

Factor Theorem

For AQA Level 2 Certificate in Further Mathematics (8365)

Name _____

Total marks: **28**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

- 1** You want to use the factor theorem to test whether $(3x + 2)$ is a factor of a polynomial $f(x)$

Which value of x should you substitute into $f(x)$?

Circle your answer.

[1 mark]

$x = -\frac{3}{2}$

$x = -\frac{2}{3}$

$x = \frac{2}{3}$

$x = 2$

- 2** $p(x) = x^4 + 3x^3 + x^2 + 4$

Use the factor theorem to show that $(x + 2)$ is a factor of $p(x)$

[2 marks]

3 $(x - 5)(x^2 + ax + b) \equiv x^3 - 2x^2 - 13x - 10$

(a) Work out the values of a and b .

[2 marks]

$a =$ _____ $b =$ _____

(b) Hence factorise $x^3 - 2x^2 - 13x - 10$ fully.

[1 mark]

Answer _____

4 $f(x) = 3x^3 + 4x^2 - 13x + 6$

(a) By working out $f\left(\frac{2}{3}\right)$, show that $(3x - 2)$ is a factor of $f(x)$

[2 marks]

(b) Factorise $f(x)$ fully and hence solve $f(x) = 0$

[3 marks]

Answer _____

- 5 $(2x + 1)$ is a factor of $4x^4 + ax^3 - 3x + 1$
Work out the value of a .

[3 marks]

$a =$ _____

6 $f(x) = x^3 - 5x^2 + x + 3$

- (a) Use the factor theorem to find a linear factor of $f(x)$

[2 marks]

Answer _____

- (b) Hence solve $f(x) = 0$

Give the two non-integer solutions in the form $p \pm \sqrt{q}$, where p and q are integers.

[3 marks]

Answer _____

- 7 $(x - 2)$ is a factor of $g(x) = 4x^3 - 4x^2 - 7x - 2$

Kofi says,

“ $g(x) = 0$ is a cubic equation, so it must have three different solutions.”

Show that Kofi is wrong.

[3 marks]

- 8 $f(x) = 2x^3 + ax^2 + bx + 12$, where a and b are constants.

$(x + 4)$ is a factor of $f(x)$

$f(1) = -10$

(a) Work out the values of a and b .

[4 marks]

$a =$ _____ $b =$ _____

(b) Factorise $f(x)$ fully.

[2 marks]

Answer _____