AQA Qualifications

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8360)

Worksheet 10

Factor Theorem

Version 2.0

Our specification is published on our website (www.aqa.org.uk). We will let centres know in writing about any changes to the specification. We will also publish changes on our website. The definitive version of our specification will always be the one on our website, this may differ from printed versions.

You can get further copies of this Teacher Resource from:
The GCSE Mathematics Department
AQA
Devas Street
Manchester
M16 6EX

Or, you can download a copy from our All About Maths website (http://allaboutmaths.aqa.org.uk/).

Copyright © 2012 AQA and its licensors. All rights reserved.

AQA retains the copyright on all its publications, including the specifications. However, registered centres for AQA are permitted to copy material from this specification booklet for their own internal use.

AQA Education (AQA) is a registered charity (number 1073334) and a company limited by guarantee registered in England and Wales (number 3644723). Our registered address is AQA, Devas Street, Manchester M15 6EX.

10 Factor Theorem

Question 1

(a) Show that $x(x + 4)(x - 9) = x^3 - 5x^2 - 36x$ *(1 mark)*

(b) Write down the x values of the three points where the graph of $y = x^3 - 5x^2 - 36x$ crosses the x-axis. *(2 marks)*

Question 2

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

(a) Work out f(1) and f(–1) *(2 marks)*

(b) Work out f(2) and f(–2) *(2 marks)*

(c) Work out f(3) and f(–3) *(2 marks)*

(d) Write down the three linear factors of f(x). *(1 mark)*

Question 3

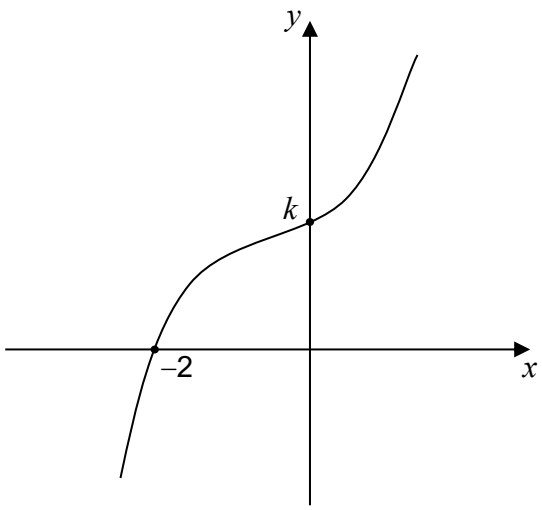
(a) Show that $(x + 5)$ is a factor of $x^3 + 7x^2 + 2x - 40$ *(2 marks)*

(b) Work out the other two linear factors of $x^3 + 7x^2 + 2x - 40$ *(3 marks)*

(c) Hence, solve $x^3 + 7x^2 + 2x - 40 = 0$ *(1 mark)*

Question 4

A sketch of $y = x^3 + 5x^2 + 9x + k$ where k is an integer, is shown.



Work out the value of k. *(3 marks)*

Question 5

(a) $(x + 3)$ is a factor of $f(x) = x^3 + x^2 + ax - 72$ where a is an integer.

Work out the value of a. *(3 marks)*

(b) Work out the other linear factors of $f(x)$. *(3 marks)*

Question 6

$(x - 3)$ and $(x + 4)$ are factors of $f(x) = x^3 + ax^2 + bx + 24$ where *a* and *b* are integers.

(a) Work out the third linear factor of $f(x)$. *(2 marks)*

(b) Work out the values of a and b. *(4 marks)*

Question 7

(a) $(x - 5)$ is a factor of $f(x) = x^3 + kx^2 + 9x - 20$ where k is an integer.

Work out the value of k. *(3 marks)*

(b) Express $f(x)$ as a product of $(x - 5)$ and a quadratic factor. *(2 marks)*

(c) Show that $(x - 5)$ is the only linear factor of $f(x)$. *(2 marks)*

Question 8

Solve $x^3 - 6x^2 - 25x - 18 = 0$ *(5 marks)*