

EMT111 Practice Problems

Indices, Surds and Logarithms

September 8, 2010

1. Evaluate.

(a) $\left(\frac{2}{3}\right)^{-2}$ (b) $(121)^{\frac{3}{2}}$ (c) $\frac{1}{2^{-1}}$ (d) $\left(\frac{125}{27}\right)^0$

2. Express in terms of the simplest possible surds.

(a) $\sqrt{288}$ (b) $\sqrt{450}$ (c) $\sqrt{72}$ (d) $\sqrt{12}$

3. Simplify:

(a) $\sqrt{2}(3 - \sqrt{2})$ (b) $(\sqrt{2} - 1)(\sqrt{2} + 1)$ (c) $(2\sqrt{5} + 3)(3\sqrt{5} - 2)$

4. Rationalise denominators and simplify.

(a) $\frac{1}{\sqrt{5}}$ (b) $\frac{3}{2-\sqrt{3}}$ (c) $\frac{2}{3+2\sqrt{5}}$ (d) $\frac{1}{2\sqrt{3}+\sqrt{2}}$

5. Evaluate.

(a) $\log_4 64$ (b) $\log 1000$ (c) $\log_{121} 11$ (d) $5^{\log_5 25}$

6. Simplify.

(a) $\log 3 + \log 4$ (b) $\frac{\log 9}{\log 3}$ (c) $\log(x+1) - \log(x^2 - 1)$

7. Solve the equations.

(a) $3^{x-1} = 7$ (b) $\log_2 x + \log_x 2 = 2$ (c) $\log_2 x = \log_4(x+6)$

8. Simplify.

(a) $\frac{100x^2y^4}{5x^3y^2}$ (b) $\frac{y^4(x^3y^{-2})^2}{2x^{-1}}$ (c) $\sqrt[3]{-8x^6}$ (d) $\left(\frac{M^{1/5}}{3N^{-1/2}}\right)^2$

9. Solve for x .

(a) $e^{x+4} = 10$ (b) $Pe^{kx} = Q$ (c) $121e^{-0.112x} = 88$

10. Solve.

(a) $2(2^{2x}) - 5(2^x) + 2 = 0$ (b) $3^{2x+1} - 26(3^x) - 9 = 0$