

Surds:

1. $\sqrt{3} \times 2$

2. $3\sqrt{5} \times 2\sqrt{5}$

3. $\sqrt{8}$

4. $\sqrt{12} + \sqrt{27}$

5. $(\sqrt{8} + 1)(\sqrt{2} - 3)$

Extension:

[SMC 2014 Q24] Which of the following is smallest?

- $10 - 3\sqrt{11}$
- $8 - 3\sqrt{7}$
- $5 - 2\sqrt{6}$
- $9 - 4\sqrt{5}$
- $7 - 4\sqrt{3}$

[SMC 2012 Q21] Which of the following numbers does *not* have a square root in the form $x + y\sqrt{2}$, where x and y are positive integers?

- $17 + 12\sqrt{2}$
- $22 + 12\sqrt{2}$
- $38 + 12\sqrt{2}$
- $54 + 12\sqrt{2}$
- $73 + 12\sqrt{2}$

Rationalising the denominator:

Examples:

1. $\frac{3}{\sqrt{2}}$

2. $\frac{6}{\sqrt{3}}$

3. $\frac{7}{\sqrt{7}}$

4. $\frac{15}{\sqrt{5}} + \sqrt{5}$

Test your understanding:

$$\frac{12}{\sqrt{3}}$$

$$\frac{2}{\sqrt{6}}$$

$$\frac{4\sqrt{2}}{\sqrt{8}}$$

More Complicated Examples:

1. $\frac{3}{\sqrt{6}-2}$

2. $\frac{4}{\sqrt{3}+1}$

3. $\frac{3\sqrt{2}+4}{5\sqrt{2}-7}$

Test Your Understanding: Rationalise the denominator and simplify

1. $\frac{4}{\sqrt{5}-2}$

2. $\frac{2\sqrt{3}-1}{3\sqrt{3}+1}$

3. Solve $y(\sqrt{3}-1) = 8$

Give your answer in the form $a + b\sqrt{3}$ where a and b are integers.