

1. The remainder when $x^4 - 3x^3 + x^2 - x + 2$ is divided by $x - 2$ is
a) 48 b) -4 c) 12 d) 16 e) none of these
2. If $f(x) = 3x - 5$, then $f^{-1}(x) =$
a) $\frac{1}{3x-5}$ b) $\frac{x+5}{3}$ c) $\frac{x}{3} + 5$ d) $\frac{x-5}{3}$ e) none of these
3. If 4 geometric means are inserted between -5 and 160, the fourth term in the sequence is
a) -120 b) -80 c) 40 d) -40 e) none of these
4. The sum $0.\bar{7} + 0.\overline{42}$ is equal to
a) $\frac{119}{99}$ b) $\frac{56}{45}$ c) $\frac{49}{9}$ d) $\frac{112}{99}$ e) none of these
5. Determine x so that $(x,1)$ is equidistant from $(2,3)$ and $(-3,5)$.
a) $\frac{5}{2}$ b) $-\frac{17}{10}$ c) $\frac{17}{2}$ d) $-\frac{5}{2}$ e) none of these
6. If $f(x) = \frac{1}{x} - 3$ and $g(x) = |x - 4|$, then $f(-1) - g(4)$ is equal to
a) -2 b) -4 c) undefined d) 4 e) none of these
7. If $f(x) = \frac{1}{x^2}$ then $f(xy) =$
a) $\frac{f(x)}{f(y)}$ b) $f(x)f(y)$ c) $f(x) + f(y)$ d) $\frac{f(x)+f(y)}{2}$ e) none of these
8. The expression $\sin[\ln \sqrt[3]{e^{\pi/2}}]$ simplifies to
a) 0 b) 1 c) -1 d) $\frac{1}{2}$ e) none of these
9. $\log_2\left(\frac{1}{16}\right) =$
a) -8 b) $\frac{1}{8}$ c) -4 d) $\frac{1}{4}$ e) none of these
10. The solution set for $|3x - 2| \leq 7$ is
a) $(-\frac{5}{3}, 3)$ b) $[-\frac{5}{3}, 3]$ c) $(\frac{5}{3}, -3)$ d) $[\frac{5}{3}, -3]$ e) none of these
11. If $e^{3x-4} = 5$, then $x =$
a) $\frac{\ln 5-4}{3}$ b) $\frac{\ln 5+4}{3}$ c) $\ln 9 - 3$ d) $\frac{\ln 9}{3}$ e) none of these
12. For the equation $9x^2 - 18x + 4y^2 = 27$, the point $(1, \sqrt{5})$ is a(n)
a) vertex b) focus c) maximum d) endpoint e) none of these

13. If $9^{x-2} = 27^x$ then $x =$
 a) 4 b) 1 c) -1 d) -4 e) none of these
14. If $\sin 17^\circ = a$, then $\cos 34^\circ =$
 a) $\frac{1}{2a}$ b) $1 - 2a^2$ c) $2a$ d) not enough information e) none of these
15. If $(x + y)^2 = 50$ and $(x - y)^2 = 30$, then $x^2 - xy + y^2$ equals
 a) 30 b) 35 c) 40 d) 45 e) none of these
16. The value of $\arccos\left(-\frac{1}{2}\right)$ is
 a) $-\frac{\pi}{3}$ b) $\frac{\pi}{3}$ c) $\frac{2\pi}{3}$ d) $\frac{5\pi}{6}$ e) none of these
17. If $P(x) = 2x^2 + 1$ and $(x) = -x + 5$, then $Q(P(x)) =$
 a) $-2x^2 + 6$ b) $2x^2 - x + 6$ c) $2x^2 - 20x + 51$ d) $-2x^2 + 4$ e) none of these
18. If $\{(x, y) | 4x - 3y = 17 \text{ and } 2x + 5y = -11\}$, then $y =$
 a) -2 b) $\frac{7}{5}$ c) 3 d) -3 e) none of these
19. If $\log_5(2x + 1) + \log_5(3x - 1) = 2$, then $x =$
 a) $-\frac{13}{6}$ b) $\frac{2}{5}$ c) 2 d) a and c are correct e) none of these
20. The polar coordinates $\left(\sqrt{2}, \frac{5\pi}{3}\right)$ correspond to the rectangular coordinates:
 a) $\left(\frac{\sqrt{6}}{2}, -\frac{\sqrt{2}}{2}\right)$ b) $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{6}}{2}\right)$ c) $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{6}}{2}\right)$ d) $\left(-\frac{\sqrt{6}}{2}, \frac{\sqrt{2}}{2}\right)$ e) none of these
21. The equation $x^3 + x - 2$ has exactly _____ real root(s)
 a) zero b) one c) two d) three e) none of these
22. $\sec^{-1}(-2) + \tan^{-1}(-\sqrt{3}) =$
 a) $-\frac{2\pi}{3}$ b) 0 c) 6π d) 2π e) none of these
23. $\cos^4(2x) - \sin^4(2x) =$
 a) $\cos^4(4x)$ b) $\sin^4(4x)$ c) $\sin(4x)$ d) $\cos(4x)$ e) none of these
24. $(1 - i)^{16} =$
 a) -2^8 b) 2^8 c) 2^8i d) -2^8i e) none of these
25. As θ increases from 0 to $\frac{\pi}{2}$ radians $\csc(\theta)$
 a) increases b) decreases c) is undefined d) is constant e) none of these
26. $\sec(\arctan x) =$
 a) $x^2 + 1$ b) $x^2 - 1$ c) $\sqrt{x^2 + 1}$ d) $\sqrt{x^2 - 1}$ e) none of these

27. The graph of $r = 4\sin(\theta)$ in polar coordinates _____
- a) is a circle b) is a cardioid c) has four loops d) has eight loops e) none of these
28. If $\log_{10} a = x$, $\log_{10} b = y$, and $\log_{10} c = z$, then $\log_{10} \left(\frac{a^2c}{b}\right) =$
- a) $2x + z - y$ b) $x^2 + z - y$ c) $\frac{2x+z}{y}$ d) $\frac{x^2+z}{y}$ e) none of these
29. If $x = 4t^2 - 5$ and $y = 2t + 3$, then $x =$
- a) $y^2 - 14$ b) $2y^2 - 12y + 13$ c) $y^2 - 6y + 4$ d) $y^2 - 3y + 4$ e) none of these
30. If $\cos \theta = \frac{5}{13}$ and $270^\circ < \theta < 360^\circ$, then $\sin \theta$
- a) $\frac{12}{13}$ b) $-\frac{12}{13}$ c) $\frac{6}{13}$ d) $-\frac{6}{13}$ e) none of these

