



Example Mathematics Admission Test

1. The expression $\ln \left(\frac{x}{2} \right)^{\frac{y}{3}}$ is equivalent to

- a) $\frac{y \ln x}{3 \ln 2}$
- b) $\frac{y(\ln x - \ln 2)}{3}$
- c) $\sqrt[3]{\ln \left(\frac{x}{2} \right)^y}$
- d) None of the above
- e) All of the above

2. The expression $\left(\frac{a^{2/3} b^{1/5}}{a b^{-1}} \right)^{-4}$ is equivalent to:

- a) $(a^{1/3} b^{4/5})^4$
- b) $\left(\frac{a b^{-1}}{a^{2/3} b^{1/5}} \right)^4$
- c) $a^{-4/3} b^{24/5}$
- d) All of the above
- e) None of the above

3. The expression $\frac{\sqrt[3]{5a^2} \sqrt{\frac{a}{4}}}{\sqrt[6]{a^5}}$ is equivalent to:

- a) $2^{-1} \sqrt[3]{5a}$
- b) $\sqrt[6]{\frac{25a^2}{4^3}}$
- c) $\frac{a}{2} \left(\frac{a^2}{5} \right)^{-1/3}$
- d) All of the above
- e) None of the above

4. Find the quotient polynomials $C(x)$ and the rest $R(x)$ which are obtained by dividing the polynomial $P(x) = 12x^3 + 8x^2 + 8$ and $Q(x) = 2x^2 + 3x + 2$.

5. Find the polynomial $P(x)$ of 3rd degree that have $x_1 = 1$ as a double root and $x_2 = -1$ as simple root and verify that $P(0) = 6$.

6. Find the equation of the line of the plane containing the point $(-1, 1)$ and is parallel to the line of equation $2x + 5y - 1 = 0$.
7. Find the equation of the plane perpendicular to the line with equation $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and passing through the point $P = (0, 1, 0)$.
8. The $\sin(a + b)$ is equal to:
- a) $\sin a \cos b + \cos a \sin b$
 - b) $\sin a \cos b - \cos a \sin b$
 - c) $\cos a \cos b + \sin a \sin b$
 - d) $\cos a \cos b - \sin a \sin b$
9. Solve the equation $\sin^2 x + \cos x = \frac{5}{4}$
10. Solve $\tan(75^\circ) \cdot \sec(225^\circ)$
11. Calculate the derivative of the function $y = \frac{x^2 - 1}{3x + 2}$
- a) $y' = \frac{2x}{3}$
 - b) $y' = \frac{9x^2 + 4x - 3}{9x^2 + 12x + 4}$
 - c) $y' = \frac{3x^2 + 4x + 3}{9x^2 + 12x + 4}$
12. Calculate the derivative of the function $y = \arcsin \sqrt{1 - x^2}$