

https://www.youtube.com/watch?v=B-Sfvry_h3Q



Squares and Square Roots

Name: _____

Date: _____ Period: _____

Perfect Squares

Square the Following Numbers

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Find the Square Roots of the following Numbers

$$\sqrt{1}$$

$$\sqrt{4}$$

$$\sqrt{9}$$

$$\sqrt{16}$$

$$\sqrt{25}$$

$$\sqrt{36}$$

$$\sqrt{49}$$

$$\sqrt{64}$$

$$\sqrt{81}$$

$$\sqrt{100}$$

$$\sqrt{121}$$

$$\sqrt{144}$$

$$\sqrt{169}$$

$$\sqrt{196}$$

$$\sqrt{225}$$

Sometimes numbers are not perfect squares. If numbers are not perfect squares and we want to find their exact value we need to simplify the square root.

Example 1.

$$\sqrt{162}$$

1. Begin the process with _____ 162
2. Write all the factors inside the radical sign.
3. Look for pairs.
4. For each pair that occurs write the number once on of the radical sign.
5. Multiply all outside numbers together and all Inside numbers. The result is your answer

Example 2: Find $\sqrt{72}$

Finding Square Roots of Fractions

When finding the square root of a fraction you will follow the same process as we did for finding the square root of a whole number.

Example 3: Find $\sqrt{\frac{49}{25}} \rightarrow \frac{\sqrt{49}}{\sqrt{25}} = \frac{7}{5}$

Example 4: $\sqrt{\frac{10}{49}} = \frac{\sqrt{10}}{\sqrt{49}} = \frac{\sqrt{10}}{7}$

$$\begin{array}{c} 10 \\ 2 \swarrow 5 \end{array}$$

Example 5: $\sqrt{\frac{16}{27}} = \frac{\sqrt{16}}{\sqrt{27}} = \frac{4}{3\sqrt{3}}$

$$\begin{array}{c} 27 \\ 3 \swarrow 9 \\ \quad 3 \swarrow 3 \\ \quad \quad \sqrt{2 \cdot 3} \end{array}$$

NO $\sqrt{\quad}$
in
denominator

$$\frac{4}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3\sqrt{9}} = \frac{4\sqrt{3}}{3 \cdot 3} = \frac{4\sqrt{3}}{9}$$

$$\sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3$$

You Try

$$a. \sqrt{\frac{100}{169}} = \frac{\sqrt{100}}{\sqrt{169}} = \frac{10}{13}$$

$$b. \sqrt{\frac{81}{32}} = \frac{\sqrt{81}}{\sqrt{32}} = \frac{9}{4\sqrt{2}}$$

$$\frac{9}{4\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{9\sqrt{2}}{4\sqrt{4}} = \frac{9\sqrt{2}}{8}$$

$$11. \sqrt{\frac{16}{9}}$$

$$12. \sqrt{\frac{225}{49}}$$

$$13. \sqrt{\frac{625}{81}} = \frac{\sqrt{625}}{\sqrt{81}} = \frac{25}{9}$$

$$14. \sqrt{\frac{12}{25}} = \frac{\sqrt{12}}{\sqrt{25}} = \frac{2\sqrt{3}}{5}$$

$$\begin{array}{c} 12 \\ \swarrow \downarrow \searrow \\ 2 \quad 6 \quad 2 \quad 3 \\ \quad \swarrow \searrow \\ \quad 2 \quad 3 \end{array} = \frac{\sqrt{2 \cdot 2 \cdot 3}}{2\sqrt{3}}$$

$$15. \sqrt{\frac{18}{121}}$$

$$\begin{array}{c} 18 \\ \swarrow \downarrow \searrow \\ 2 \quad 9 \quad 2 \quad 2 \\ \quad \swarrow \searrow \\ \quad 2 \quad 2 \end{array}$$

$$\sqrt{2 \cdot 2 \cdot 2}$$

$$2\sqrt{2}$$

$$16. \sqrt{\frac{121}{8}} = \frac{\sqrt{121}}{\sqrt{8}} =$$

$$\frac{11}{\sqrt{8}} = \frac{11}{2\sqrt{2}}$$

$$\frac{11}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{11\sqrt{2}}{4}$$

17. $\sqrt{\frac{75}{8}}$

18. $\sqrt{\frac{32}{125}}$

19. $\sqrt{\frac{175}{27}} = \frac{\sqrt{175}}{\sqrt{27}} = \frac{5\sqrt{7}}{3\sqrt{3}}$

20. $\sqrt{\frac{56}{147}}$

$$\begin{array}{r}
 175 \\
 \swarrow \quad \searrow \\
 5 \quad 35 \\
 \quad \swarrow \quad \searrow \\
 \quad 5 \quad 7 \\
 \hline
 \sqrt{5 \cdot 5 \cdot 7} = 5\sqrt{7}
 \end{array}$$

$$\begin{array}{r}
 \frac{5\sqrt{7}}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \\
 \frac{5\sqrt{21}}{3\sqrt{9}} \\
 \frac{5\sqrt{21}}{9}
 \end{array}$$

21. $\sqrt{243}$

22. $\sqrt{712}$

$$\begin{array}{r}
 712 \\
 2 \overline{) 356} \\
 \underline{2 \quad 78} \\
 2 \quad 84 \\
 \underline{2 \quad 84} \\
 0
 \end{array}$$

$$\sqrt{2 \cdot 2 \cdot 2 \cdot 89} = 2\sqrt{178}$$

23. $\sqrt{1320}$

24. $\sqrt{1800}$

Answers

1. $4\sqrt{5}$ 2. $3\sqrt{2}$ 3. $10\sqrt{2}$ 4. $8\sqrt{2}$ 5. $11\sqrt{2}$

6. $10\sqrt{6}$ 7. $20\sqrt{11}$ 8. $12\sqrt{2}$ 9. 24 10. $12\sqrt{2}$

Answers

11. $\frac{4}{3}$ 12. $\frac{15}{7}$ 13. $\frac{25}{9}$ 14. $\frac{2\sqrt{3}}{5}$ 15. $\frac{3\sqrt{2}}{11}$

16. $\frac{11\sqrt{2}}{4}$ 17. $\frac{5\sqrt{6}}{4}$ 18. $\frac{4\sqrt{10}}{25}$ 19. $\frac{4\sqrt{10}}{25}$ 20. $\frac{2\sqrt{42}}{21}$

21. $11\sqrt{2}$ 22. $2\sqrt{178}$ 23. $2\sqrt{330}$ 24. $30\sqrt{2}$