

QQQ – Pure Year 1 – Chapter 7 – Polynomials (Version 2)

Total Marks: 24

(24 = Platinum, 22 = Gold, 19 = Silver, 16 = Bronze)

1. Given that $(x - 2)$ is a factor of $2x^3 + kx - 4$, find the value of the constant k . [2]

(Total 2 marks)

OCR A October 2021 Paper 2 Q1

2. Simplify fully $\frac{2x^2 + 9x - 18}{12x^2 - 8x - 15}$ [3 marks]

(Total 3 marks)

AQA June 2024 Paper 2 Q15

3. Kaya is investigating the function

$$f(x) = 2x^3 - 7x^2 - 12x + 45$$

Kaya makes two statements.

Statement 1: $f(3) = 0$

Statement 2: this shows that $(x + 3)$ must be a factor of $f(x)$.

- (a) State, with a reason, whether each of Kaya's statements is correct. [2 marks]

- (b) Fully factorise $f(x)$. [3 marks]

(Total 5 marks)

AQA June 2022 Paper 2 Q5

4. The polynomial $x^3 - 4x^2 + 10x - 21$ is denoted by $f(x)$.

- (a) Use the factor theorem to show that $(x - 3)$ is a factor of $f(x)$. [2]

- (b) The polynomial $f(x)$ can be written as $(x - 3)(x^2 + bx + c)$ where b and c are constants.
Find the values of b and c . [2]

- (c) Show that $x = 3$ is the only real root of the equation $f(x) = 0$. [2]

(Total 6 marks)

OCR MEI June 2024 Paper 1 Q6

5.

In this question you must show all stages of your working.

Solutions relying entirely on calculator technology are not acceptable.

$$f(x) = 2x^3 - 3ax^2 + bx + 8a$$

where a and b are constants.

Given that $(x - 4)$ is a factor of $f(x)$,

(a) use the factor theorem to show that

$$10a = 32 + b$$

(2)

Given also that $(x - 2)$ is a factor of $f(x)$,

(b) express $f(x)$ in the form

$$f(x) = (2x + k)(x - 4)(x - 2)$$

where k is a constant to be found.

(4)

(c) Hence,

(i) state the number of real roots of the equation $f(x) = 0$

(ii) write down the largest root of the equation $f\left(\frac{1}{3}x\right) = 0$

(2)

(Total 8 marks)