# Additional Mathematics

18/1/05

## Chapter 2: Algebra II - Techniques

### Chapter Assessment

1 Solve the following inequalities and represent their solutions on a number line.

(i) $3x + 4 < 7$ [2]

(ii) $\frac{(x-1)}{4} \geq 5$ [2]

(iii) $2 \leq 3x - 5 < 9$ [4]

2 Solve the following inequalities and represent their solutions on a number line.

(i) $x^2 - 7x + 12 < 0$ [4]

(ii) $x^2 - 4x + 3 > 0$ [5]

3 Simplify the following:

(i) $\frac{3(x+2)}{(8x+16)}$ [1]

(ii) $\frac{x}{3} + \frac{2x}{5}$ [2]

(iii) $\frac{2x+4}{x^2 - x - 6}$ [3]

(iv) $\frac{2}{x} - \frac{3}{x-1}$ [2]

4 Solve the equation: $\frac{6}{x} - \frac{2}{x+5} = 1$. [5]

5 Simplify the following:

(i) $\sqrt{128}$ [1]

(ii) $2\sqrt{27} - \sqrt{3}$ [2]

(iii) $\left(\sqrt{2} + \sqrt{3}\right)^2 + \left(\sqrt{2} - \sqrt{3}\right)^2$ [3]

6 Simplify the following by rationalising the denominator.

(i) $\frac{2}{\sqrt{2}}$ [1]

(ii) $\frac{3}{\sqrt{27}}$ [2]

7 Solve the quadratic equation: $x^2 + 3x - 7 = 0$, giving your answers exactly. [4]

8 Paul drives along a motorway for $t$ hours and averages 90 km/h.
The following hour he only drives 30 km, as a result of which his average speed for the whole journey drops to 78 km/h.

(i) Write down the total distance travelled in the first $t$ hours and $(t + 1)$ hours. [2]

(ii) Write down the average speed for the first $(t + 1)$ hours in terms of $t$.
Formulate an equation in $t$ and solve it to find the value of $t$. [5]

9 A jackpot of £1540 is to be shared equally amongst the winners.
If the number of winners is increased by 3 then amount that each receives is reduced by £66.
Find the number of winners. [10]

Total: 60