

Pure mathematics assessment

Topic: Differentiation

Name:

Date:

1. Differentiate  $y = x^3$ . [1]
2. Differentiate  $y = x$ . [1]
3. Differentiate  $y = 2x^4$ . [1]
4. Differentiate  $y = 2x^3 - 2x^2 + 1$  [2]
5. Differentiate  $y = (3x^2 + x)^2$ . [3]
6. Differentiate  $y = x^{-3}$ . [2]
7. Differentiate  $y = \frac{1}{2x^4}$ . [2]
8. Differentiate  $y = \frac{\sqrt[3]{x^5}}{5} + \frac{9}{x^2}$ . [3]
9. Given that  $y = 5x^2 + 3x - 3$ , find  $x$  if  $\frac{dy}{dx} = 7$ . [5]
10. Find the equation of the tangent to the curve  $y = x^2 - 4$  at the point  $(2, 0)$ . [5]
11. Find the equation of the normal to the curve  $y = 3 - x^2$  where the  $x$ -coordinate is 0. [5]

Prepared by: John Sylvester Tabdi