

## Section 1: Surds

### Exercise level 2

Do not use a calculator in this exercise.

1. Write these in terms of the simplest possible surd.

(i)  $\sqrt{6} \times \sqrt{27}$                       (ii)  $\sqrt{12} \times \sqrt{15}$                       (iii)  $\sqrt{10} \times \sqrt{24} \times \sqrt{15}$

2. Multiply out the brackets and simplify as far as possible.

(i)  $(\sqrt{2} + 2\sqrt{3})(5\sqrt{2} - \sqrt{3})$                       (ii)  $(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2})$

(iii)  $(\sqrt{2} - \sqrt{8})^2$                       (iv)  $(3 + \sqrt{3})(3 - \sqrt{3})$

(v)  $(1 + 2\sqrt{3} - \sqrt{5})^2$

3. Rationalise the denominators of the following.

(i)  $\frac{1 - \sqrt{3}}{2 - \sqrt{3}}$                       (ii)  $\frac{1 + 2\sqrt{5}}{3 - \sqrt{5}}$

(iii)  $\frac{1 + \sqrt{2}}{\sqrt{3} + \sqrt{2}}$                       (iv)  $\frac{\sqrt{6} + \sqrt{3}}{\sqrt{6} - \sqrt{3}}$

4. Express each of the following expressions as a single rational fraction, leaving a rational denominator.

(i)  $\frac{2}{\sqrt{7}} + \frac{3}{\sqrt{2}}$                       (ii)  $\frac{1}{3 - \sqrt{2}} + \frac{2}{2 - \sqrt{3}}$

(iii)  $\frac{3}{\sqrt{x}} - \frac{\sqrt{x}}{4}$                       (iv)  $\frac{1}{x + \sqrt{y}} + \frac{1}{x - \sqrt{y}}$