

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



Squares and Square Roots

Name: _____

Date: _____ Period: _____

Perfect Squares

Square the Following Numbers

$$1^2 = 1$$

$$2^2 = 4$$

$$3^2 = 9$$

$$4^2 = 16$$

$$5^2 = 25$$

$$6^2 = 36$$

$$7^2 = 49$$

$$8^2 = 64$$

$$9^2 = 81$$

$$10^2 = 100$$

$$11^2 = 121$$

$$12^2 = 144$$

$$13^2 = 169$$

$$14^2 = 196$$

$$15^2 = 225$$

Find the Square Roots of the following Numbers

$$\sqrt{1} = 1$$

$$\sqrt{4} = 2$$

$$\sqrt{9} = 3$$

$$\sqrt{16} = 4$$

$$\sqrt{25} = 5$$

$$\sqrt{36} = 6$$

$$\sqrt{49} = 7$$

$$\sqrt{64} = 8$$

$$\sqrt{81} = 9$$

$$\sqrt{100} = 10$$

$$\sqrt{121} = 11$$

$$\sqrt{144} = 12$$

$$\sqrt{169} = 13$$

$$\sqrt{196} = 14$$

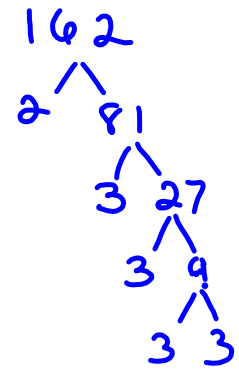
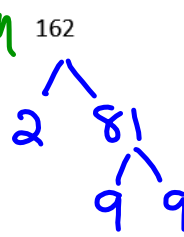
$$\sqrt{225} = 15$$

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 prime factorization 162
 2, 3, 5, 7, 11, 13, 17, 19



2. Write all the factors inside the radical sign.

$$\sqrt{2 \cdot 9 \cdot 9}$$

$$\sqrt{2 \cdot 3 \cdot 3 \cdot 3 \cdot 3}$$

3. Look for pairs.

$$9\sqrt{2}$$

$$3 \cdot 3 \sqrt{2} = 9\sqrt{2}$$

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 $\sqrt{72}$

```

  72
  /  \
 2   36
     /  \
    3   12
       /  \
      3   4
           \ /
            2 2
  
```

$$\rightarrow \sqrt{2 \cdot 6 \cdot 6} = 6\sqrt{2}$$

You Try

a. $\sqrt{48}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = 2 \cdot 2 \sqrt{3} = 4\sqrt{3}$

Assignment

1. $\sqrt{80}$

3. $\sqrt{200}$

5. $\sqrt{242}$

7. $\sqrt{4400}$

9. $\sqrt{576}$

b. $\sqrt{150}$

$\sqrt{2 \cdot 3 \cdot 5 \cdot 5} = 5\sqrt{2 \cdot 3} = 5\sqrt{6}$

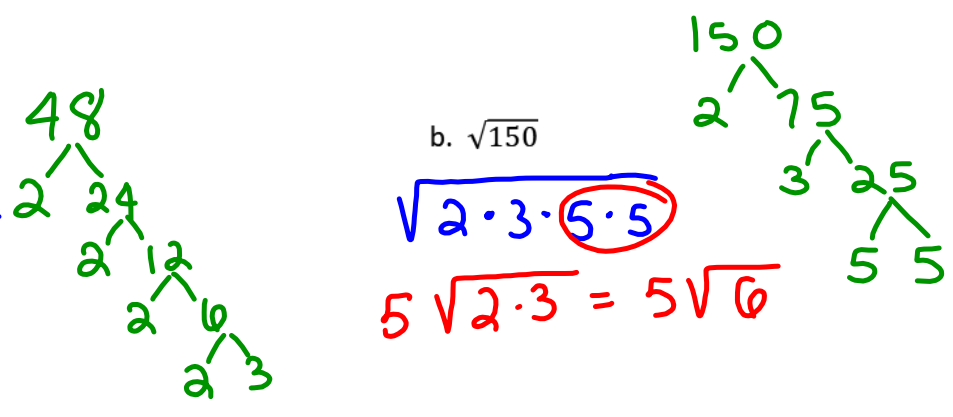
2. $\sqrt{18}$

4. $\sqrt{128}$

6. $\sqrt{600}$

8. $\sqrt{288}$

10. $\sqrt{1440}$



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 $\sqrt{\frac{49}{25}}$

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

Example 5: $\sqrt{\frac{16}{27}}$

You Try

a. $\sqrt{\frac{100}{169}}$

b. $\sqrt{\frac{81}{32}}$

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

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

13. $\sqrt{\frac{625}{81}}$

14. $\sqrt{\frac{12}{25}}$

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

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

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

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

19. $\sqrt{\frac{175}{27}}$

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

21. $\sqrt{243}$

22. $\sqrt{712}$

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. $30\sqrt{2}$