Simplifying Surds with Operations

Mathematicards *Grade 5–7*

PRO TIP: Square Factors

To simplify a surd, find the largest square number that is a factor of the radicand.

- $\sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}$
- $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$

Section 1: The Essentials (Grade 5–6)

Simplify the following surds completely.

1. $\sqrt{12}$
2. $\sqrt{20}$
3. $\sqrt{50}$
4. $\sqrt{72}$
5. $\sqrt{80}$
6. $\sqrt{45}$
7. $\sqrt{200}$
8. $\sqrt{300}$
9. $2\sqrt{28}$
10. $3\sqrt{44}$
11. $5\sqrt{48}$
12. $10\sqrt{54}$

PRO TIP: Like Surds

You can only add or subtract “like” surds (surds with the same radicand). Always simplify first to see if surds can be combined!

- $2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$
- $\sqrt{2} + \sqrt{3}$ (Cannot be simplified)

Section 2: Addition and Subtraction (Grade 7)

Simplify by collecting like terms.

13. $\sqrt{8} + \sqrt{18}$
14. $\sqrt{27} + \sqrt{75}$
15. $\sqrt{20} + \sqrt{45}$
16. $\sqrt{50} - \sqrt{32}$
17. $4\sqrt{18} - \sqrt{2}$
18. $\sqrt{12} + \sqrt{48} - \sqrt{27}$

19. $2\sqrt{20} + 3\sqrt{80}$

20. $\sqrt{150} - \sqrt{54} + \sqrt{24}$