Warm Up Grade 8
Nov. 1

1) Find the square of each number below:

   a) 9   b) 16

   $9^2 = 81$ $16^2 = 256$

2) Find the square root of each number below:

   a) 25   b) 100

   $\sqrt{25} = 5$ $\sqrt{100} = 10$

3) The factors of 624 are:

   1,2,3,4,6,8,12,13,16,24,26,39,48,52,78,104,156,208,312,624

   Is 624 perfect? How do you know

   No it is Not perfect since we have 20 factors
   (even number of factors means Not perfect)

Homework Solutions

Pg 15

5 a) $4^2 = 16$ b) $6^2 = 36$

c) $2^2 = 4$ d) $9^2 = 81$

6 a) $8^2 = 64$ b) $3^2 = 9$

c) $1^2 = 1$ d) $7^2 = 49$

7 a) $\sqrt{25} = 5$ b) $\sqrt{81} = 9$

c) $\sqrt{64} = 8$ d) $\sqrt{169} = 13$

8 a) $1^2 = 1$

$10^2 = 100$

$100^2 = 10\ 000$

$1000^2 = 1\ 000\ 000$

b) $10\ 000^2 = 100\ 000\ 000$

$1\ 000\ 000^2 = 1\ 000\ 000\ 000\ 000$

Homework Solutions

9a) $\underline{50}$
1 × 50
2 × 25
5 × 10
not perfect
square

ii) $\underline{100}$
1 × 100
2 × 50
4 × 25
5 × 20
10 × 10
perfect
square

(b) $\sqrt{100}$
= 10

iii) $\underline{144}$
1 × 144
2 × 72
3 × 48
4 × 36
6 × 24
8 × 18
9 × 16
12 × 12
perfect
square　(b) $\sqrt{144}$
12

iv) $\underline{85}$
1 × 85
5 × 17
not perfect
square

Homework Solutions

10 a) 256

1 x 256
2 x 128
4 x 64
8 x 32
16 x 16

1, 2, 4, 8, (16), 32, 64, 128, 256

$\sqrt{256} = 16$

b) 625

1 x 625
5 x 125
25 x 25

1, 5, (25), 125, 625

$\sqrt{625} = 25$

c) 121

1 x 121
11 x 11

1, (11), 121

$\sqrt{121} = 11$

11 a) 225 - odd number of factors, so perfect square

$\sqrt{225} = 15$ (middle factor)

b) 500 → even number of factors not a square number

c) 324 - odd number of factors, perfect square

$\sqrt{324} = 18$

d) 160 - even factors, not a square

Homework Solutions

12. 96

i) 1×96
   2×48
   3×32
   4×24
   6×16
   8×12

not square

ii) 484

   1×484
   2×242
   4×121
   11×44
   22×22

perfect square
odd number of factors

iii) 240

   1×240
   2×120
   3×80
   4×60
   5×48
   6×40
   8×30
   10×24
   12×20
   15×16

not a square

iv) 152

   1×152
   2×76
   4×38
   8×19

not a square

v) 441

   1×441
   3×147
   7×63
   9×49
   21×21

perfect square

vi) 54

   1×54
   2×27
   3×18
   6×9

not a square

Homework Solutions

13 a) $\sqrt{1} = 1$ b) $\sqrt{49} = 7$

c) $\sqrt{144} = 12$ d) $\sqrt{9} = 3$

e) $\sqrt{16} = 4$ f) $\sqrt{100} = 10$

g) $\sqrt{625} = 25$ h) $\sqrt{225} = 15$

14 a) $3^2 = 9$ $\sqrt{x^2} = x$ 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) $\sqrt{225} =$ d) $\sqrt{676}$

$15 \times 15 = 225$ $\sqrt{26 \times 26}$

so $\sqrt{225} = 15$ 26

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

Section 1.2
continued

Other Ways of Finding Square Roots

✱ If you know a number is a perfect square it is easy find the square root, whatever number you multiply by itself to get the square root is the answer.

Ex. 5 x 5 = 25   so $\sqrt{25} = 5$

✱ You can also find the square root of a number by listing the factors. If a number has an odd number of factors, it is a perfect square and the middle factor is the square root.

Ex. 225 - 1, 3, 5, 9, ⑮ 25, 45, 75, 225
        225 has 9 factors so it is a perfect square.
     $\sqrt{225}$ is the middle factor or 15

✱ Finding the square root using the product of perfect squares
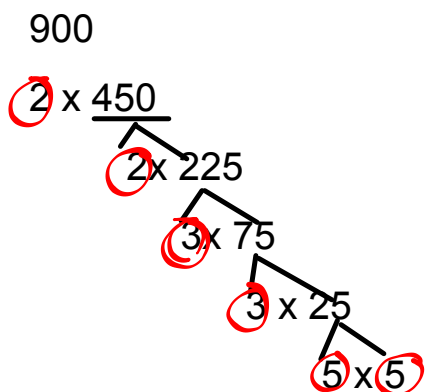
$$\sqrt{a} \times \sqrt{b} = \sqrt{a \times b}$$

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

$\sqrt{900} = \sqrt{225 \times 4}$

$= \sqrt{225} \times \sqrt{4}$

$= 15 \times 2$

$= 30$

$\sqrt{1764} = \sqrt{196 \times 9}$

$= \sqrt{196} \times \sqrt{9}$

$= 14 \times 3$

$= 42$

Factor Tree

900

②x 450

　　②x 225

　　　③x 75

　　　　3 x 25

　　　　　⑤x⑤

Prime → # divisible by 1
and itself
2, 3, 5, 7, 11, 13, 17,
19
23,

$900 = 2 \times 2 \times 3 \times 3 \times 5 \times 5$

$\sqrt{900} = \sqrt{2 \times 2 \times 3 \times 3 \times 5 \times 5}$

Separate pairs

$\sqrt{900} = \sqrt{2 \times 2} \times \sqrt{3 \times 3} \times \sqrt{5 \times 5}$

$\sqrt{900} = \sqrt{4} \times \sqrt{9} \times \sqrt{25}$

$\sqrt{900} = 2 \times 3 \times 5$

$\sqrt{900} = 30$

grade 10

$180 = 2 \times 2 \times 3 \times 3 \times 5$

$\sqrt{180} = \sqrt{2 \times 2} \ \sqrt{3 \times 3} \ \sqrt{5}$

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

$6 \sqrt{5}$

To find the square root of a number using product of perfect squares, you first have to **find 2 perfect squares** that multiply to give the number. Then find the square root of each and multiply the answers.
Remember You need to find TWO PERFECT SQUARES.

Using product of perfect square, find the square root of the following:

(a) $\sqrt{1024}$ (b) $\sqrt{3025}$ (c) $\sqrt{8\,225}$

(d) $\sqrt{1521}$ (e) $\sqrt{3969}$ (f) $\sqrt{6084}$

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

a) $\sqrt{1024}$

$= \sqrt{64 \times 16}$ separate them

$= \sqrt{64} \times \sqrt{16}$

$= 8 \times 4$

$\sqrt{1024} = 32$

b) $\sqrt{3025}$

$= \sqrt{121 \times 25}$

$= \sqrt{121} \times \sqrt{25}$

$= 11 \times 5$

$\sqrt{3025} = 55$

c) $\sqrt{18225}$

$= \sqrt{225 \times 81}$

$= \sqrt{225} \times \sqrt{81}$

$= 15 \times 9$

$\sqrt{18225} = 135$

Square Root

The square root (symbol $\sqrt{}$) of any number is the number that, when multiplied by itself, gives the first number. The square root of 64 is 8, because 8 x 8 gives 64.

There are different ways that you can use to find the square root.
  - knowing the number is a perfect square
  - using the product of perfect squares
  - using prime factorization
  - using a calculator

Finding the square root using the product of perfect squares

$$\sqrt{a} \ x \sqrt{b} = \sqrt{a \ x \ b}$$

$$\sqrt{900} = \sqrt{ \ x \ }$$

$$= \sqrt{} \ x \ \sqrt{}$$

$$= \ x \ $$

$$=$$

$$\sqrt{1764} =$$
$$=.$$
$$=$$
$$=$$

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

To find the square root of a number using product of perfect squares, you first have to **find 2 perfect squares** that multiply to give the number. Then find the square root of each and multiply the answers.
Remember You need to find TWO PERFECT SQUARES.

Using product of perfect square, find the square root of the following:

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

(d) 1089   (e) 576   (f) 11025

Homework Board Question
pg. 15 -16 # 19
show work

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