Product Rule for Differentiation
Worksheet 1

Exercise 1

Differentiate each of the following:

1. $f(x) = 5x \, . \, cos(x)$
2. $y = x^2 \, . \, ln(x)$
3. $y = \left(2x^3 - 2x\right) . \, e^x$
4. $f(x) = 5 . ln(x) \, . \, tan(x)$
5. $y = 2sin(x) \, . \, \sqrt{x}$
6. $f(x) = \sqrt[3]{x} \left(x^3 - 2x\right)$
7. $y = \dfrac{3}{x} \left(2x^5 - 2\right)$
8. $f(x) = 3sin(x)cos(x)$

The following derivatives are typically seen in higher level courses:

9. $y = 4x^2 \, . \, tan^{-1}(x)$
10. $f(x) = 2^x \, . \, cos(x)$
11. $f(x) = 8x \, . \, sin^{-1}(x)$
12. $y = x^2 . 3^x$

Exercise 2

Consider the curve defined by $y = 2x \, . \, ln(x)$.

1. Find the y coordinate at the point P whose x-coordinate is $x = 1$.
2. Find $\dfrac{dy}{dx}$.
3. Calculate the gradient of the curve when $x = 1$.
4. Find the equation of the tangent to the curve at P.
5. Find the equation to the normal to the curve at P.