



Warm Up Grade 8

Perfect Squares

1	4
9	16
25	36
49	64
81	100
121	144
169	196
225	

Use product of perfect squares to find the square root of the follo

(a) 5184 (b) 5929 (c) 7056

(d) 1089 (e) 576 (f) 11 025

$$\begin{aligned}
 \sqrt{5184} &= \sqrt{81 \times 64} \\
 &= \sqrt{81} \times \sqrt{64} \\
 &= 9 \times 8 \\
 &= 72
 \end{aligned}$$

$$\begin{aligned}
 &\sqrt{144 \times 36} \\
 &\sqrt{144} \times \sqrt{36} \\
 &12 \times 6 \\
 &72
 \end{aligned}$$

$$\begin{aligned}
 \sqrt{5929} &= \sqrt{121 \times 49} \\
 &= \sqrt{121} \times \sqrt{49} \\
 &= 11 \times 7 \\
 &= 77
 \end{aligned}$$

Square each (Show the symbol)

$$\begin{array}{l} \text{a) } 7 \\ \quad \downarrow \\ \quad 7^2 \\ \quad = 49 \end{array}$$

$$\begin{array}{l} \text{b) } \sqrt{100} \\ \quad \downarrow \\ \quad \sqrt{100}^2 \\ \quad = 100 \end{array}$$

Square Root each (Show symbol)

$$\begin{array}{l} \text{a) } 64 \\ \quad \downarrow \\ \quad \sqrt{64} \\ \quad = 8 \end{array}$$

$$\begin{array}{l} \text{b) } 81^2 \\ \quad \downarrow \\ \quad \sqrt{81^2} \\ \quad = 81 \end{array}$$

$$\sqrt{x^2} = x$$

$$(\sqrt{x})^2 = x$$

Warm Up Grade 8

solutions

Use product of perfect squares to find the square root of the following:

(a) 5184

(b) 5929

(c) 7056

(d) 1089

(e) 576

(f) 11 025

Perfect Squares	
1	4
9	16
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225	

$$\begin{aligned}
 \text{a) } \sqrt{5184} &= \sqrt{144 \times 36} \\
 &= \sqrt{144} \times \sqrt{36} \\
 &= 12 \times 6 \\
 &= 72
 \end{aligned}$$

$$\sqrt{5184} = 72$$

Quiz

V1

Name: _____

1) Square the following numbers (Show the correct symbol. You can use a calculator)

a) 9

b) 4

c) 16

d) $\sqrt{144}$

2) Square root the following numbers (Show the correct symbol. You can use a calculator)

a) 25

b) 225

c) 8^2

d) 36

3) Find the $\sqrt{576}$ using the product of perfect squares

Quiz

V2

Name: _____

1) Square root the following numbers (Show the correct symbol. You can use a calculator)

a) 49

b) 4

c) 81

d) 9^2

2) Square the following numbers (Show the correct symbol. You can use a calculator)

a) 12

b) 25

c) $\sqrt{169}$

d) 3

3) Find the $\sqrt{1089}$ using the product of perfect squares

$$\begin{array}{l} \text{ii) } \frac{96}{\sqrt{96}} \\ 1 \times 96 \\ 2 \times 48 \\ 3 \times 32 \\ 4 \times 24 \\ 6 \times 16 \\ 8 \times 12 \\ \text{not square} \end{array}$$

$$\begin{array}{l} \text{ii) } \frac{484}{\sqrt{484}} \\ 1 \times 484 \\ 2 \times 242 \\ 4 \times 121 \\ 11 \times 44 \\ 22 \times 22 \\ \text{perfect square} \\ \text{odd number of factors} \end{array}$$

Homework Solutions

Homework pg. 16 # 12 -15

$$\begin{array}{l} \text{iii) } \frac{240}{\sqrt{240}} \\ 1 \times 240 \\ 2 \times 120 \\ 3 \times 80 \\ 4 \times 60 \\ 5 \times 48 \\ 6 \times 40 \\ 8 \times 30 \\ 10 \times 24 \\ 12 \times 20 \\ 15 \times 16 \\ \text{not a square} \end{array}$$

$$\begin{array}{l} \text{iv) } \frac{152}{\sqrt{152}} \\ 1 \times 152 \\ 2 \times 76 \\ 4 \times 38 \\ 8 \times 19 \\ \text{not a square} \end{array}$$

$$\begin{array}{l} \text{v) } \frac{441}{\sqrt{441}} \\ 1 \times 441 \\ 3 \times 147 \\ 7 \times 63 \\ 9 \times 49 \\ 21 \times 21 \\ \text{perfect square} \end{array}$$

$$\begin{array}{l} \text{vi) } \frac{54}{\sqrt{54}} \\ 2 \times 27 \\ 3 \times 18 \\ 6 \times 9 \\ \text{not a square} \end{array}$$

13 a) $\sqrt{1} = 1$ b) $\sqrt{49} = 7$ Homework Solutions
 c) $\sqrt{144} = 12$ d) $\sqrt{9} = 3$
 e) $\sqrt{16} = 4$ f) $\sqrt{100} = 10$
 g) $\sqrt{225} = 15$ h) $\sqrt{225} = 15$

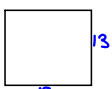


14 a) $3^2 = 9$ b) $6^2 = 36$
 $\sqrt{9} = 3$ $\sqrt{36} = 6$
 c) $10^2 = 100$ d) $\sqrt{117^2} = 117$
 $\sqrt{100} = 10$

15. $\sqrt{4} = 2$ b) $\sqrt{121} = 11$
 c) $\sqrt{225} = 15$ d) $\sqrt{676} = 26$
 $15 \times 15 = 225$ $\sqrt{26 \times 26} = 26$
 so $\sqrt{225} = 15$

Perfect Squares	
1	81
4	100
9	121
16	144
25	169
36	196
49	225
64	

Homework pg. 16 # 16-19

Homework Solutions

16. a) $\sqrt{169} = 13$ b) $\sqrt{36} = 6$
 
 $169 = 13 \times 13$ $36 = 6 \times 6$
 c) $\sqrt{196} = 14$  $196 = 14 \times 14$

17 $\sqrt{\quad} = 23$
 $\sqrt{23^2} = 23$ $\sqrt{529} = 23$

18. $3^2 = 9$ $\sqrt{9} = 3$
 The answer of 3^2 is 9, and the answer of $\sqrt{9}$ is 3, so this shows that taking the square root is the inverse of squaring a number.

19. a) $\sqrt{36}, 36, 4, \sqrt{9}$
 $6, 36, 4, 3$
 Least to Greatest $\sqrt{9}, 4, \sqrt{36}, 36$
 b) $\sqrt{400}, \sqrt{100}, 19, 15$
 $20, 10$
 $\rightarrow \sqrt{100}, 15, 19, \sqrt{400}$
 c) $\sqrt{81}, 81, \sqrt{100}, 11$
 $9, 81, 10, 11$
 $\rightarrow \sqrt{81}, \sqrt{100}, 11, 81$
 d) $\sqrt{49}, \sqrt{64}, \sqrt{36}, 9$
 $7, 8, 6, 9$
 $\rightarrow \sqrt{36}, \sqrt{49}, \sqrt{64}, 9$

Prime numbers are numbers that are only divisible by 1 and itself

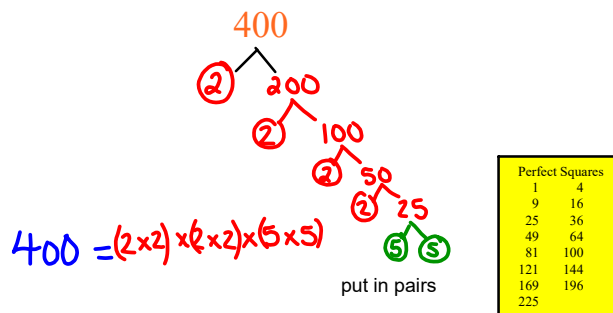
2, 3, 5, 7, 11, 13, 17, 19, 23, 29,...

Finding the square root using prime factorization

Prime # → 2, 3, 5, 7, 11, 13, 17, 19, 23, ...

To find the square root of number using prime factorization, you first have to write the number as a product of prime numbers. You can use a factor tree to write a number as a product of prime numbers.

Step 1) Find the prime Factors of 400



Step 2) Find the square root by putting the factors in pairs, under a $\sqrt{\quad}$, then calculate.

$$\begin{aligned} \sqrt{400} &= \sqrt{(2 \times 2) \times (2 \times 2) \times (5 \times 5)} && \text{pairs} \\ &\quad \text{Separate pairs} \\ \sqrt{400} &= \sqrt{2 \times 2} \times \sqrt{2 \times 2} \times \sqrt{5 \times 5} && \text{separate} \\ \sqrt{400} &= 2 \times 2 \times 5 && \text{calculate the } \sqrt{\quad} \text{ of each pair} \quad \text{remember the } \sqrt{2 \times 2} = \sqrt{4} = 2 \\ \sqrt{400} &= 20 \end{aligned}$$

Prime Numbers
2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Now find the $\sqrt{324}$, using each method below:

- (a) product of perfect squares
- (b) prime factorization
- (c) Factors

a) product of perfect squares

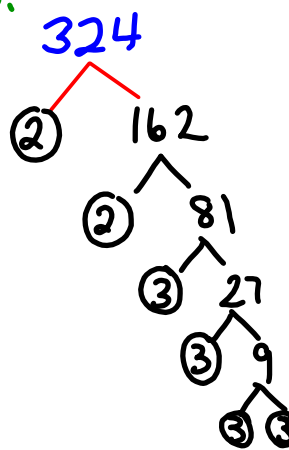
Solutions

Perfect Squares	
1	4
9	16
25	36
49	64
81	100
121	144
169	196
225	

Prime # $\Rightarrow 2, 3, 5, 7, 11, 13, 17, 19, 23, \dots$

b) prime factorization

$$\begin{aligned} \sqrt{324} &= \sqrt{(2 \times 2) \times (3 \times 3) \times (3 \times 3)} \\ &= \sqrt{(2 \times 2)} \times \sqrt{(3 \times 3)} \times \sqrt{(3 \times 3)} \\ &= 2 \times 3 \times 3 \\ \sqrt{324} &= 18 \end{aligned}$$



c) Factors

Now find the $\sqrt{324}$, using each method below:

- (a) product of perfect squares
- (b) prime factorization
- (c) Factors

a) Product of Perfect Squares

$$\begin{aligned} \sqrt{324} &= \sqrt{4 \times 81} \\ &= \sqrt{4} \times \sqrt{81} \\ &= 2 \times 9 \\ &= 18 \end{aligned}$$

Solutions

Perfect Squares	
1	4
9	16
25	36
49	64
81	100
121	144
169	196
225	

b) Prime Factorization

$$\begin{aligned} 324 &= 2 \times 2 \times 3 \times 3 \times 3 \times 3 \\ \sqrt{324} &= \sqrt{(2 \times 2) \times (3 \times 3) \times (3 \times 3)} \\ &= 2 \times 3 \times 3 \\ &= 18 \end{aligned}$$



c) Find the factor

Factors
1, 2, 3, 4, 6, 9, 12, 18, 27, 36
54, 81, 108, 162, 324
Odd number of factors,
so 324 is a perfect square,
middle number is 18
so $\sqrt{324} = 18$

- 324
- 1 x 324
 - 2 x 162
 - 3 x 108
 - 4 x 81
 - 6 x 54
 - 9 x 36
 - 12 x 27
 - 18 x 18

Now find the 256, using each method below:

- (a) product of perfect squares
- (b) prime factorization

Perfect Squares	
1	4
9	16
25	36
49	64
81	100
121	144
169	196
225	

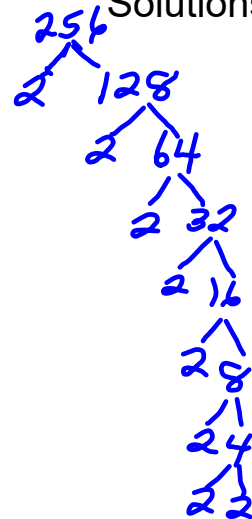
Find the square root of 256 using prime factorization



$$256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$\begin{aligned} \sqrt{256} &= \sqrt{(2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2)} \\ &= 2 \times 2 \times 2 \times 2 \\ &= 16 \end{aligned}$$

OR Solutions



b) Find the square root of 256 using product of squares

$$\begin{aligned} \sqrt{256} &= \sqrt{4 \times 64} \\ &= \sqrt{4} \times \sqrt{64} \\ &= 2 \times 8 \\ &= 16 \end{aligned}$$

Product of Perfect Squares

2. Find the square root of the following, using prime factorization:
 (a) $\sqrt{1444}$ (b) $\sqrt{784}$ (c) $\sqrt{2025}$ (d) $\sqrt{2304}$

Prime number
 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 (but)
 eddy is a

Homework Nov. 7 (Grade 8)

1. Use the product of perfect squares to find the following square roots:

(a) $\sqrt{1296}$

(b) $\sqrt{1089}$

(c) $\sqrt{1764}$

(d) $\sqrt{9216}$

2. Find the square root of the following, using prime factorization:

(a) $\sqrt{576}$

(b) $\sqrt{784}$

(c) $\sqrt{2025}$

(d) $\sqrt{2304}$

1. Use the product of perfect squares to find the following square roots:

- (a) $\sqrt{1296}$ (b) $\sqrt{1089}$ (c) $\sqrt{1764}$ (d) $\sqrt{2116}$

2. Find the square root of the following, using prime factorization:

- (a) $\sqrt{576}$ (b) $\sqrt{784}$ (c) $\sqrt{2025}$ (d) $\sqrt{2304}$

1a)

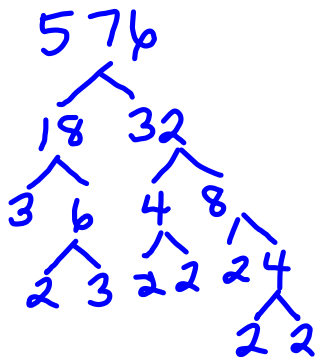
$$\begin{aligned} \sqrt{1296} &= \sqrt{36 \times 36} \\ &= 6 \times 6 \\ &= 36 \end{aligned}$$

or

$$\begin{aligned} &= \sqrt{9 \times 144} \\ &\quad \quad \quad 3 \times 12 \\ &\quad \quad \quad 36 \end{aligned}$$

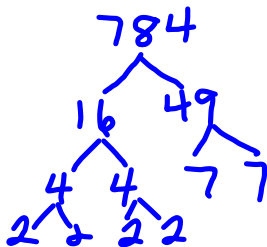
b)

$$\begin{aligned} \sqrt{576} &= \sqrt{(2 \times 2)(2 \times 2)(2 \times 2)(3 \times 3)} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24 \end{aligned}$$



$$576 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$\begin{aligned} \sqrt{576} &= \sqrt{(2 \times 2)(2 \times 2)(2 \times 2)(3 \times 3)} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24 \end{aligned}$$



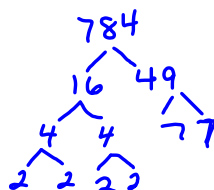
$$784 = 2 \times 2 \times 2 \times 2 \times 7 \times 7$$

$$\begin{aligned} \sqrt{784} &= \sqrt{(2 \times 2)(2 \times 2)(7 \times 7)} \\ &= 2 \times 2 \times 7 \\ &= 28 \end{aligned}$$

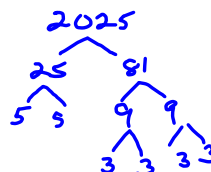
2025

2304

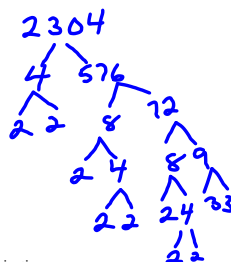
b) $\sqrt{784}$
 $= \sqrt{(2 \times 2) \times (2 \times 2) \times (7 \times 7)}$
 $= 2 \times 2 \times 7$
 $= 28$



c) $\sqrt{2025}$
 $= \sqrt{(5 \times 5) \times (3 \times 3) \times (3 \times 3)}$
 $= 5 \times 3 \times 3$
 $= 45$



d) $\sqrt{2304}$
 $= \sqrt{(2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (3 \times 3)}$
 $= 2 \times 2 \times 2 \times 2 \times 3$
 $= 48$



1. Find the square root of the following, using prime factorization.

- (a) $\sqrt{729}$ (b) $\sqrt{3025}$ (c) $\sqrt{1225}$
 (d) $\sqrt{1764}$ (e) $\sqrt{576}$ (f) $\sqrt{1296}$

2. Use the product of perfect squares to find the following square roots:

- (a) $\sqrt{1296}$ (b) $\sqrt{1089}$ (c) $\sqrt{1764}$ (d) $\sqrt{9216}$

Homework Board Questions

1. Find the square root of the following, using prime factorization.

- (a) $\sqrt{729}$ (b) $\sqrt{3025}$ (c) $\sqrt{1225}$
 (d) $\sqrt{1764}$ (e) $\sqrt{576}$ (f) $\sqrt{1296}$

Homework Day 2
if needed

2. Use the product of perfect squares to find the following square roots:

- (a) $\sqrt{1296}$ (b) $\sqrt{1089}$ (c) $\sqrt{1764}$ (d) $\sqrt{9216}$

1. Find the square root of the following, using prime factorization.

- (a) $\sqrt{729}$ (b) $\sqrt{3025}$ (c) $\sqrt{1225}$
 (d) $\sqrt{1764}$ (e) $\sqrt{576}$ (f) $\sqrt{1296}$

2. Use the product of perfect squares to find the following square roots:

- (a) $\sqrt{1296}$ (b) $\sqrt{1089}$ (c) $\sqrt{1764}$ (d) $\sqrt{9216}$

1. Find the square root of the following, using prime factorization.

- (a) $\sqrt{729}$ (b) $\sqrt{3025}$ (c) $\sqrt{1225}$
 (d) $\sqrt{1764}$ (e) $\sqrt{576}$ (f) $\sqrt{1296}$

2. Use the product of perfect squares to find the following square roots:

- (a) $\sqrt{1296}$ (b) $\sqrt{1089}$ (c) $\sqrt{1764}$ (d) $\sqrt{9216}$

Attachments

Grade 8 Math Homework Oct. 29, 2014.docx