



Warm Up Grade 8

Feb. 15

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

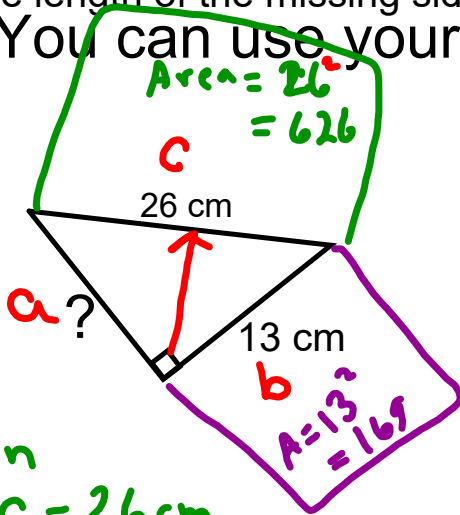
$$a^2 = c^2 - b^2$$



Find the length of the missing side (Use calculators but show your work)

You can use your notes

a)



Given

$$c = 26 \text{ cm}$$

$$b = 13 \text{ cm}$$

$$a = ?$$

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

$$a^2 = (26 \text{ cm})^2 - (13 \text{ cm})^2$$

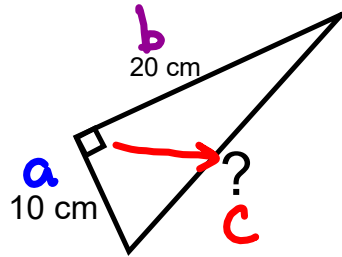
$$a^2 = 676 \text{ cm}^2 - 169 \text{ cm}^2$$

$$a^2 = 507 \text{ cm}^2$$

$$\sqrt{a^2} = \sqrt{507 \text{ cm}^2}$$

$$a = 22.5 \text{ cm}$$

b)



Given:  $a = 10 \text{ cm}$   
 $b = 20 \text{ cm}$   
 $c = ?$

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

$$c^2 = (10 \text{ cm})^2 + (20 \text{ cm})^2$$

$$c^2 = 100 \text{ cm}^2 + 400 \text{ cm}^2$$

$$c^2 = 500 \text{ cm}^2$$

$$\sqrt{c^2} = \sqrt{500 \text{ cm}^2}$$

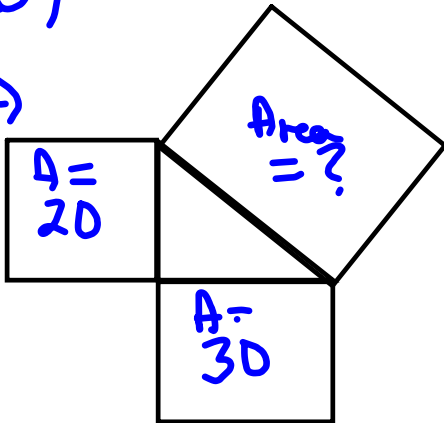
$$c \approx 22.3 \text{ cm}$$

Area of Square off Side  $a$

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

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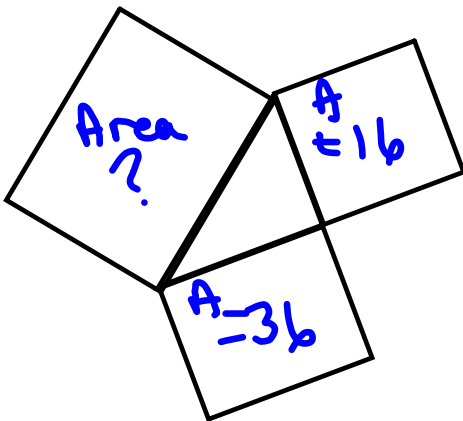
3a)



Missing Area  
 $20 + 30 = 50$

$A = 50$   
 Side Length =  $\sqrt{50}$

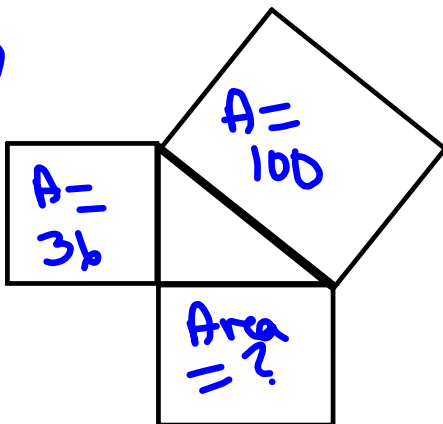
b)



Missing Area  
 $16 + 36 = 52$

$A = 52$   
 Side Length =  $\sqrt{52}$

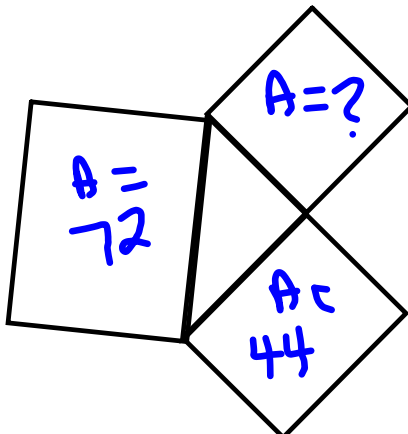
4a)



Missing Area  
 $100 - 36 = 64$

$A = 64$   
 Side Length =  $\sqrt{64} = 8$

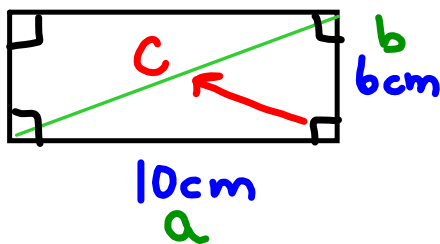
b)



Missing Area  
 $72 - 44 = 28$

$A = 28$   
 Side Length =  $\sqrt{28}$

A rectangular pencil case has dimensions 10 cm by 6 cm. What is the longest pencil that can fit in the pencil case?



Given

$$a = 10\text{cm}$$

$$b = 6\text{ cm}$$

$$c = ?$$

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

$$c^2 = (10\text{cm})^2 + (6\text{cm})^2$$

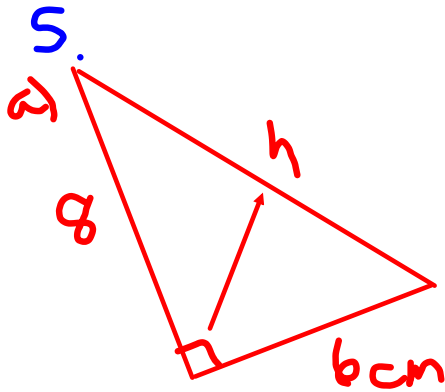
$$c^2 = \underline{100\text{cm}^2} + \underline{36\text{cm}^2}$$

$$c^2 = \underline{136\text{cm}^2}$$

$$\sqrt{c^2} = \sqrt{\underline{136\text{cm}^2}}$$

$$c \approx \underline{11.6\text{ cm}}$$

The longest pencil that can fit in the pencil case is 11.6 cm.



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

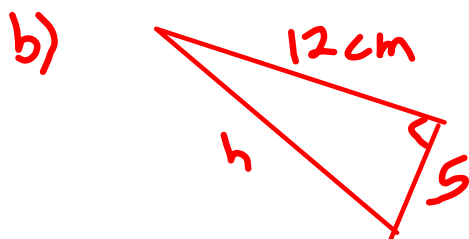
$$c^2 = 8^2 + 6^2$$

$$c^2 = 64 + 36$$

$$c^2 = 100$$

$$\sqrt{c^2} = \sqrt{100}$$

$$c = 10 \text{ cm}$$



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

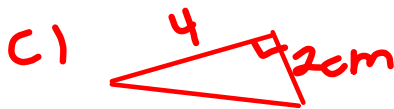
$$c^2 = 12^2 + 5^2$$

$$c^2 = 144 + 25$$

$$c^2 = 169$$

$$\sqrt{c^2} = \sqrt{169}$$

$$c = 13 \text{ cm}$$



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

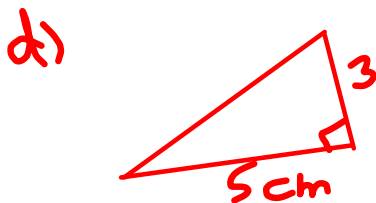
$$c^2 = 4^2 + 2^2$$

$$c^2 = 16 + 4$$

$$c^2 = 20$$

$$\sqrt{c^2} = \sqrt{20}$$

$$c = 4.5 \text{ cm}$$



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

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

$$c^2 = 25 + 9$$

$$c^2 = 34$$

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

$$c = 5.8 \text{ cm}$$

# Class/Homework

Given

$a =$   
 $b =$   
 $c =$

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# 3a, 4a, 5(a,b), 6(c,d), 7(a,b), 8(a,b), 9(a), ~~10~~, ~~12~~, 13(a,b)

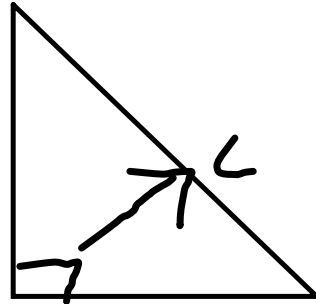
REMEMBER

$$(\sqrt{20})^2 = 20$$

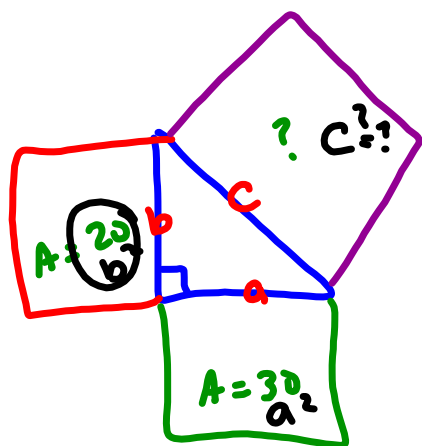
$$\sqrt{20} \times \sqrt{20}$$

$$\sqrt{20 \times 20}$$

$$20$$



Make sure to  
check if you  
are finding  
c or a



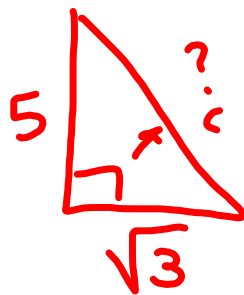
$$C^2 = \underbrace{a^2} + \underbrace{b^2}$$
$$30 + 20$$

Given (Given the square area)  $C^2 = 50$

$$a^2 = 30$$

$$b^2 = 20$$

$$C^2 = ?$$

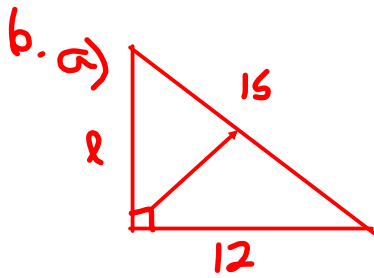


$$a^2 + b^2 = c^2$$
$$(\sqrt{3})^2 + (5)^2 = c^2$$

$$3 + 25 = c^2$$

$$\sqrt{28} = \sqrt{c^2}$$

$$\boxed{5.29c}$$



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

$$15^2 = a^2 + 12^2$$

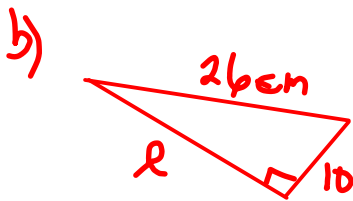
$$225 = a^2 + 144$$

$$225 - 144 = a^2 + 144 - 144$$

$$81 = a^2$$

$$\sqrt{81} = \sqrt{a^2}$$

$$9 = a$$



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

$$26^2 = a^2 + 10^2$$

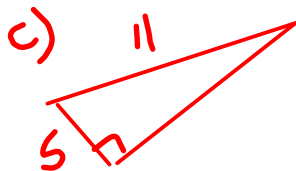
$$676 = a^2 + 100$$

$$676 - 100 = a^2 + 100 - 100$$

$$576 = a^2$$

$$\sqrt{576} = \sqrt{a^2}$$

$$24 = a$$



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

$$11^2 = a^2 + 5^2$$

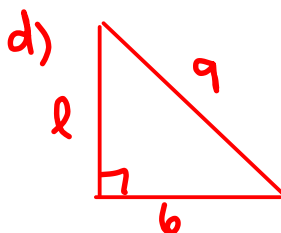
$$121 = a^2 + 25$$

$$121 - 25 = a^2 + 25 - 25$$

$$96 = a^2$$

$$\sqrt{96} = \sqrt{a^2}$$

$$9.8 = a$$



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

$$9^2 = a^2 + 6^2$$

$$81 = a^2 + 36$$

$$81 - 36 = a^2 + 36 - 36$$

$$45 = a^2$$

$$\sqrt{45} = \sqrt{a^2}$$

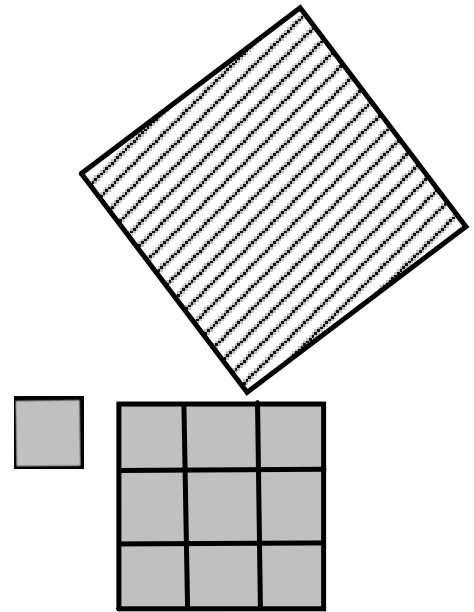
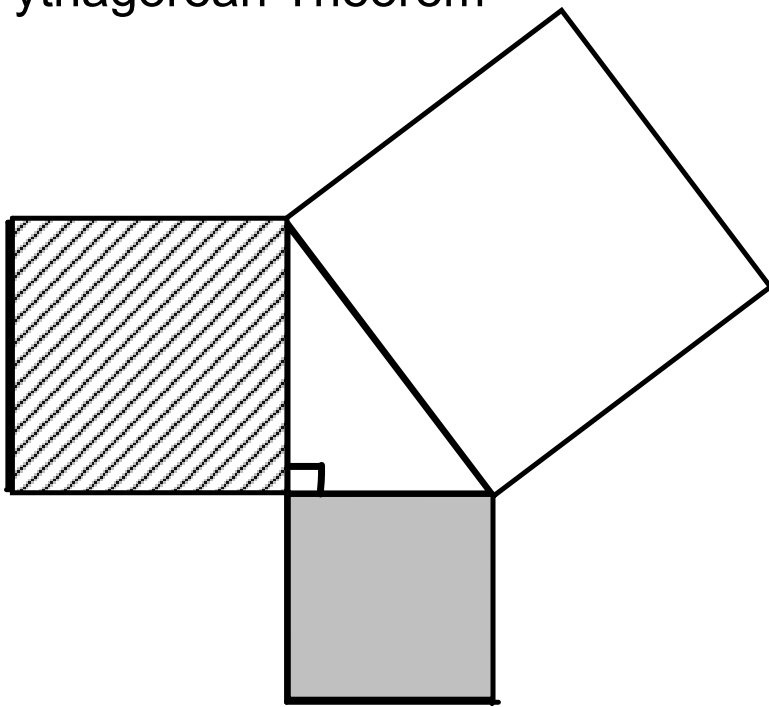
$$6.7 = a$$







# Pythagorean Theorem

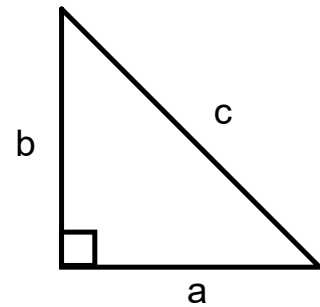


## Pythagorean Theorem

- Right Angle Triangle has one angle that  $90^\circ$
- the side directly across to the right angle is always the longest side, it is the **hypotenuse**.

We use "c" for the hypotenuse

- Legs are side "a" and "b"



### Pythagorean Theorem Equation:

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

area of the square  
off the hypotenuse

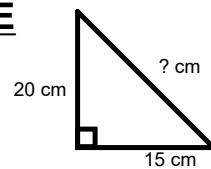
$$(c)^2 - (b)^2 = (a)^2$$

area of the square  
off the leg

**Pythagorean Theorem Equation:**

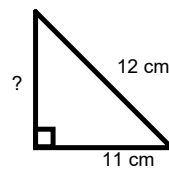
Then to find the length of the **HYPOTENUSE**

$$c = \sqrt{(a)^2 + (b)^2}$$



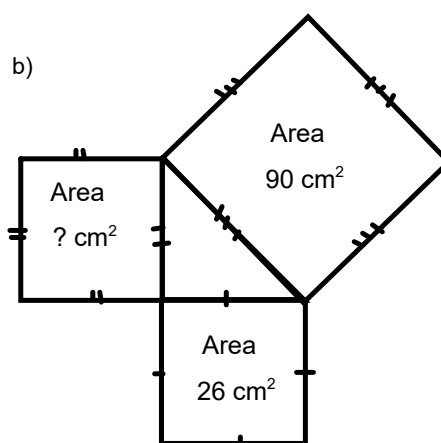
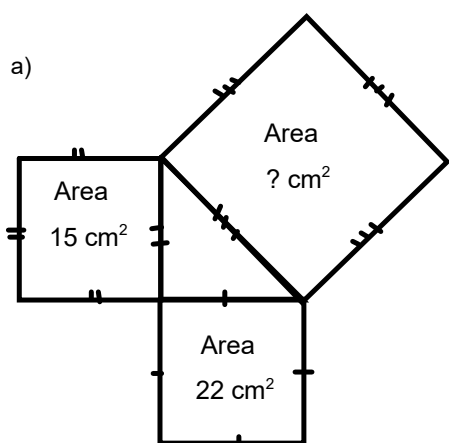
Then to find the length of a **LEG**

$$a = \sqrt{(c)^2 - (b)^2}$$



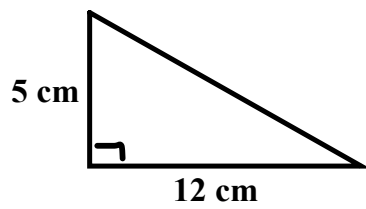
### Example)

Find the area of the indicated square:

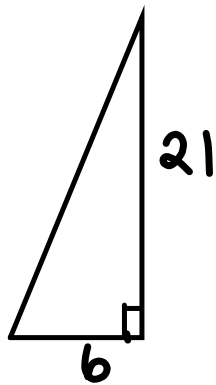


**Examples:**

2a)

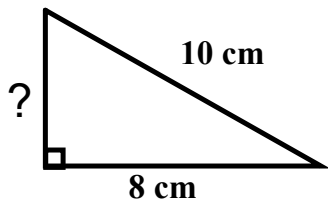


2b)

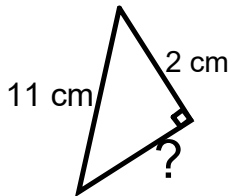


**Examples:**

3a)



3b)







# Class/Homework



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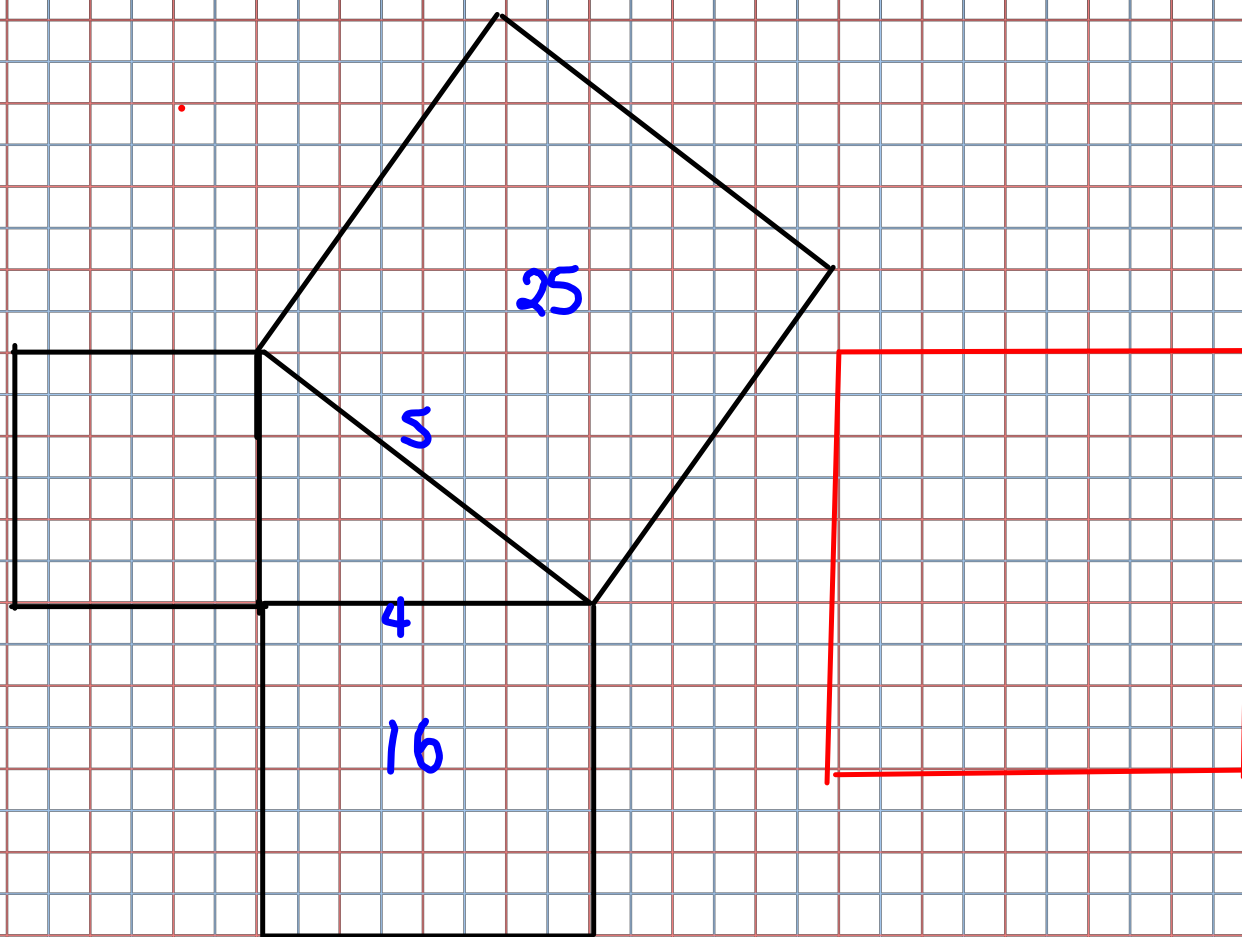
#3(a,b)

#4(a,b)

#5(a,c)

#6(a,c)

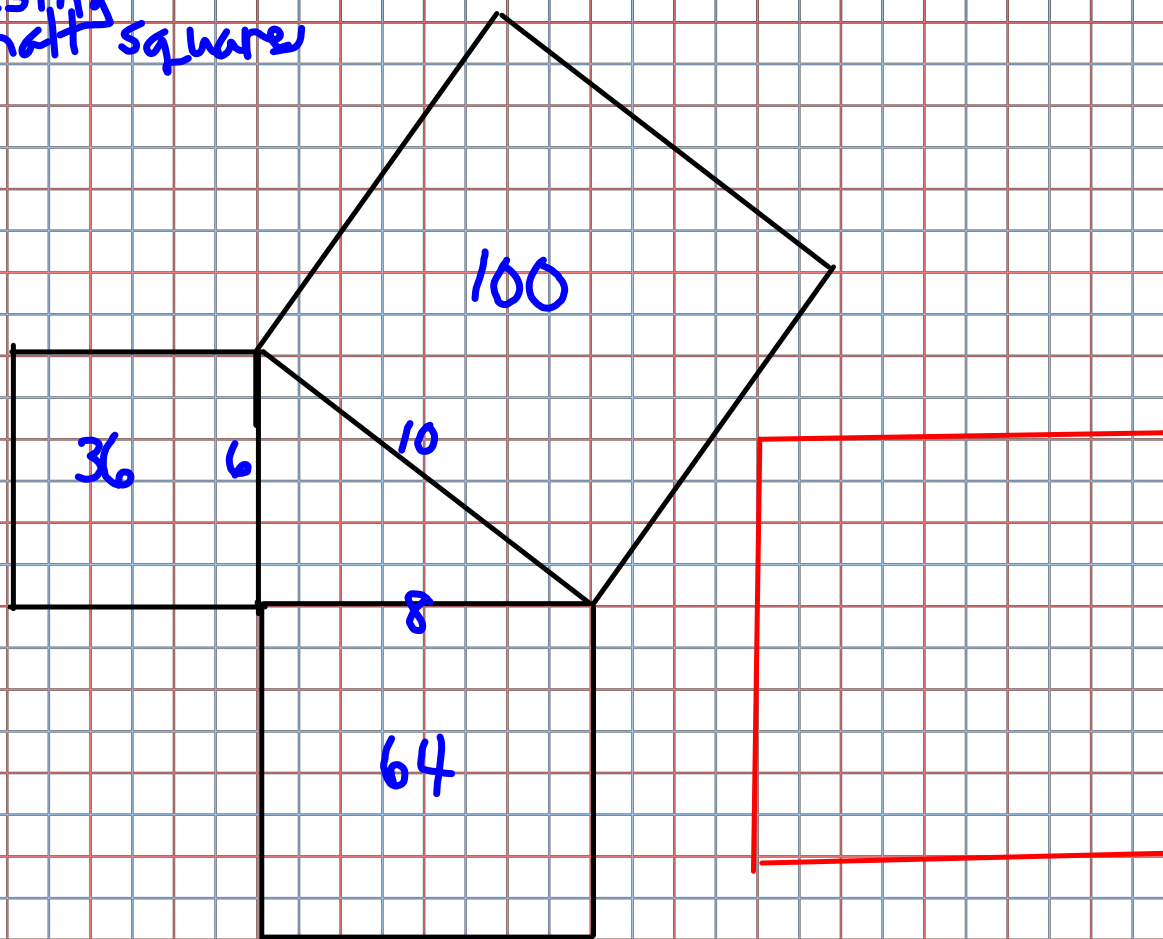
#7(a,b)



### Pythagorean Theorem

**The Pythagorean Theorem is used with right triangles only. It gives you a way of finding the length of the third side if you know the other 2 sides of the triangle.**

-using  
small square



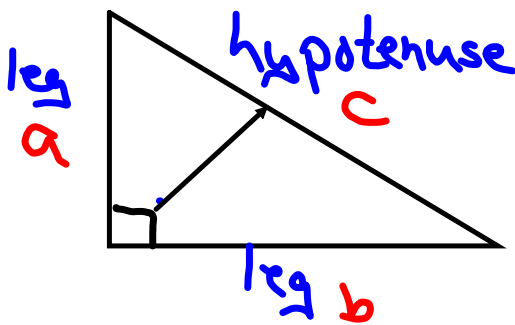
### Pythagorean Theorem

The Pythagorean Theorem is used with right triangles only. It gives you a way of finding the length of the third side if you know the other 2 sides of the triangle.

## Pythagorean Theorem

If you have a right angle triangle, you can square the lengths of the legs of the triangle, then add these 2 values and you will get the square of the hypotenuse.

The hypotenuse is the longest side of a right angle triangle, directly across from the right angle.



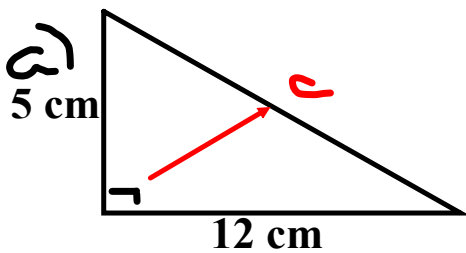
Pythagorean Theorem

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

or

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

Examples:



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

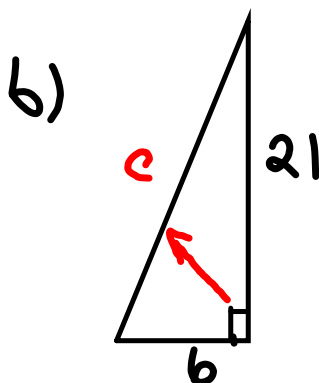
$$c^2 = 5^2 + 12^2$$

$$c^2 = 25 + 144$$

$$c^2 = 169$$

$$\sqrt{c^2} = \sqrt{169}$$

$$c = 13$$



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

$$c^2 = 6^2 + 21^2$$

$$c^2 = 36 + 441$$

$$c^2 = 477$$

$$\sqrt{c^2} = \sqrt{477}$$

$$c = 21.84$$

$$\begin{array}{r} 10934 \\ \underline{13-6} \end{array}$$