

KIX 1001: ENGINEERING MATHEMATICS 1

Tutorial 1: Basic Functions & Derivatives

1. Find the limit

$$\lim_{x \rightarrow 5} \frac{x^2 - 25}{x^2 + x - 30}$$

2. Find the limit

$$\lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{x - 9}$$

3. Find the limit

$$\lim_{x \rightarrow 0} \frac{\sqrt{2+x} - \sqrt{2}}{x}$$

4. Find the limit

$$\lim_{\theta \rightarrow \frac{\pi}{2}} \frac{\tan \theta}{\sec \theta}$$

5. Find the limit

$$\lim_{\theta \rightarrow 0} \frac{\cos \theta - 1}{\sin \theta}$$

6. If $2x \leq g(x) \leq x^2 - x + 2$, evaluate $\lim_{x \rightarrow 1} g(x)$

7. Solve y' if $y =$

$$\sqrt{3x^2 - 2x + 3}$$

8. Solve y' if

$$y = 5\sqrt[3]{x^2 + \sqrt{x^3}}$$

9. Solve y' if $y = \ln(\cos x^2)$

10. Differentiate $y = \log(4 + \cos x)$

11. Find y' for $10e^{2xy} = e^{15y} + e^{13x}$

12. Solve $f'(x)$ if $f(x) = 2x(\arctan 5x)^2 + 6 \tan(\cos 6x)$

13. Solve y' if $y = 4x \sinh^{-1}\left(\frac{x}{6}\right) + \tanh^{-1}(\cos 10x)$

14. Differentiate

$$y = \frac{1}{\sin^{-1}x}$$

15. Differentiate $y = (x^3 - 1)^{100}$