

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