4.1) Roots of a quadratic equation

Worked example

The roots of the quadratic equation $2x^2 + 5x + 4 = 0$ are α and β. Without solving the equation, find the values of:

(a) $\alpha + \beta$ (b) $\alpha\beta$ (c) $\frac{1}{\alpha} + \frac{1}{\beta}$ (d) $\alpha^2 + \beta^2$

Your turn

The roots of the quadratic equation $2x^2 - 5x - 4 = 0$ are α and β. Without solving the equation, find the values of:

(a) $\alpha + \beta$ (b) $\alpha\beta$ (c) $\frac{1}{\alpha} + \frac{1}{\beta}$ (d) $\alpha^2 + \beta^2$

(a) $\frac{5}{2}$

(b) -2

(c) $-\frac{5}{4}$

(d) $\frac{41}{4}$

Worked example

The roots of the quadratic equation $6x^2 + 9x - 2 = 0$ are α and β. Without solving the equation, find the value of $\alpha^3 + \beta^3$

Your turn

The roots of the quadratic equation $6x^2 - 9x + 2 = 0$ are α and β. Without solving the equation, find the value of $\alpha^3 + \beta^3$

$$\frac{15}{8}$$

Worked example

The roots of a quadratic equation $ax^2 + bx + c = 0$ are $\alpha = \frac{3}{2}$ and $\beta = -\frac{5}{4}$.

Find integer values for a, b and c

Your turn

The roots of a quadratic equation $ax^2 + bx + c = 0$ are $\alpha = -\frac{3}{2}$ and $\beta = \frac{5}{4}$.

Find integer values for a, b and c

$$a = 8, b = 2, c = -15$$

Worked example

The equation $ax^2 + 6x + c = 0$, where a and c are real constants, has roots α and α^*. Given that $Re(\alpha) = 1$ and $Im(\alpha) = 4i$, find the values of a and c

Your turn

The equation $ax^2 + 8x + c = 0$, where a and c are real constants, has roots α and α^*. Given that $Re(\alpha) = 2$ and $Im(\alpha) = 3i$, find the values of a and c

$a = -2, c = -26$