

- 8 The variables x and y are connected by the equation

$$y = 1 + 2x^2 - x^3.$$

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The table below shows some values of x , and the corresponding values of y , correct to 1 decimal place where appropriate.

x	-1	-0.5	0	0.5	1	1.5	2	2.5
y	4	1.6	1	1.4	2	2.1	1	p

- (a) Calculate p .
Give your answer correct to 1 decimal place.

Answer $p = \dots\dots\dots$ [1]

- (b) On the graph paper opposite, using a scale of 2 cm to represent 1 unit on both axes, draw a horizontal x -axis for $-2 \leq x \leq 3$, and draw a vertical y -axis for $-3 \leq y \leq 5$.
On your axes, plot the points given in the table and join them with a smooth curve. [3]

- (c) Use your graph to find all the solutions of $1 + 2x^2 - x^3 = 2$.

Answer $x = \dots\dots\dots$ [2]

- (d) By drawing a tangent, find the gradient of the curve at the point where $x = -0.5$.

Answer $\dots\dots\dots$ [2]

- (e) By drawing an appropriate straight line on the grid, solve the equation $1 + 2x^2 - x^3 = x$.

Answer $x = \dots\dots\dots$ [2]

- (f) Find the range of values of k such that $1 + 2x^2 - x^3 = k$ has 3 solutions.

Answer $\dots\dots\dots$ [2]

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