Pythagorean Theorem
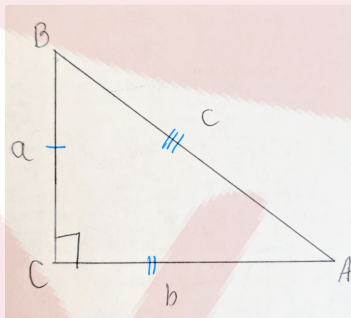
Pythagorean Theorem

The Pythagorean Theorem of Theorem of Pythagorus is a theorem or rule that related the lengths of the sides of a right angled triangle. First some definitions. A right angled triangle is a traingle with one 90° angle. The side opposite the 90° angle is called the *hypontenuse*, *h*. Let's choose one of the other angles in the triangle and label it as θ. The side beside the angle θ is called the *adjacent* side, *a*. The side opposite the angle θ is called the *opposite* side, *o*. There is a relationshiop between the three sides of a right angled triangle called the *Theorem of Pythagorus*.
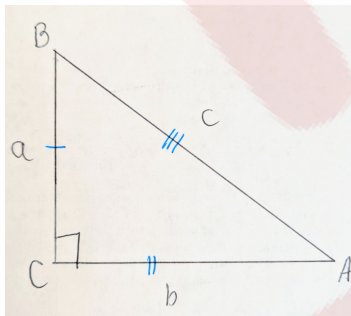
Pythagorean Theorem

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$$a^2 + b^2 = c^2 \tag{1}$$

Let's have a look at an example to see the application of the Theorem of Pythagorus.

Example

For the following triangle, where $a = 4cm$ and $b = 3cm$ find the missing side using the theorm of Pythagorus.
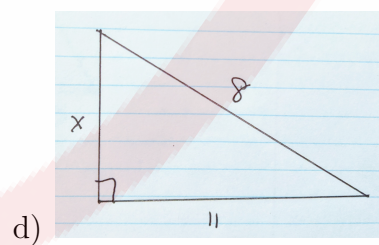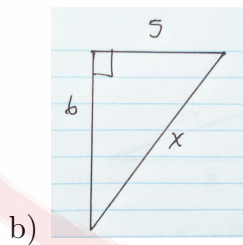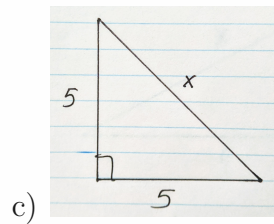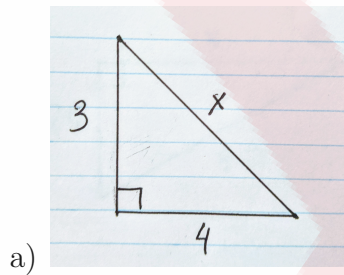
Solution: The side we are looking for is opposite the right angle, or the hypotenuse. By the theorm of Pythagorus in equation (1), we have,
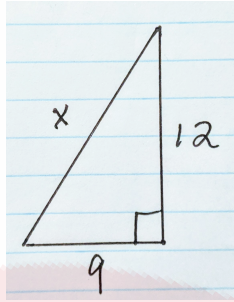
$$
\begin{aligned}
c^2 &= a^2 + b^2 \\
&= 4^2 + 3^2 \\
&= 16 + 9 \\
&= 25 \\
\therefore c &= \sqrt{25} \\
c &= 5cm
\end{aligned}
$$

Therefore, the length of the missing side, or the hypotenuse, is $5cm$.
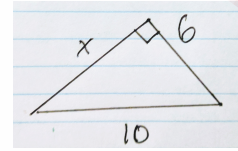
Exercises

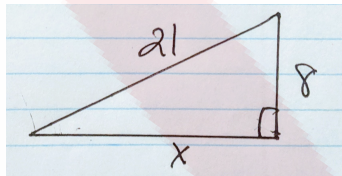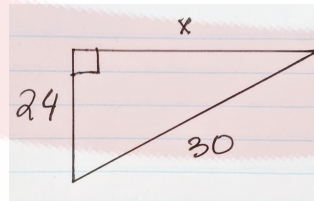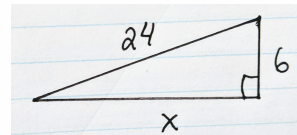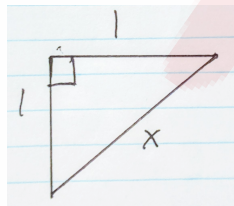Use the pythagorean Theorem to find the missing side length in the following right angled triangles.

a)

c)

b)

d)

e)

x
12
9

h)

x
6
10

f)

21
8
x

i)

x
24
30

g)

1
l
x

j)

24
6
x

k)

x
5
y
9
3