



Additional Math with Ali Hashir
The Remainder Theorem
 Answers

CIE O Level Additional Mathematics 4037 • Total: 52 marks

Easy (Q1–Q2)

Q1. Remainder = $f(2) = 3$

Q2. Remainder = $f(-2) = 5$

Medium (Q3–Q7)

Q3. Remainder = $f\left(\frac{1}{2}\right) = -\frac{3}{2}$

Q4. $p = 0$ or $p = \frac{1}{3}$

Q5. $a = -6$, $b = -1$

Q6. $a = 6$, $b = -1$; remainder on division by $x - 1$ is 3

Q7. $a = -2$, $p = 2$

Hard (Q8–Q10)

Q8. $b = 3a - 5$; remainder = $32 - 8a$

Q9 (a). $Q(x)$ has degree 1; the remainder has degree less than 2, so it is at most linear, i.e. of the form $ax + b$

Q9 (b). $a = 5$, $b = -14$

Q10. $p = -1$, $q = 3$

Extra Challenge

(i). $x^2 + 2 = 0$ has no real solution (since $x^2 \geq 0$ gives $x^2 + 2 \geq 2$), so there is no value of x that makes the divisor zero

(ii). $3u^2 - 5u + 4 = (u + 2)(3u - 11) + 26$ with $u = x^2$; remainder = 26

(iii). $p = 3$, $q = 8$

Full worked solutions available at the website.

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