

## 5H Revision on Surds

**Rules of Surds:**  $\sqrt{ab} = \sqrt{a}\sqrt{b}$  and  $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

### 1. Simplify the following surds:

- |                |                |                 |                |
|----------------|----------------|-----------------|----------------|
| a. $\sqrt{12}$ | b. $\sqrt{20}$ | c. $\sqrt{18}$  | d. $\sqrt{27}$ |
| e. $\sqrt{8}$  | f. $\sqrt{24}$ | g. $\sqrt{28}$  | h. $\sqrt{32}$ |
| i. $\sqrt{45}$ | j. $\sqrt{48}$ | k. $\sqrt{44}$  | l. $\sqrt{63}$ |
| m. $\sqrt{50}$ | n. $\sqrt{54}$ | o. $\sqrt{200}$ |                |

### 2. Add or subtract these surds

- |                            |                            |                            |                            |
|----------------------------|----------------------------|----------------------------|----------------------------|
| a. $4\sqrt{2} + 3\sqrt{2}$ | b. $5\sqrt{2} - 3\sqrt{2}$ | c. $6\sqrt{3} + 2\sqrt{3}$ | d. $6\sqrt{3} - 2\sqrt{3}$ |
| e. $\sqrt{5} + \sqrt{5}$   | f. $\sqrt{5} - \sqrt{5}$   | g. $8\sqrt{2} + 2\sqrt{2}$ | h. $2\sqrt{3} - \sqrt{3}$  |
| i. $3\sqrt{3} + 3\sqrt{3}$ |                            |                            |                            |

### 3. Simplify:

- |                            |                            |                             |                            |
|----------------------------|----------------------------|-----------------------------|----------------------------|
| a. $\sqrt{8} + \sqrt{2}$   | b. $\sqrt{18} - \sqrt{2}$  | c. $\sqrt{125} - 5\sqrt{5}$ | d. $\sqrt{48} - \sqrt{12}$ |
| e. $\sqrt{32} + \sqrt{18}$ | f. $\sqrt{75} - \sqrt{12}$ | g. $\sqrt{45} - \sqrt{20}$  | h. $\sqrt{63} - \sqrt{28}$ |

### 4. Simplify:

- |                                |                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| a. $\sqrt{2} \times \sqrt{2}$  | b. $\sqrt{6} \times \sqrt{6}$  | c. $\sqrt{2} \times \sqrt{50}$ | d. $\sqrt{3} \times \sqrt{12}$ |
| e. $\sqrt{3} \times \sqrt{27}$ | f. $\sqrt{10} \times \sqrt{2}$ | g. $\sqrt{3} \times \sqrt{15}$ | h. $\sqrt{5} \times \sqrt{10}$ |

### 5. Multiply out the brackets:

- |                                   |   |   |
|-----------------------------------|---|---|
| a. $(2 + \sqrt{2})(3 + \sqrt{2})$ | b. $(2 + \sqrt{2})(3 - \sqrt{2})$   | c. $(5 - \sqrt{3})(5 + \sqrt{3})$   |
| d. $(\sqrt{3} - \sqrt{2})^2$      | e. $\left(\frac{1}{\sqrt{2}} + \sqrt{2}\right)\left(\frac{1}{\sqrt{2}} - \sqrt{2}\right)$ | f. $\frac{2}{\sqrt{3}}\left(\frac{1}{\sqrt{3}} - \frac{\sqrt{3}}{2}\right)$ |

**6. Rationalise the denominator and simplify where possible:**

a.  $\frac{1}{\sqrt{6}}$

b.  $\frac{1}{\sqrt{7}}$

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

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

e.  $\frac{5}{\sqrt{10}}$

f.  $\frac{1}{\sqrt{11}}$

g.  $\frac{4}{\sqrt{2}}$

h.  $\frac{20}{\sqrt{5}}$

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

j.  $\frac{12}{\sqrt{6}}$

**7. Rationalise the denominator and simplify where possible:**

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

b.  $\frac{1}{\sqrt{5}-1}$

c.  $\frac{1}{\sqrt{2}+1}$

d.  $\frac{1}{2+\sqrt{2}}$

e.  $\frac{1}{\sqrt{2}-1}$

f.  $\frac{1}{\sqrt{3}+1}$

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