

Warm Up Grade 8

Feb. 14, 2023



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

1) Find the square root of each, (without a calculator)

a) 100  
 $\sqrt{100}$   
 = 10

b) 176

$\sqrt{176}$   
 $\sqrt{169}$      $\sqrt{196}$   
 ↓        ↓        ↓  
 13    13.2    14

2) Prove that 86 is not perfect using factors.

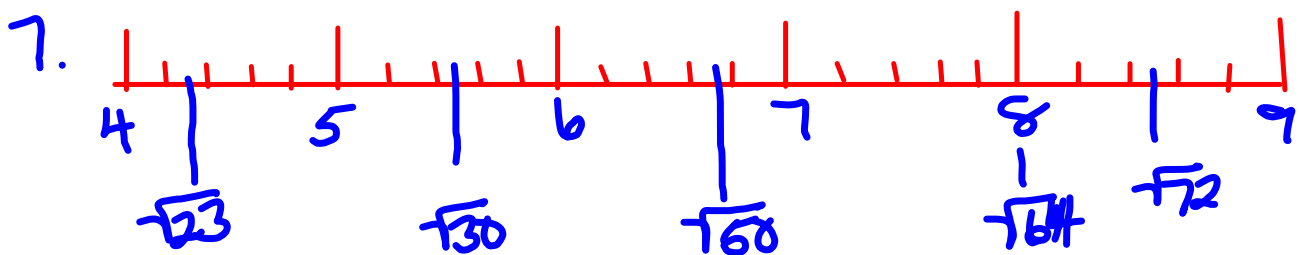
1 x 86  
 2 x 43  
 1, 2, 43, 86

4 factors → Even number of factors  
 So Not Perfect

b.  $\sqrt{4} = 2$        $\sqrt{9} = 3$

$\sqrt{7} \approx 2.7$

Homework  
Solutions



a) The estimates that are good are

$\sqrt{30}$  in the middle between  
 $\sqrt{25}$  and  $\sqrt{36}$

$\sqrt{64}$  is exactly 8

$\sqrt{72}$  is in the middle between  
 $\sqrt{64}$  and  $\sqrt{81}$

b)  $\sqrt{23}$  should be closer to 5 than 4  
 $\sqrt{50}$  should be greater than 7

**Homework**  
**Solutions**

8a)

$$\sqrt{9} \quad \sqrt{11} \quad \sqrt{16}$$

$$3 \qquad \qquad 4$$

$$\sqrt{11} \approx 3.2$$

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

b)

$$\sqrt{36} \quad \sqrt{40} \quad \sqrt{49}$$

$$6 \qquad \qquad 7$$

$$\sqrt{40} \approx 6.3$$

c)

$$\sqrt{25} \quad \sqrt{30} \quad \sqrt{36}$$

$$5 \qquad \qquad 6$$

$$\sqrt{30} \approx 5.5$$

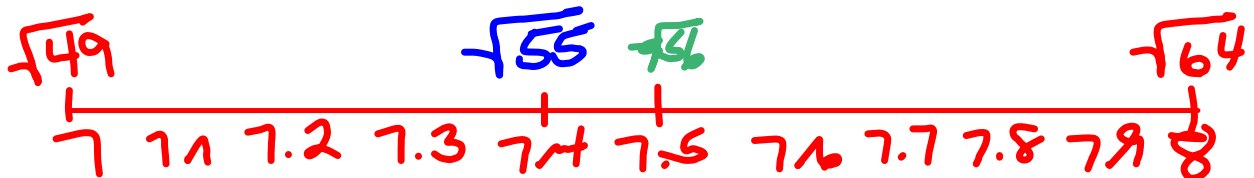
d)

$$\sqrt{49} \quad \sqrt{55} \quad \sqrt{64}$$

$$7 \qquad \qquad 8$$

$$\sqrt{55} \approx 7.4$$

Middle between  
49 and 64  
 $\approx 56$



## Homework Solutions

9.  $7, \sqrt{14}$

$$\sqrt{16} = 4, \text{ so } \sqrt{14} < 7$$

b)  $8, \sqrt{60}$

$$8^2 = 64, \text{ so } \sqrt{60} < 8$$

c)  $11, \sqrt{121}$

$$11^2 = 121, \text{ so } \sqrt{121} = 11$$

d)  $12, \sqrt{150}$

$$\sqrt{144} = 12, \text{ so } \sqrt{150} > 12$$

10 a)

$$\begin{array}{cc} \sqrt{58} & \\ \sqrt{49} & \sqrt{64} \\ 7 & 8 \\ \sqrt{58} \approx 7.8 \end{array}$$

b)

$$\begin{array}{cc} \sqrt{70} & \\ \sqrt{64} & \sqrt{81} \\ 8 & 9 \\ \sqrt{70} \approx 8.3 \end{array}$$

c)

$$\begin{array}{cc} \sqrt{90} & \\ \sqrt{81} & \sqrt{100} \\ 9 & 10 \\ \sqrt{90} \approx 9.5 \end{array}$$

d)

$$\begin{array}{cc} \sqrt{151} & \\ \sqrt{144} & \sqrt{169} \\ 12 & 13 \\ \sqrt{151} \approx 12.2 \end{array}$$

Perfect Squares

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

11. a)  $\sqrt{17}$  is between 16 and 18

False,

$\sqrt{17}$  is between 4 ( $\sqrt{16}$ ) and 5 ( $\sqrt{25}$ )

Homework

Solutions

b)  $\sqrt{5} + \sqrt{5} = \sqrt{10}$

$$\sqrt{5} \approx 2.2$$

$$\sqrt{4} = 2$$

$$\sqrt{9} = 3$$

$$\sqrt{10} \approx 3.2$$

$$\sqrt{9} = 3$$

$$\sqrt{16} = 4$$

Is  $2.2 + 2.2 = 3.2$ , NO

so False  $\sqrt{5} + \sqrt{5}$  does not equal  $\sqrt{10}$

c)  $\sqrt{13}$  is between 11 and 12

True

$$\sqrt{121} = 11 \quad \text{and} \quad \sqrt{144} = 12$$

and 13 is between 121 and 144

Mid-Unit Review  
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#1ab

#2ab

#3ab

~~#5~~

#7ab

#9ab

#10abcd

~~#11~~

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Homework

12 a)  $\sqrt{23}$   
 $\sqrt{16}$       $\sqrt{25}$   
 4            5  
 $\sqrt{23} \approx 4.8$

b)  $\sqrt{13}$   
 $\sqrt{9}$       $\sqrt{16}$   
 3            4  
 $\sqrt{13} \approx 3.5$

Solutions

c)  $\sqrt{78}$   
 $\sqrt{64}$       $\sqrt{81}$   
 8            9  
 $\sqrt{78} \approx 8.8$

d)  $\sqrt{135}$   
 $\sqrt{121}$       $\sqrt{144}$   
 11            12  
 $\sqrt{135} \approx 11.7$

e)  $\sqrt{62}$   
 $\sqrt{49}$       $\sqrt{64}$   
 7            8  
 $\sqrt{62} \approx 7.8$   
 or 7.9

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

f)  $\sqrt{45}$   
 $\sqrt{36}$       $\sqrt{49}$   
 6            7  
 $\sqrt{45} \approx 6.7$

13. Area = 92 cm<sup>2</sup>

Side Length =  $\sqrt{92}$   
 $\sqrt{81}$       $\sqrt{100}$   
 9            10  
 $\sqrt{92} \approx 9.6$

b) Area = 430 m<sup>2</sup>

Side Length =  $\sqrt{430}$   
 $\sqrt{400}$       $\sqrt{441}$   
 20            21  
 $\sqrt{430} \approx 20.7$

$20^2 = 400$   
 $21^2 = 441$

c) Area = 150 cm<sup>2</sup>

Side Length =  $\sqrt{150}$   
 $\sqrt{144}$       $\sqrt{169}$   
 12            13  
 $\sqrt{150} \approx 12.2$

d) Area = 29 m<sup>2</sup>

Side Length =  $\sqrt{29}$   
 $\sqrt{25}$       $\sqrt{36}$   
 5            6  
 $\sqrt{29} \approx 5.3$

Homework  
Solutions

14a)  $\sqrt{17}$  is about 8.50

Not a good estimate  $\sqrt{16} = 4$ , so  
 $\sqrt{17}$  a little more than 4.

b)  $\sqrt{20}$  is about 4.3

$$\sqrt{16} = 4, \sqrt{25} = 5$$

4.3 is an OK estimate, but 20 is  
about the middle so 4.4 or 4.5  
are better estimate

c)  $\sqrt{8}$  is about 2.83

Good estimate since  $\sqrt{9} = 3$

d)  $\sqrt{34}$  is about 5.83

Good estimate since  $\sqrt{36} = 6$



15.

$$\text{Area} = 5 \text{ m}^2$$

Side Length  
 $\sqrt{5}$ Homework  
Solutions

$$\frac{\sqrt{14}}{2} \quad \frac{\sqrt{5}}{2} \quad \frac{\sqrt{9}}{3}$$

$$\sqrt{5} \approx 2.2$$

b) Justify your answer.

16.

$$\text{Area} = 162 \text{ m}^2$$

$$\text{Side Length} = \sqrt{152}$$

$$\frac{\sqrt{144}}{12} \quad \frac{\sqrt{169}}{13}$$

$$\sqrt{152} \approx 12.3$$

b) Tape around the outside

$$- 4 \times 12.3 = 49.2$$

$$\approx 50 \text{ m of tape needed}$$

20 Is the product of 2 perfect squares a perfect square? Homework  
Solutions

$$49 \times 64 = 3136 \quad \sqrt{3136} = 56$$

$$36 \times 16 = 576 \quad \sqrt{576} = 24$$

$$144 \times 121 = 17424 \quad \sqrt{17424} = 132$$

$$25 \times 16 = 400 \quad \sqrt{400} = 20$$

$$9 \times 4 = 36 \quad \sqrt{36} = 6$$

$$169 \times 196 = 33124 \quad \sqrt{33124} = 182$$

$$\frac{\sqrt{a \times b}}{\sqrt{a} \times \sqrt{b}} = \sqrt{a \times b}$$

Yes, the product of any two perfect squares will give a perfect square

21.  $7.67^2$

Is it closer to 49 or 64?

Homework  
Solutions

7.67 is closer to 8, so  
 $7.67^2$  is closer to  $8^2$  or 64.

22. Five number whose square roots are between 9 and 10.

$$\sqrt{81} = 9$$

$$\sqrt{100} = 10$$

$$\sqrt{82}, \sqrt{83}, \sqrt{84} \dots \sqrt{98}, \sqrt{99}$$

## Homework Solutions

$$23 \text{ a) } \sqrt{81} + \sqrt{16}$$

$$\begin{array}{ccc} 9 & + & 4 \\ & 13 & \end{array}$$

$$\text{b) } \sqrt{81 + 16}$$

$$\sqrt{97}$$

$$\begin{array}{ccc} \sqrt{81} & & \sqrt{100} \\ 9 & & 10 \end{array}$$

$$\sqrt{97} \approx 9.8$$

$$\text{c) } \sqrt{\sqrt{81} + 16}$$

$$\sqrt{9 + 16}$$

$$\sqrt{25}$$

$$5$$

$$\text{d) } \sqrt{81 + \sqrt{16}}$$

$$\sqrt{81 + 4}$$

$$\sqrt{85}$$

$$\approx 9.2$$

$$\text{e) } \sqrt{\sqrt{81} + \sqrt{16}}$$

$$\sqrt{9 + 4}$$

$$\sqrt{13}$$

$$\approx 3.6$$

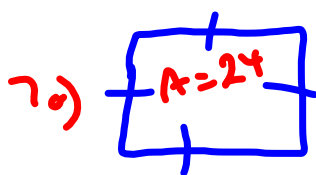
# Class/Homework



Mid-Unit Review

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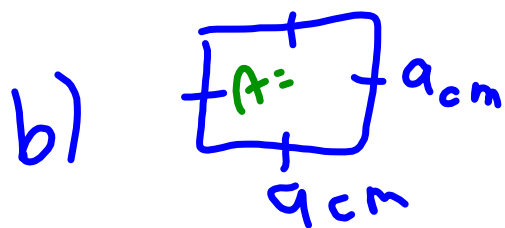
$$\sqrt{16} = 4 \quad (4^2 = 16)$$



$$\text{Side} = \sqrt{\text{Area}}$$

$$\begin{array}{c} \sqrt{24} \\ \swarrow \quad \searrow \\ \sqrt{16} \quad \sqrt{25} \\ \downarrow \quad \downarrow \\ 4 \quad 5 \end{array}$$

$$4.9 \text{ cm}$$



$$\begin{array}{l} \text{Area} = \text{side} \times \text{side} \\ 9 \times 9 \\ 81 \text{ cm}^2 \end{array}$$