



**Calculus - Differentiation**

**Past Exam Questions**

**Maths - Ordinary Level**

Q8 2013 Sample P1

**Question 8**

**(50 marks)**

- (a) Differentiate  $x^2 - 6x + 1$  with respect to  $x$ .

A 12x12 grid for working out the differentiation of  $x^2 - 6x + 1$ .

- (b) (i) Differentiate  $5 - 3x$  with respect to  $x$  from first principles.

A 12x12 grid for working out the differentiation of  $5 - 3x$  from first principles.

- (ii) Given that  $y = (x^2 - 4)(3x - 1)$ , find the value of  $\frac{dy}{dx}$  when  $x = 2$ .

A 12x12 grid for working out the value of  $\frac{dy}{dx}$  when  $x = 2$  for the function  $y = (x^2 - 4)(3x - 1)$ .



**Question 6**

**(25 marks)**

The diagram opposite shows graphs of the quadratic function  $f(x) = x^2 + 3x - 1$ ,  $x \in \mathbb{R}$  and the line  $l_1$ .

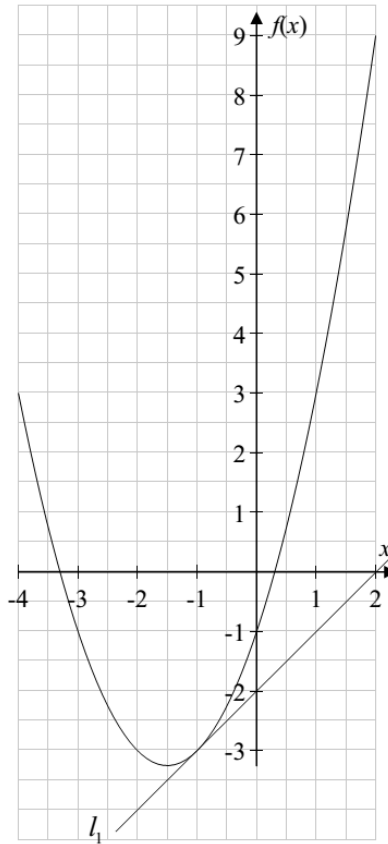
The line  $l_1$  passes through the point  $(2, 0)$  and is a tangent to the curve at the point  $(-1, -3)$ .

(a) Find the slope of  $l_1$ , using a slope formula.


(b) (i) Find  $f'(x)$ , the derivative of  $f(x)$ .


(ii) Verify your answer to (a) above by finding the value of  $f'(x)$  at  $x = -1$ .


(c) The line  $l_2$  is perpendicular to  $l_1$  and is also a tangent to the curve  $f(x)$ . Find the co-ordinates of the point at which  $l_2$  touches the curve.

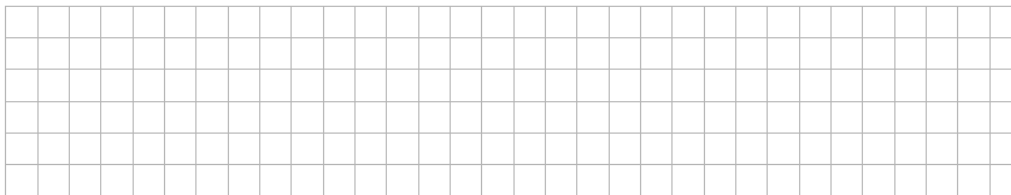



**Q8 2012 Sample**

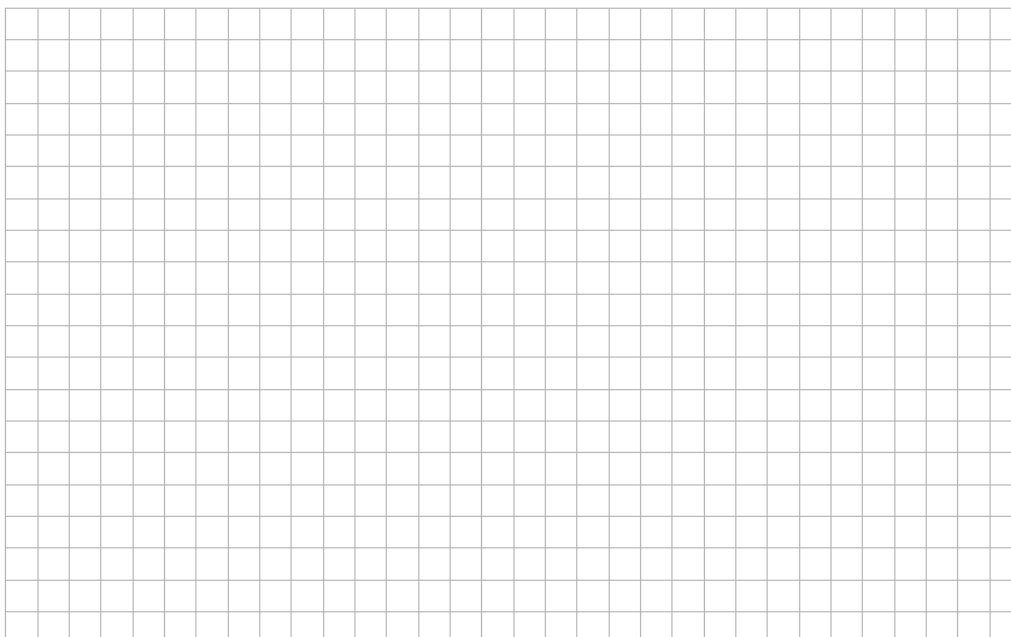
**Question 8**

**(50 marks)**

- (a) Differentiate  $x^2 - 6x + 1$  with respect to  $x$ .



- (b) (i) Differentiate  $5 - 3x$  with respect to  $x$  from first principles.



- (ii) Given that  $y = (x^2 - 4)(3x - 1)$ , find the value of  $\frac{dy}{dx}$  when  $x = 2$ .

