1   (i) Solve the equation $2x^2 + 3x = 0$.   [2]

    (ii) Find the set of values of k for which the equation $2x^2 + 3x - k = 0$ has no real roots.   [3]

2   Make x the subject of the equation $y = \dfrac{x+3}{x-2}$.   [4]

3   Solve the equation $y^2 - 7y + 12 = 0$.

    Hence solve the equation $x^4 - 7x^2 + 12 = 0$.   [4]

4   (i) Write $\sqrt{48} + \sqrt{3}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible.   [2]

    (ii) Simplify $\dfrac{1}{5+\sqrt{2}} + \dfrac{1}{5-\sqrt{2}}$.   [3]

5   Solve the equation $\dfrac{4x+5}{2x} = -3$.   [3]

6   Make a the subject of the equation

$$2a + 5c = af + 7c.$$ [3]

7 Find the set of values of k for which the equation $2x^2 + kx + 2 = 0$ has no real roots. [4]

8 One root of the equation $x^3 + ax^2 + 7 = 0$ is $x = -2$. Find the value of a. [2]

9 n is a positive integer. Show that $n^2 + n$ is always even. [2]

10 Make C the subject of the formula $P = \dfrac{C}{C+4}$. [4]

11 **(i)** Find the range of values of k for which the equation $x^2 + 5x + k = 0$ has one or more real roots. [3]

(ii) Solve the equation $4x^2 + 20x + 25 = 0$. [2]