

## Warm up

1) If a number has 13 factors, what can you tell me about that number?

odd # of factors means the # is a perfect square

2) Show the symbol for each then work it out on a calculator

a) Square 49      b) Square root 81

$$49^2 = 2401 \quad \sqrt{81} = 9$$

3) a) find  $16^2 = 256$       b)  $\sqrt{900} = 30$

4) Show work to Estimate

a)  $\sqrt{74}$

$$\sqrt{64} \sqrt{81} = 8.6$$

8      9

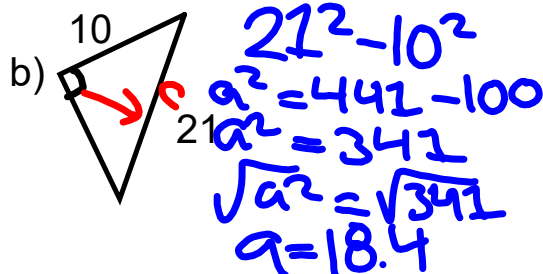
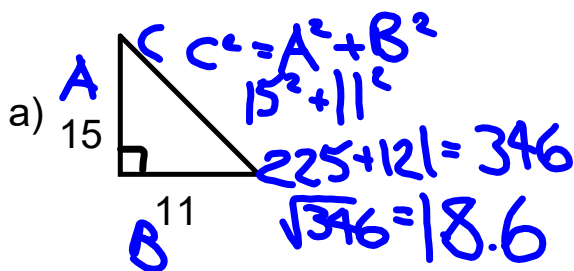
b)  $\sqrt{221}$

$$\sqrt{196} \sqrt{225} = 14.8$$

= 14      = 15

$$a^2 = c^2 - b^2$$

5) Find the missing side to one decimal place (Show all work)



# Unit 1 Test Review Worksheet SOLUTIONS

Show your work for the following

1. List the factors of 216. Is the number a perfect square? Explain with numbers of fact

$1 \times 216$      $8 \times 27$     1, 2, 3, 4, 5, 6, 8, 9, 12, 18, 27, 36, 54, 72, 108, 216  
 $2 \times 108$      $9 \times 24$   
 $3 \times 72$      $12 \times 18$   
 $4 \times 54$   
 $6 \times 36$

even # of factors  
not a perfect square

225  
196  
169  
144  
121

2. Find the square root of the following using the given method:

(a)  $\sqrt{1764}$  - product of perfect squares

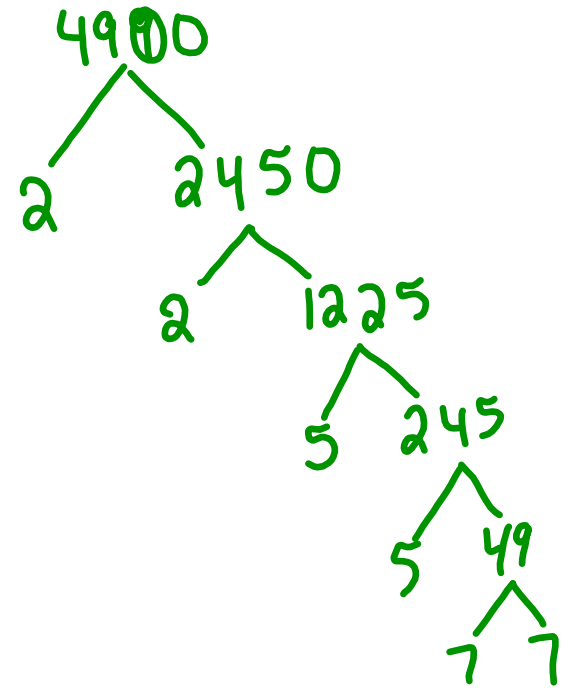
$\sqrt{(9) \times (196)}$   
 $\sqrt{9} \times \sqrt{196}$   
 $3 \times 14$   
 $42$

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

3 pts

(b)  $\sqrt{4900}$  - prime factorization (hint: TREE)

2, 3, 5, 7, 9, 11, 13, ...

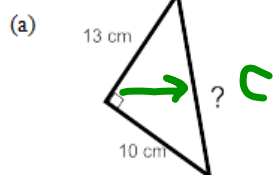


$$\begin{aligned}
 \sqrt{4900} &= \sqrt{2 \times 2 \times 5 \times 5 \times 7 \times 7} \\
 &= \sqrt{2 \times 2} \times \sqrt{5 \times 5} \times \sqrt{7 \times 7} \\
 &= 2 \times 5 \times 7
 \end{aligned}$$

$$\sqrt{4900} = 70$$

4 pt

3. Find the length of the indicated side in each triangle (SHOW WORK)



$$c^2 = a^2 + b^2$$

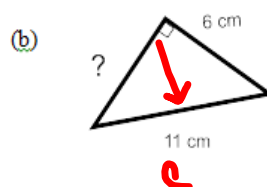
$$c^2 = (10)^2 + (13)^2$$

$$c^2 = 100 + 169$$

$$c^2 = 269$$

$$c = \sqrt{269}$$

$$c = 16.4$$



$$a^2 = c^2 - b^2$$

$$= (11)^2 - (6)^2$$

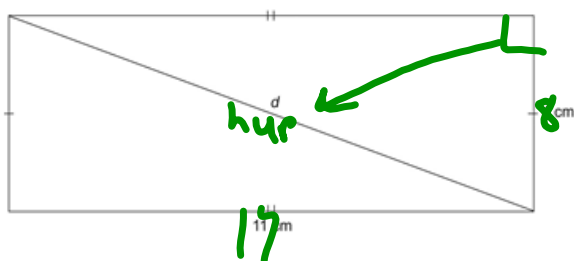
$$= 121 - 36$$

$$a^2 = 85$$

$$a = \sqrt{85}$$

$$a = 9.2$$

4. Find the length of the diagonal,  $d$ , in this rectangle.



$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 &= (17)^2 + (8)^2 \\
 &= 289 + 64 \\
 c^2 &= 353 \\
 c &= \sqrt{353} \\
 c &= 18.8\text{cm}
 \end{aligned}$$

5. Simplify.

a) square 49  $49^2 = \underline{2401}$

b) square root of 36  $= \underline{6}$

c)  $(\sqrt{35})^2 = \underline{35}$

6. Estimate the following (make sure to show work)

(a)  $\sqrt{190}$

$\sqrt{169}$        $\sqrt{196}$   
 $\Downarrow$        $\Downarrow$   
 13      14

13.6

(b)  $\sqrt{20}$

$\sqrt{16}$        $\sqrt{25}$   
 $\Downarrow$        $\Downarrow$   
 4      5

4.4

8. Determine whether a triangle with each set of side lengths is a right triangle. Justify your answers. (Show work)  
 8cm, 9 cm, and 11 cm

$c^2$	$a^2 + b^2$
$11^2$	$(8)^2 + (9)^2$
121	64 + 81
	145

Not equal

8, 9, 11 does Not form a right  $\Delta$

10. A trucker has two companies to choose to work at.  
 Company A follows route 1 and pays \$15/km  
 Company B follows route 2 and pays \$19/km



- a) What is the trucker's pay if he goes with company A?

$$62 \text{ km} + 36 \text{ km} = 98 \text{ km}$$

$$\begin{array}{r} \times 15 \\ \hline \$ 1470 \end{array}$$

get paid \$1470  
w/ company A

- b) What is the trucker's pay if he goes with company B?  
 (Note: this requires 2 steps)

$$c^2 = a^2 + b^2$$

$$= (62)^2 + (36)^2$$

$$c^2 = 3844 + 1296$$

$$c^2 = 5140$$

$$c = \sqrt{5140}$$

$$c = 71.7 \text{ km}$$

$$\begin{array}{r} 71.7 \text{ km} \\ \times \$ 19 \\ \hline \$ 1362.20 \end{array}$$

get paid \$1362.20  
w/ company B

- c) Which is the better option? Explain

Company A pays \$1470  
\$ 107.8 more

## Review for Test

Know what perfect squares are ( be able to explain and/ or model)

odd number of factor means perfect square

Repeated factor means perfect square

Even number of factor then not a perfect square

Model would be to draw a square and label the side lengths

Know the perfect squares from 1 - 225

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

If given the area of a square, be able to find the side length and vice versa.

$$\text{Area} = (\text{side})^2 \quad \text{AND} \quad \text{Side} = \sqrt{\text{Area}}$$

Know what square roots are and be able to find the square roots using:

- factors
- product of perfect squares
- prime factorization
- using a calculator

Be able to estimate square roots using the perfect squares before and after the number.

Know what the Pythagorean Theorem is, know when and how to use it.

Be able to determine is a triangle is a right triangle, or if a set of numbers is a Pythagorean triple.

Be able to apply the Pythagorean Theorem to word problems.

# Class/Homework

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#4(a,d), #7, #9(a,b,c), #11(a), #14(a,f),

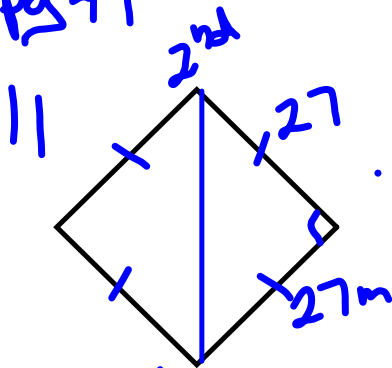
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#17(a,b), #18(a,b), #19(a), #21, #27





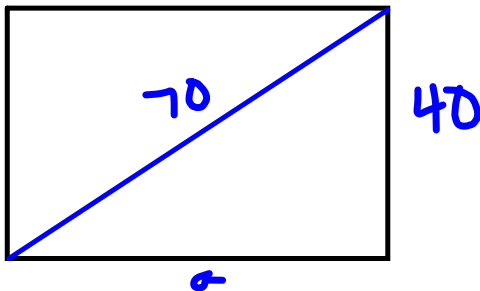
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The throw must  
be 38.2 m

$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 c^2 &= 27^2 + 27^2 \\
 c^2 &= 729 + 729 \\
 c^2 &= 1458 \\
 \sqrt{c^2} &= \sqrt{1458} \\
 c &= 38.2 \text{ m}
 \end{aligned}$$

13.



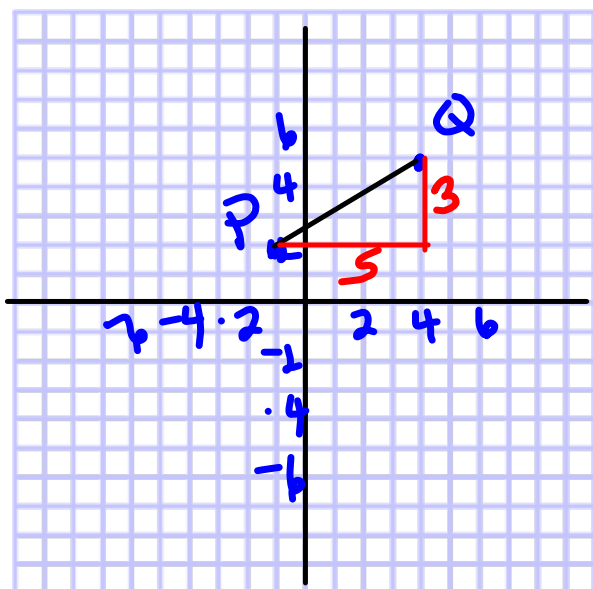
$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 70^2 &= a^2 + 40^2 \\
 4900 &= a^2 + 1600 \\
 4900 - 1600 &= a^2 + 1600 - 1600 \\
 3300 &= a^2 \\
 \sqrt{3300} &= \sqrt{a^2} \\
 57.4 &= a \\
 &\text{cm}
 \end{aligned}$$

The length is 57.4 cm

14. To get from A to B, you move right 4 and up 3.

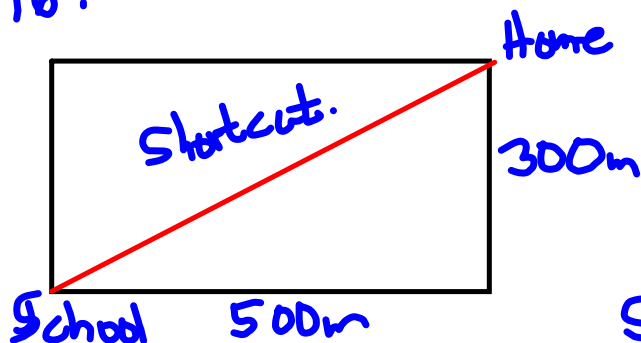
To get from A to F, you move down 3 and left 4, so F is the same distance from A as B is.

15.  
 P (-1, 2)  
 Q (4, 5)



$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 c^2 &= 3^2 + 5^2 \\
 c^2 &= 9 + 25 \\
 c^2 &= 34 \\
 \sqrt{c^2} &= \sqrt{34} \\
 c &= 5.8
 \end{aligned}$$

16.



Joanna normally walks 800m

$$\begin{aligned}
 \text{Short cut} \\
 c^2 &= a^2 + b^2 \\
 c^2 &= 300^2 + 500^2 \\
 c^2 &= 9000 + 25000 \\
 c^2 &= 34000 \\
 \sqrt{c^2} &= \sqrt{34000} \\
 c &= 583
 \end{aligned}$$

$$\begin{array}{r}
 79 \\
 806 \\
 -583 \\
 \hline
 217
 \end{array}$$

The shortcut is 217m shorter

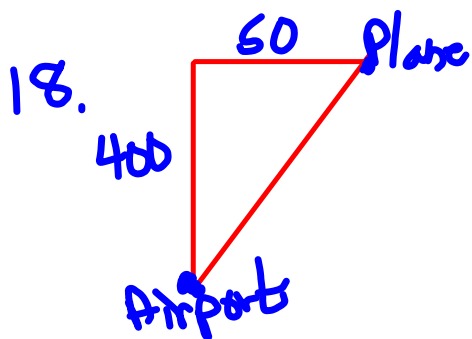
17. Does 650, 720 and 970 form a right triangle

$$970^2 \quad . \quad 650^2 + 720^2$$

$$940900 \quad \quad 422500 + 518400$$

$$940900 \quad \quad 940900$$

Yes they were travelling at right angles.



$$c^2 = a^2 + b^2$$

$$c^2 = 400^2 + 50^2$$

$$c^2 = 160000 + 2500$$

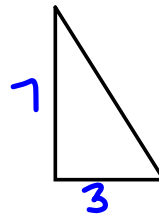
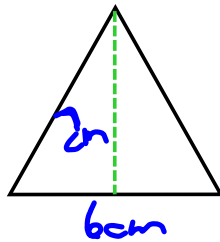
$$c^2 = 162500$$

$$\sqrt{c^2} = \sqrt{162500}$$

$$c = 403.1 \text{ km}$$

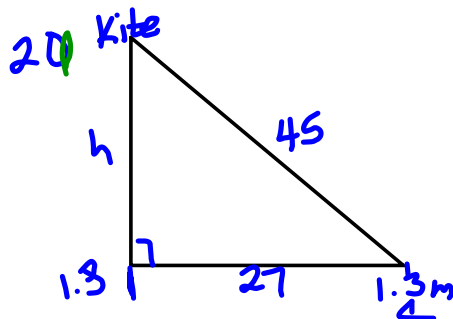
The plane is 403.1 km from the airport

19.



$$\begin{aligned} c^2 &= a^2 + b^2 \\ c^2 &= 7^2 + 3^2 \\ c^2 &= 49 + 9 \\ c^2 &= 58 \\ \sqrt{c^2} &= \sqrt{58} \\ c &= 7.6 \text{ cm} \end{aligned}$$

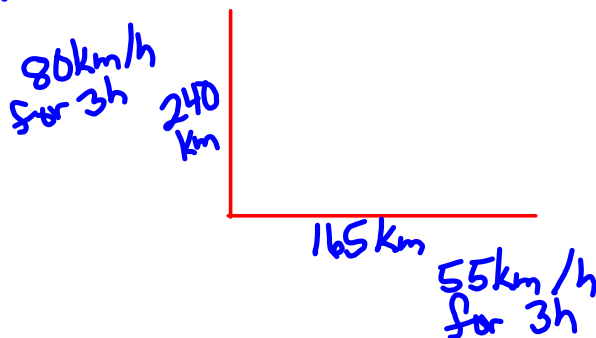
The slant height  
is 7.6 cm



$$\begin{aligned} c^2 &= a^2 + b^2 \\ 45^2 &= a^2 + 27^2 \\ 2025 &= a^2 + 729 \\ 2025 - 729 &= a^2 + 729 - 729 \\ 1296 &= a^2 \\ \sqrt{1296} &= \sqrt{a^2} \\ 36 &= a \end{aligned}$$

The kite is  $36 + 1.3$  or  $37.3$  m  
in the air.

22. - Discuss



line length

$$\sqrt{5}$$

$$(\sqrt{5})^2 = 5$$

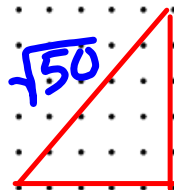
$$a^2 + b^2 = 5$$

$$1 + 4$$

$$a^2 = 1$$

$$b^2 = 4$$

$$b = 2$$



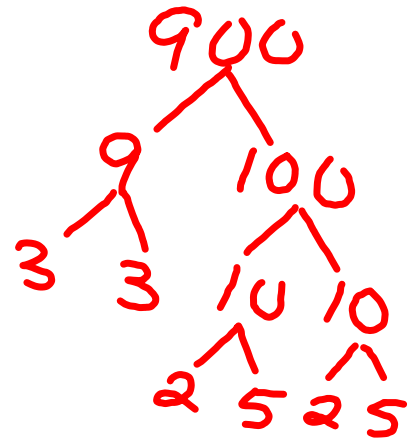
$$5^2 + 5^2$$

$$25 + 25$$

$$50$$



$$\begin{aligned}\sqrt{900} &= \sqrt{9 \times 100} \\ &= \sqrt{9} \times \sqrt{100} \\ &= 3 \times 10 \\ &= 30\end{aligned}$$



$$\begin{aligned}\sqrt{2 \times 2 \times 3 \times 3 \times 5 \times 5} \\ = 2 \times 3 \times 5 \\ = 30\end{aligned}$$

$$\begin{array}{l} 900 \\ \sqrt{1 \times 900} \\ 2 \times 450 \\ 3 \times 300 \\ 4 \times 225 \\ 5 \times 180 \\ 6 \times 150 \\ 9 \times 100 \\ 10 \times 90 \\ 12 \times 75 \\ 15 \times 60 \\ 20 \times 45 \\ 25 \times 36 \\ 30 \times 30 \end{array}$$

25 factors - odd  
so perfect square

$$30 \times 30 = 900$$

$$\text{so } \sqrt{900} = 30$$