n^n)^{1/n}}$ is evaluated for $n=5$, and then rounded to the nearest integer, the result is

- A. 0 B. 1 C. 18 D. 278,584 E. NOTA

30. Which of the following is not a computing instrument

- A. an abacus B. the Sieve of Eratosthenes C. a slide rule D. Napier's bones
E. NOTA