

# SIMPLIFYING SURDS

USE THE FIRST FIFTEEN SQUARE NUMBERS TO HELP YOU SIMPLIFY THESE SURDS

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 255 (BUT DON'T USE 1)

Using non-square factors in this process is not the most efficient way to simplify surds

For example  $\sqrt{20} = \sqrt{2} \times \sqrt{10}$  is not a simplification as both factors are SURDS

$$\begin{aligned}\sqrt{20} &= \sqrt{4} \times \sqrt{5} && \text{can be used as 4 is a square number and } \sqrt{4} = 2 \\ &= 2\sqrt{5}\end{aligned}$$

If possible try to find the highest square factor  $\sqrt{72} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$  as

$\sqrt{72} = \sqrt{4} \times \sqrt{18} = 2 \times \sqrt{9} \times \sqrt{2} = 2 \times 3\sqrt{2} = 6\sqrt{2}$  gives the same answer,  
but takes much longer!

Now try these

1.  $\sqrt{12}$

2.  $\sqrt{20}$

3.  $\sqrt{27}$

4.  $\sqrt{40}$

5.  $\sqrt{32}$

6.  $\sqrt{18}$

7.  $\sqrt{50}$

8.  $\sqrt{45}$

9.  $\sqrt{8}$

10.  $\sqrt{99}$

11.  $\sqrt{90}$

12.  $\sqrt{200}$

13.  $\sqrt{24}$

14.  $\sqrt{28}$

15.  $\sqrt{75}$

16.  $\sqrt{500}$

17.  $\sqrt{108}$

18.  $\sqrt{98}$

19.  $\sqrt{288}$

20.  $\sqrt{1000}$

SOLUTIONS

1. $2\sqrt{3}$	2. $2\sqrt{5}$	3. $3\sqrt{3}$	4. $2\sqrt{10}$
5. $4\sqrt{2}$	6. $3\sqrt{2}$	7. $5\sqrt{2}$	8. $3\sqrt{5}$
9. $2\sqrt{2}$	10. $3\sqrt{11}$	11. $3\sqrt{10}$	12. $10\sqrt{2}$
13. $2\sqrt{6}$	14. $2\sqrt{7}$	15. $5\sqrt{3}$	16. $10\sqrt{5}$
17. $6\sqrt{3}$	18. $7\sqrt{2}$	19. $12\sqrt{2}$	20. $10\sqrt{10}$