

Maths HL11 Extended – Derived functions

1. For each of the following find $\frac{dy}{dx}$:

a. x^5

b. $4x^2$

c. $12x^{-4}$

d. $\frac{1}{x^4}$ (tricky)

2. Find the gradient of each of the following curves at the point indicated

a. $y = 3x^2$ (3,27)

b. $-4x^3$ (-2,32)

c. $2x^2 - 3x + 4$ (5,39)

d. $y = (2x - 3)(x + 6)$ (4,40)

e. $2(x + 3)^2$ (-1,8)

f. $\frac{3}{8}x^3(x - \frac{1}{5})$ (-2,-17.6)

3. Find the turning point or points for each of the following curves:

a. $y = 3x^2 - 4x - 5$

b. $-(x - 4)(3 - x)$

c. $2x^2(1 - x)$

Applying your skills

4. The height, h metres, of a ball above the ground is given by the formula $h = 6t - 2t^2$ at time t seconds after the ball is thrown upwards.

a. Find $\frac{dh}{dt}$

b. Find the greatest height of the ball above the ground

c. Make a sketch of the curve from when the ball leaves the ground until it hits the ground