

9 Craig is investigating the gradient of chords of the curve with equation $f(x) = x - x^2$

Each chord joins the point $(3, -6)$ to the point $(3 + h, f(3 + h))$

The table shows some of Craig's results.

x	$f(x)$	h	$x + h$	$f(x + h)$	Gradient
3	-6	1	4	-12	-6
3	-6	0.1	3.1	-6.51	-5.1
3	-6	0.01			
3	-6	0.001			
3	-6	0.0001			

9 (a) Show how the value -5.1 has been calculated.

[1 mark]

9 (b) Complete the third row of the table above.

[2 marks]

9 (c) State the limit suggested by Craig's investigation for the gradient of these chords as h tends to 0

[1 mark]

9 (d) Using differentiation from first principles, verify that your result in part (c) is correct.

[4 marks]