

QQQ – Core Pure 1 – Chapter 4 – Roots of Polynomials (Version 1)

Total Marks: 24

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

1. The quadratic equation $x^2 + px + q = 0$ has roots α and β

Which of the following is equal to $\alpha\beta$?

Circle your answer.

[1 mark]

- p
- $-p$
- q
- $-q$

(Total 1 marks)

AQA AS June 2022 Paper 1 Q2

2. The quartic equation

$$3x^4 + x^2 - 5x - 11 = 0$$

has roots α, β, γ and δ

(a) Write down the value of $\alpha\beta\gamma\delta$

[1 mark]

(b) Write down the value of $\alpha\beta\gamma + \alpha\beta\delta + \alpha\gamma\delta + \beta\gamma\delta$

[1 mark]

(Total 2 marks)

AQA AS June 2025 Paper 1 Q5

3. The roots of the equation $2x^2 + 3x + 5 = 0$ are denoted by α and β .

(a) Write down the value of $\alpha + \beta$ and the value of $\alpha\beta$.

[2]

(b) Using the answers to part (a) determine the value of each of the following.

- $\alpha^2 + \beta^2$
- $\frac{1}{\alpha} + \frac{1}{\beta}$

[4]

(Total 6 marks)

OCR A AS June 2025 Paper 1 Q3

4. The equation $2x^3 - 2x^2 + 8x - 15 = 0$ has roots α, β and γ .

Determine the value of $\alpha^2 + \beta^2 + \gamma^2$.

[4]

(Total 4 marks)

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5. The cubic equation

$$z^3 - 3z^2 + z + 5 = 0$$

has roots α, β and γ .

Without solving the equation, find the cubic equation whose roots are $(2\alpha + 1)$, $(2\beta + 1)$ and $(2\gamma + 1)$, giving your answer in the form $w^3 + pw^2 + qw + r = 0$, where p, q and r are integers to be found.

(5)

(Total 5 marks)

Edexcel AS June 2018 Paper 1 Q2

6. The three roots of the equation

$$4x^3 - 12x^2 - 13x + k = 0$$

where k is a constant, form an arithmetic sequence.

Find the roots of the equation.

[6 marks]

(Total 6 marks)

AQA A2 June 2020 Paper 1 Q8