

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Topic: \_\_\_\_\_

**SURDS**

Simplify each of the following surds.

1.  $\sqrt{50}$

\_\_\_\_\_

2.  $\sqrt{28}$

\_\_\_\_\_

3.  $\sqrt{63}$

\_\_\_\_\_

4.  $\sqrt{180}$

\_\_\_\_\_

5.  $\sqrt{363}$

\_\_\_\_\_

6.  $\sqrt{117}$

\_\_\_\_\_

7.  $\sqrt{5} + 2\sqrt{5}$

\_\_\_\_\_

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

\_\_\_\_\_

9.  $7\sqrt{2} - \sqrt{8}$

\_\_\_\_\_

10.  $5\sqrt{12} + 6\sqrt{3} - 2\sqrt{2}$

\_\_\_\_\_

11.  $5\sqrt{2} \times \sqrt{3}$

\_\_\_\_\_

12.  $6\sqrt{7} \times 4\sqrt{3}$

\_\_\_\_\_

13.  $5\sqrt{6} \times 8\sqrt{2} \times \sqrt{5}$

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14.  $15\sqrt{6} \div 3\sqrt{2}$

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15.  $2\sqrt{3} \div \sqrt{12}$

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16.  $(\sqrt{3} + 4)(\sqrt{2} - 1)$

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For each of the following, express with a rational denominator in simplest form.

17.  $\frac{5}{\sqrt{6}}$

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18.  $\frac{\sqrt{3}}{2\sqrt{5}}$

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19.  $\frac{7}{\sqrt{6} + 2}$

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20.  $\frac{9}{3\sqrt{2} - 5}$

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**SURDS**

Simplify each of the following surds.

$$\begin{aligned} 1. \quad & \sqrt{50} \\ & = \sqrt{25 \times 2} \\ & = 5\sqrt{2} \end{aligned}$$

$$\begin{aligned} 2. \quad & \sqrt{28} \\ & = \sqrt{4 \times 7} \\ & = 2\sqrt{7} \end{aligned}$$

$$\begin{aligned} 3. \quad & \sqrt{63} \\ & = \sqrt{9 \times 7} \\ & = 3\sqrt{7} \end{aligned}$$

$$\begin{aligned} 4. \quad & \sqrt{180} \\ & = \sqrt{9 \times 10} \\ & = 3\sqrt{10} \end{aligned}$$

$$\begin{aligned} 5. \quad & \sqrt{363} \\ & = \sqrt{121 \times 3} \\ & = 11\sqrt{3} \end{aligned}$$

$$\begin{aligned} 6. \quad & \sqrt{117} \\ & = \sqrt{9 \times 13} \\ & = 3\sqrt{13} \end{aligned}$$

$$\begin{aligned} 7. \quad & \sqrt{5} + 2\sqrt{5} \\ & = 3\sqrt{5} \end{aligned}$$

$$\begin{aligned} 8. \quad & 3\sqrt{2} - 5\sqrt{3} + 2\sqrt{3} \\ & = 3\sqrt{2} - 3\sqrt{3} \end{aligned}$$

$$\begin{aligned} 9. \quad & 7\sqrt{2} - \sqrt{8} \\ & = 7\sqrt{2} - 2\sqrt{2} \\ & = 5\sqrt{2} \end{aligned}$$

$$\begin{aligned} 10. \quad & 5\sqrt{12} + 6\sqrt{3} - 2\sqrt{2} \\ & = 10\sqrt{3} + 6\sqrt{3} - 2\sqrt{2} \\ & = 16\sqrt{3} - 2\sqrt{2} \end{aligned}$$

$$\begin{aligned} 11. \quad & 5\sqrt{2} \times \sqrt{3} \\ & = 5\sqrt{6} \end{aligned}$$

$$\begin{aligned} 12. \quad & 6\sqrt{7} \times 4\sqrt{3} \\ & = 24\sqrt{21} \end{aligned}$$

$$\begin{aligned} 13. \quad & 5\sqrt{6} \times 8\sqrt{2} \times \sqrt{5} \\ & = 40\sqrt{60} \\ & = 40 \times 2\sqrt{15} \\ & = 80\sqrt{15} \end{aligned}$$

$$\begin{aligned} 14. \quad & 15\sqrt{6} \div 3\sqrt{2} \\ & = 5\sqrt{3} \end{aligned}$$

$$\begin{aligned} 15. \quad & 2\sqrt{3} \div \sqrt{12} \\ & = \frac{2\sqrt{3}}{\sqrt{4 \times 3}} \\ & = 1 \end{aligned}$$

$$\begin{aligned} 16. \quad & (\sqrt{3} + 4)(\sqrt{2} - 1) \\ & = \sqrt{6} + 4\sqrt{2} - \sqrt{3} - 4 \end{aligned}$$

For each of the following, express with a rational denominator in simplest form.

$$\begin{aligned} 17. \quad & \frac{5}{\sqrt{6}} \\ & = \frac{5}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} \\ & = \frac{5\sqrt{6}}{6} \end{aligned}$$

$$\begin{aligned} 18. \quad & \frac{\sqrt{3}}{2\sqrt{5}} \\ & = \frac{\sqrt{3}}{2\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} \\ & = \frac{\sqrt{15}}{10} \end{aligned}$$

$$\begin{aligned} 19. \quad & \frac{7}{\sqrt{6} + 2} \\ & = \frac{7}{\sqrt{6} + 2} \times \frac{\sqrt{6} - 2}{\sqrt{6} - 2} \\ & = \frac{7\sqrt{6} - 14}{6 - 4} \\ & = \frac{7\sqrt{6} - 14}{2} \end{aligned}$$

$$\begin{aligned} 20. \quad & \frac{9}{3\sqrt{2} - 5} \\ & = \frac{9}{3\sqrt{2} - 5} \times \frac{3\sqrt{2} + 5}{3\sqrt{2} + 5} \\ & = \frac{27\sqrt{2} + 45}{18 - 25} \\ & = -\frac{27\sqrt{2} + 45}{7} \end{aligned}$$