



AQA IGCSE FM "Full Coverage": Factor & Remainder Theorems

This worksheet is designed to cover one question of each type seen in past papers, for each AQA IGCSE Further Maths topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise* → *Past Papers/Worksheets* (or *Library* → *Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Use the factor theorem to show that a polynomial has a linear expression as a factor.

[AQA IGCSE FM Practice paper set 4 P1 Q14a]

Show that $(x - 2)$ is a factor of $x^3 + 8x^2 + x - 42$

Question 2

Categorisation: Use the factor theorem to determine an algebraic coefficient.

[AQA IGCSE FM Practice paper set 3 P1 Q12a Edited]

$(x + 3)$ is a factor of $x^3 + 6x^2 + ax - 12$

Find the value of a .

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Question 3

Categorisation: As above, but use the factor theorem twice to form simultaneous equations.

[AQA IGCSE FM Jan2013-P2 Q22]

$$f(x) = x^3 + ax^2 + bx + 24 \text{ for all values of } x .$$

Two of the factors of $f(x)$ are $(x - 2)$ and $(x + 3)$.

Work out the values of a and b .

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Question 4

Categorisation: As above, but where the factor itself has an unknown value.

[AQA IGCSE FM June2014-P1 Q14a Edited]

$$(x - a) \text{ is a factor of } x^3 + 2ax^2 - a^2x - 16$$

Find the value of a .

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Question 5

Categorisation: Use one given factor to determine the other factors of a question.

[AQA IGCSE FM Practice paper set 4 P1 Q14b Edited]

It can be shown that $(x - 2)$ is a factor of $x^3 + 8x^2 + x - 42$

Hence, or otherwise, work out **all** solutions of $x^3 + 8x^2 + x - 42 = 0$

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Question 6

Categorisation: As above, but where no initial factor is given (and thus the factor theorem needs to be used to establish an initial factor by trial and error)

[AQA IGCSE FM SAM P2 Q21]

Factorise fully $x^3 - 4x^2 - 11x + 30$

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Question 7

Categorisation: As per Question 6.

[AQA IGCSE FM Practice paper set 2 P2 Q20]

Factorise fully

$$x^3 + 4x^2 - 25x - 28$$

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Question 8

Categorisation: Show a linear expression is not a factor of a polynomial.

[AQA IGCSE FM June2015-P2 Q19 Edited]

Use the factor theorem to show that $(x - 3)$ is not a factor of $x^3 - 10x - 3$

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Answers

Question 1

$$f(2) = 2^3 + 8(2^2) + 2 - 42 = 0$$

$\therefore (x - 2)$ is a factor

Question 2

$$a = 5$$

Question 3

$$a = -3, b = -10$$

Question 4

$$a = 2$$

Question 5

$$x = 2 \text{ or } x = -3 \text{ or } x = -7$$

Question 6

$$(x - 2)(x - 5)(x + 3)$$

Question 7

$$(x + 1)(x - 4)(x + 7)$$

Question 8

$$f(3) = 3^3 - 10(3) - 3 = -6$$

$-6 \neq 0$ therefore $(x - 3)$ is not a factor.