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 \(y = \frac{x + 3}{x - 2}.\)  \[4\]

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 \(\frac{1}{5 + \sqrt{2}} + \frac{1}{5 - \sqrt{2}}.\)  \[3\]

5  Solve the equation \(\frac{4x + 5}{2x} = -3.\)  \[3\]

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 $P = \frac{C}{C + 4}$. [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]