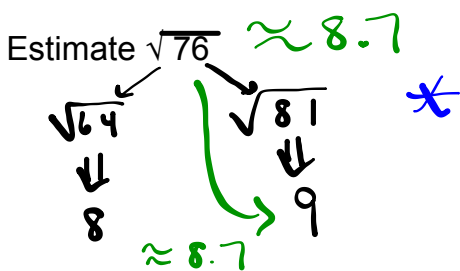


Jan. 20, 2016

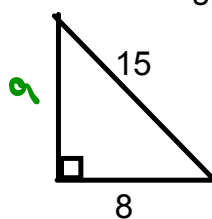
Math 8 Test Review

No Calculators

- $1^2 = 1$
- $2^2 = 4$
- $3^2 = 9$
- $4^2 = 16$
- $5^2 = 25$
- $6^2 = 36$
- $7^2 = 49$
- $8^2 = 64$
- $9^2 = 81$
- $10^2 = 100$
- $11^2 = 121$
- $12^2 = 144$
- $13^2 = 169$
- $14^2 = 196$
- $15^2 = 225$

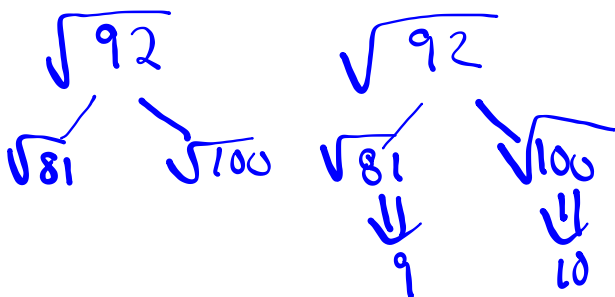


Find the missing side



$$\begin{array}{r} 225 \\ - 64 \\ \hline 161 \end{array}$$

$$\begin{aligned} a^2 &= c^2 - b^2 \\ a^2 &= 15^2 - 8^2 \\ a^2 &= 225 - 64 \\ a^2 &= 161 \\ a &= \sqrt{161} \\ &\begin{array}{l} \swarrow \quad \searrow \\ \sqrt{144} \quad \sqrt{169} \\ 12 \quad \quad 13 \\ \approx 12.6 \end{array} \end{aligned}$$



HOW does the number of factors help determine if a number is perfect?

List the factors of 36

- 1, 2, 3, 4, 6, 9, 12, 18, 36  
(9 factors, it is odd)

List the factors of 18

- 1, 2, 3, 6, 9, 18  
(6 factors, even)

- $1 \times 18$
- $2 \times 9$
- $3 \times 6$

- $1 \times 36$
- $2 \times 18$
- $3 \times 12$
- $4 \times 9$
- $6 \times 6$

odd # of factors means you have a perfect square #  
even # of factors means you have a non-perfect square #

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

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

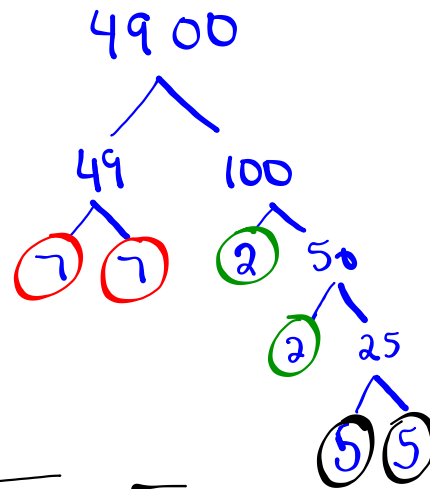
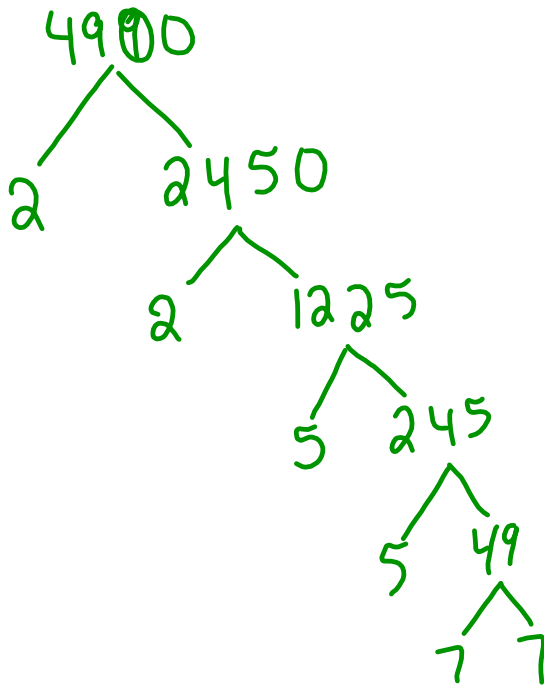
1, 4, 9, 16, 25, 36, 49, 64, 81, 100

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

3 pts

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

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



$\sqrt{4900} = \sqrt{7 \times 7} \times \sqrt{2 \times 2} \times \sqrt{5 \times 5}$   
 $= 7 \times 2 \times 5$   
 $= 14 \times 5$   
 $= 70$

4 pt

$\sqrt{4900} = \sqrt{2 \times 2 \times 5 \times 5 \times 7 \times 7}$   
 $= \sqrt{2 \times 2} \times \sqrt{5 \times 5} \times \sqrt{7 \times 7}$   
 $= 2 \times 5 \times 7$

$\sqrt{4900} = 70$

$$\sqrt{8100}$$



$$= \sqrt{81} \times \sqrt{100}$$

$$= 9 \times 10$$

$$= 90$$

24

$$1 \times 24$$

$$2 \times 12$$

$$3 \times 8$$

$$4 \times 6$$

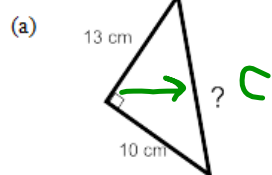
1, 2, 3, 4, 6, 12, 24

8 factors

even # of factors

So not a perfect  $\square$   
#

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



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

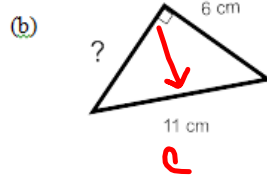
$$c^2 = (10)^2 + (13)^2$$

$$c^2 = 100 + 169$$

$$c^2 = 269$$

$$c = \sqrt{269}$$

$$c = 16.4$$



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

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

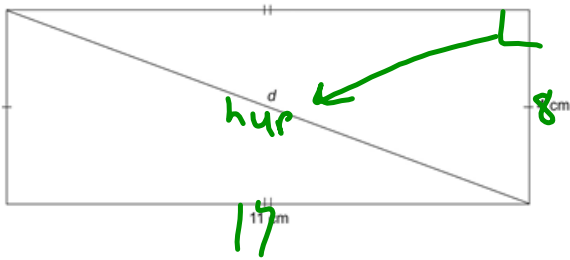
$$= 121 - 36$$

$$a^2 = 85$$

$$a = \sqrt{85}$$

$$a = 9.2$$

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



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

5. Simplify.

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

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

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

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

$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 &= (11)^2 + (4)^2 \\
 c^2 &= 121 + 16
 \end{aligned}$$

$$c^2 = 137$$

$$c = \sqrt{137}$$

$$= \sqrt{4} \left( \sqrt{144} \right)$$

"      "      "      "      "

$$c = 11.7$$

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

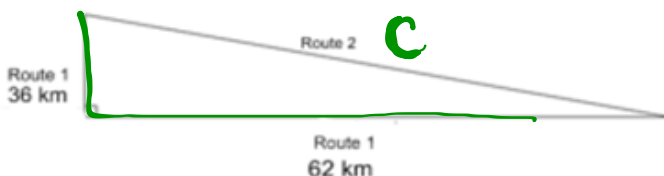
8. Determine whether a triangle with each set of side lengths is a right triangle. Justify your answers. (Show work)  
 8 cm, 9 cm, and 11 cm

$c^2$	$a^2 + b^2$
$11^2$	$(8)^2 + (9)^2$
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

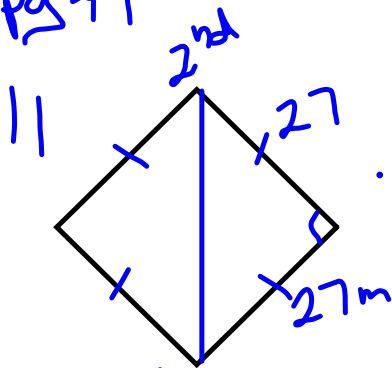
Page 49  
#11, #17

Page 55  
#4(a,d), #7, #9(a,b,c), #11(a), #14(a,f),

Page 56  
#17(a,b), #18(a,b), #19(a), #21, #27

UNIT 1 TEST Tomorrow

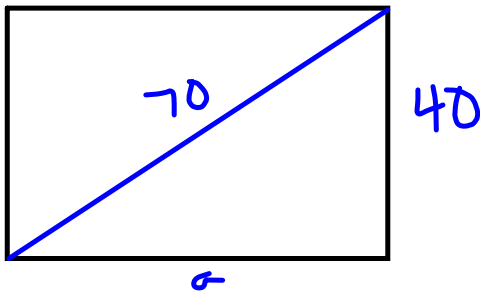
pg 49



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.



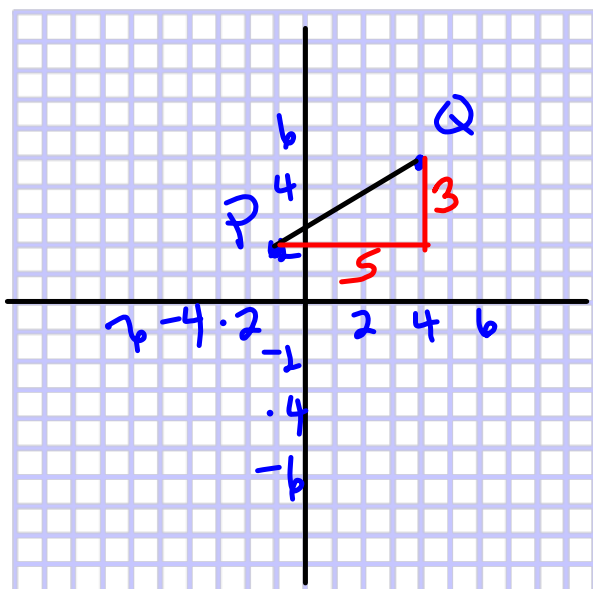
$$\begin{aligned}
 c^2 &= a^2 + b^2 \\
 70^2 &= a^2 + 40^2 \\
 4900 &= a^2 + 1600 \\
 4900 - 1600 &= a^2 + 1600 - 1600 \\
 3300 &= a^2 \\
 \sqrt{3300} &= \sqrt{a^2} \\
 57.4 &= a \\
 &\text{cm}
 \end{aligned}$$

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)



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

$$c^2 = 3^2 + 5^2$$

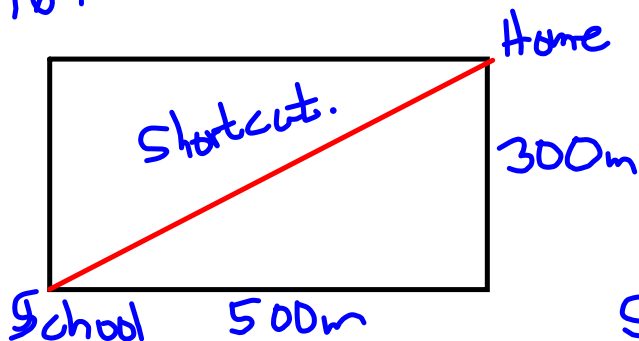
$$c^2 = 9 + 25$$

$$c^2 = 34$$

$$\sqrt{c^2} = \sqrt{34}$$

$$c = 5.8$$

16.



Joanna normally walks 800m

Short cut

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

$$c^2 = 300^2 + 500^2$$

$$c^2 = 9000 + 25000$$

$$c^2 = 34000$$

$$\sqrt{c^2} = \sqrt{34000}$$

$$c = 583$$

$$\begin{array}{r} 75 \\ 800 \\ -583 \\ \hline 217 \end{array}$$

The shortcut is 217m shorter

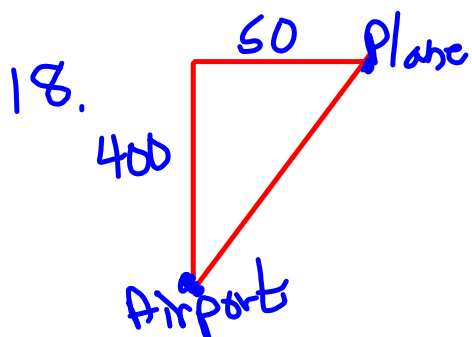
17. Does 650, 720 and 970 form a right triangle

$$970^2 = 650^2 + 720^2$$

$$940900 = 422500 + 518400$$

$$940900 = 940900$$

Yes they were travelling at right angles.



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

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

$$c^2 = 160000 + 2500$$

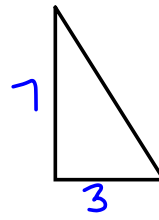
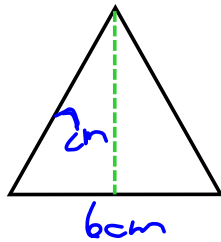
$$c^2 = 162500$$

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

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

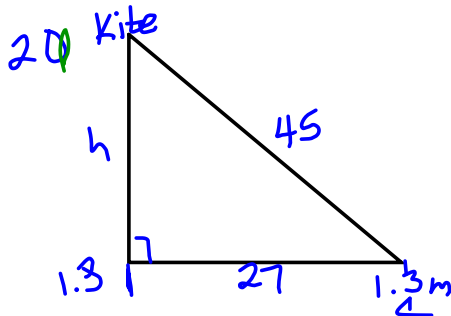
The plane is 403.1 km from the airport

19.



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

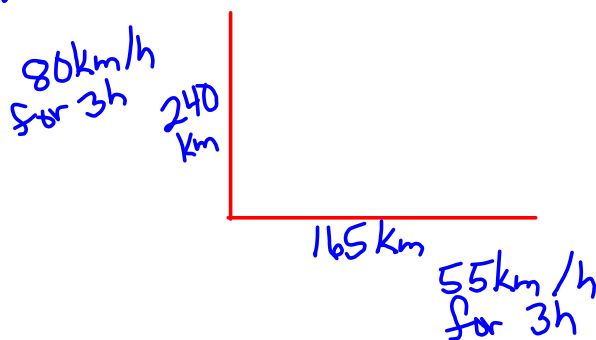
The slant height is 7.6 cm



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

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

22. - Discuss



line length

$$\sqrt{5}$$

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

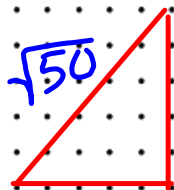
$$a^2 + b^2 = 5$$

$$1 + 4$$

$$a^2 = 1$$

$$b^2 = 4$$

$$b = 2$$



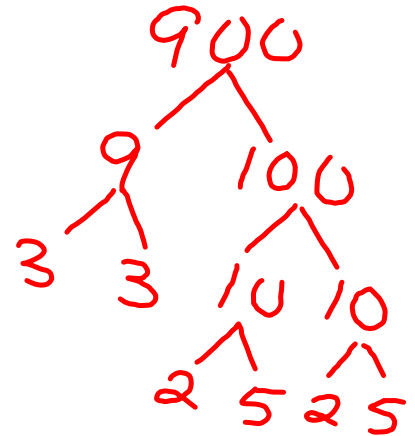
$$5^2 + 5^2$$

$$25 + 25$$

$$50$$



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



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

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

25 factors - odd  
so perfect square

$$30 \times 30 = 900$$

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