3.1 Tangent Ratio
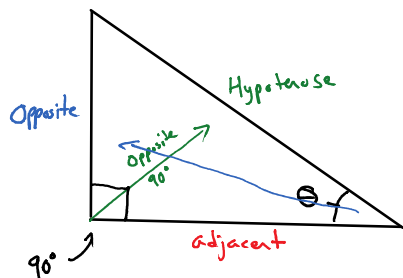
Labeling a Triangle:

In this class we will only look at right angle (90°) triangles

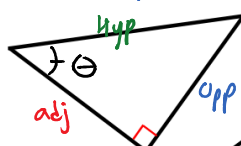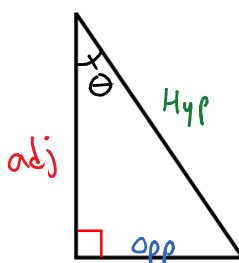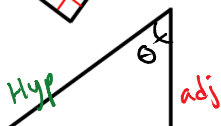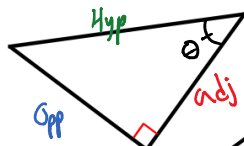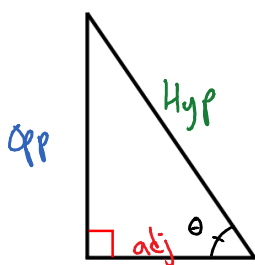1. when labelling a triangle first choose a reference angle. (θ)

2. Hypotenuse: It is the longest side and is opposite the 90° angle.

3. Opposite: It is opposite the reference angle θ

4. adjacent: It is the short side that helps form our reference θ.

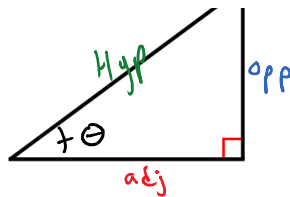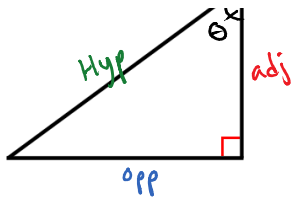**Example: Label the following triangles given the indicated angle**
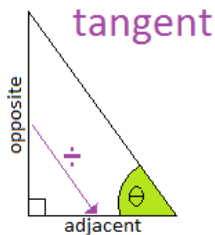
label Opposite
adjacent
Hypotenus

2. Hypotenuse: It is the longest side and is opposite the 90° angle.

3. Opposite: It is opposite the reference angle θ

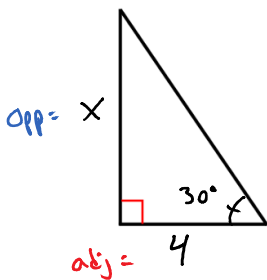4. adjacent: It is the short side that helps form our reference θ.

The Tangent Ratio

tangent

opposite ÷ adjacent

$$\boxed{Tan}\ \Theta = \frac{opposite}{adjacent}$$

This is a function and Θ is your input.

Examples

Find X

$$Tan\ \Theta = \frac{Opp}{adj}$$

Opp = X
adj = 4
30°

$$4 \times \left[Tan\ 30\right] = \left[\frac{X}{4}\right] \times 4$$

$$4\,Tan\,30 = X$$

$$(4)(0.5774\ldots) = X$$

$$2.31 = X$$

Step 1: label the △

60°   adj
X
Opp = 6

$$Tan\ \Theta = \frac{Opp}{adj}$$

$$X\left[\frac{Tan\,60}{1}\right] = \left[\frac{6}{X}\right] X$$

$$\frac{X\,Tan\,60}{Tan\,60} = \frac{6}{Tan\,60}$$

$$X = \frac{6}{Tan\,60}$$
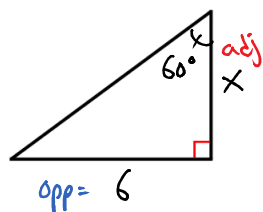
$$X = 3.46$$

Inverse Tangent Ratio

All functions in math have opposites

Examples: $X \div \ [\ ]^2$
$+ \ - \ \sqrt{[\ ]}$

The inverse Tangent Function is the opposite to the Tangent Function

$$Tan\left[45\right] = 1$$
$$Tan^{-1}\left[1\right] = 45$$

$$Tan^{-1}\left[X\right] \qquad X:\ any\ Real\ number$$

It can be found on your calculator by hitting 2nd function or Shift and then Tan

Example

Find θ_1 and θ_2 using the inverse tangent.

Step 1: pick an angle

θ_2

$$\text{Tan } \theta_2 = \frac{3}{4}$$

$$\theta_2 = \text{Tan}^{-1}\left[\frac{3}{4}\right]$$

$$\theta_2 = 37°$$

θ_1

$$\text{Tan } \theta_1 = \frac{4}{3}$$

$$\text{Tan}^{-1}\left[\text{Tan}\theta\right] = \text{Tan}^{-1}\left[\frac{4}{3}\right]$$

$$\theta_1 = 53°$$
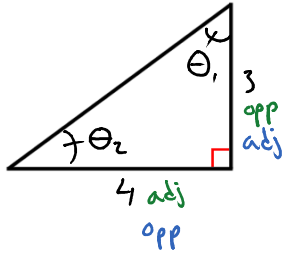
Sum of the angles in a triangle
$$= 180°$$
$$\theta_1 + \theta_2 + 90 = 180°$$

Homework: 1-13 odd
CH3 pg: 107

Washroom/water

give 15 a trg

Pythagerous Theorem

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