the study of angles and triangles

The Tangent Ratio

hypotenuse

legs

legs
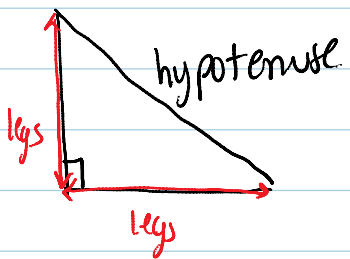
We name the sides of right triangles in relation to one of its acute angles

opposite

hypotenuse

adjacent

a

?

A
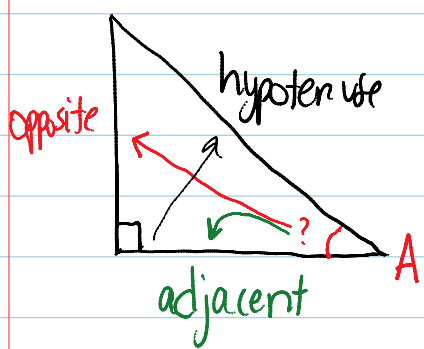
length of side opposite $\angle A$: length of side adjacent $\angle A$
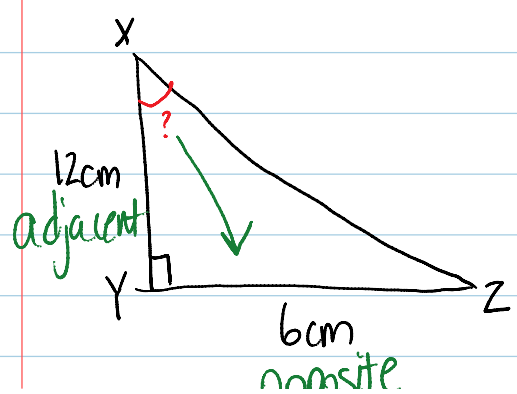
$o : a$

as a fraction $\Rightarrow \dfrac{o}{a}$

This ratio is called the tangent ratio. of $\angle A$

$$\text{Tan} \; \boxed{\angle A} = \dfrac{o}{a}$$

this # refers to the degrees in the angle

Ex. #1

Calculate tan X

X

12cm
adjacent

Y

6cm
opposite

Z

?

make sure your calculator is in degree mode !!

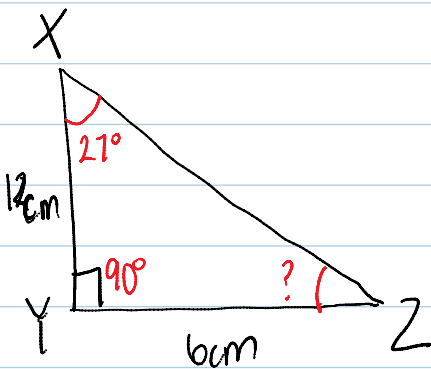$\tan X = \dfrac{\text{opposite}}{\text{adjacent}}$

6cm
Opposite

adjacent

$$\tan x = \frac{6}{12}$$

$$\tan x = 0.5 \qquad \text{Ratio!}$$

convert decimal to degrees

$$\tan^{-1}(0.5) = 26.6 \approx \boxed{27°}$$

2 methods

$$\tan Z = \frac{o}{a}$$

$$\tan Z = \frac{12}{6}$$

$$\tan Z = 2$$

$$\tan^{-1}(2) = \angle Z$$
$$= 63.43$$
$$\approx \boxed{63°}$$

Sum of a triangle is 180°

$$27° + 90°$$

$$180 - 27 - 90$$

$$= \boxed{63°}$$