

What is the remainder when $x^3 + 3x^2 - 5x - 6$ is divided by $(x - 2)$?

- A 0
- B 3
- C 4
- D 8

(a) Given that $(x - 1)$ is a factor of $x^3 + 3x^2 + x - 5$, factorise this cubic fully. 4

(b) Show that the curve with equation

$$y = x^4 + 4x^3 + 2x^2 - 20x + 3$$

has only one stationary point.

Find the x -coordinate and determine the nature of this point. 5

(a) (i) Show that $(x - 4)$ is a factor of $x^3 - 5x^2 + 2x + 8$.

(ii) Factorise $x^3 - 5x^2 + 2x + 8$ fully.

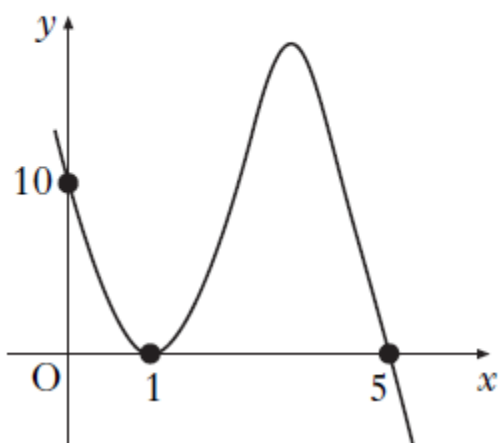
(iii) Solve $x^3 - 5x^2 + 2x + 8 = 0$. 6

(a) (i) Show that $(x - 1)$ is a factor of $f(x) = 2x^3 + x^2 - 8x + 5$.

(ii) Hence factorise $f(x)$ fully. 5

(b) Solve $2x^3 + x^2 - 8x + 5 = 0$. 1

The diagram shows the graph with equation $y = k(x - 1)^2(x + t)$.



What are the values of k and t ?

	k	t
A	-2	-5
B	-2	5
C	2	-5
D	2	5

2. $f(x) = x^3 - x^2 - 5x - 3$.

(a) (i) Show that $(x + 1)$ is a factor of $f(x)$.

(ii) Hence or otherwise factorise $f(x)$ fully.

5

(b) One of the turning points of the graph of $y = f(x)$ lies on the x -axis.

Write down the coordinates of this turning point.

1

Functions f , g and h are defined on the set of real numbers by

- $f(x) = x^3 - 1$
- $g(x) = 3x + 1$
- $h(x) = 4x - 5$.

(a) Find $g(f(x))$.

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(b) Show that $g(f(x)) + xh(x) = 3x^3 + 4x^2 - 5x - 2$.

1

(c) (i) Show that $(x - 1)$ is a factor of $3x^3 + 4x^2 - 5x - 2$.

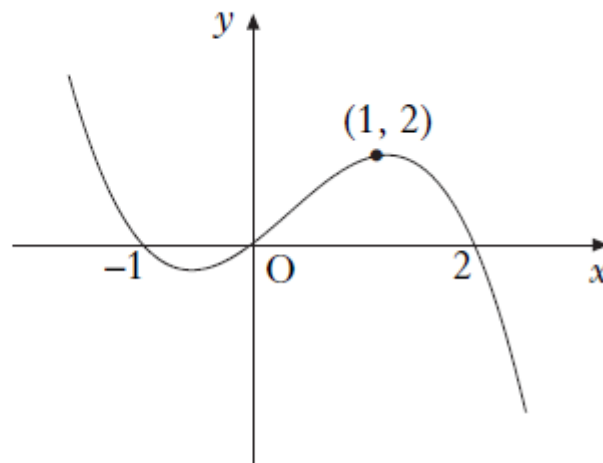
(ii) Factorise $3x^3 + 4x^2 - 5x - 2$ fully.

5

(d) Hence solve $g(f(x)) + xh(x) = 0$.

1

The diagram shows the graph of a cubic.



What is the equation of this cubic?

- A $y = -x(x + 1)(x - 2)$
- B $y = -x(x - 1)(x + 2)$
- C $y = x(x + 1)(x - 2)$
- D $y = x(x - 1)(x + 2)$