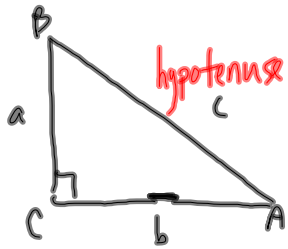
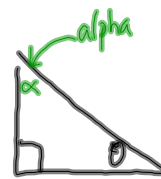
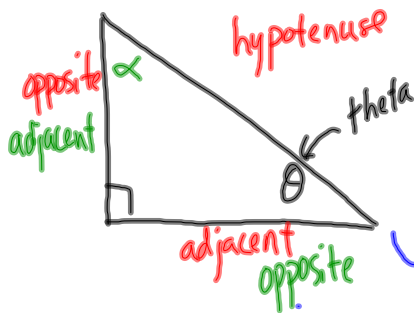
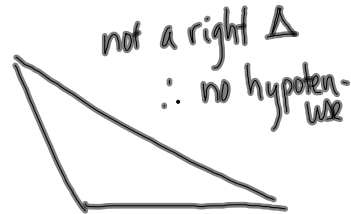


Right Angle Trigonometry



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

*A or *CAB
 or *BAC



similar triangles

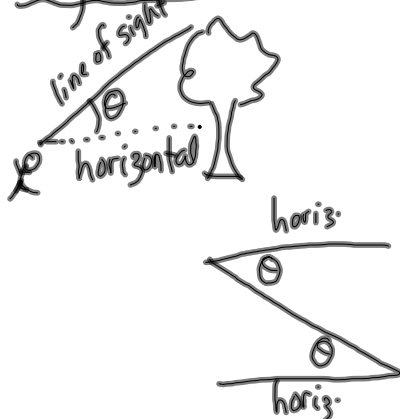
In similar triangles, the ratio of two sides is constant \Rightarrow Trig ratios

SOH|CAH|TOA

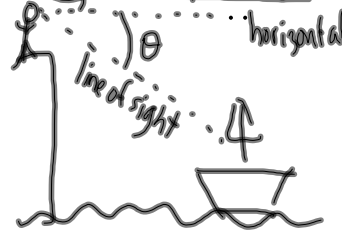
$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

* Can only use if a right Δ.

Angle of Elevation



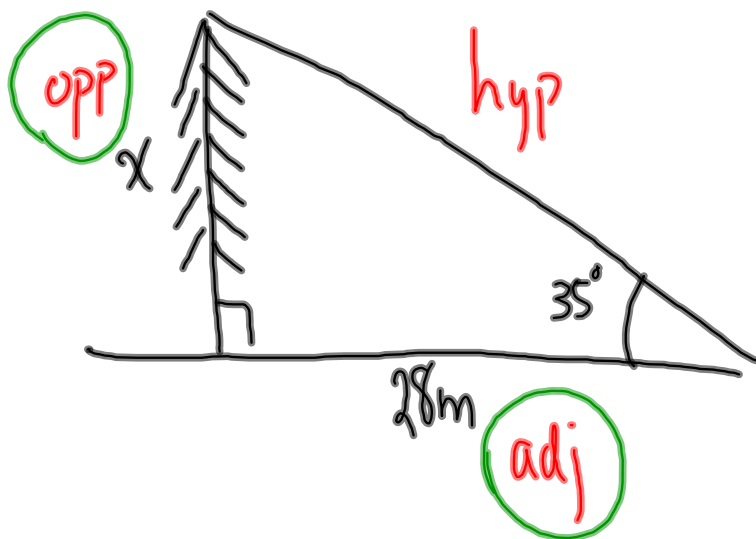
Angle of Depression



← Z-theorem

Example 1

A tree casts a shadow of 28m when the angle of elevation of the sun is 35° . Determine the height of the tree.



$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan 35^\circ = \frac{x}{28\text{m}}$$

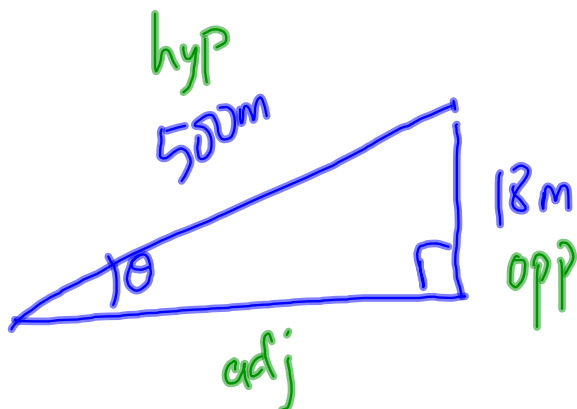
$$x = (28\text{m})(\tan 35^\circ)$$

$$x = 19.6\text{m}$$

The tree is about 20m high

Example 2

A road rises 18m over a 500m distance on the road. How steep is the grade?



$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin \theta = \frac{18\text{m}}{500\text{m}}$$

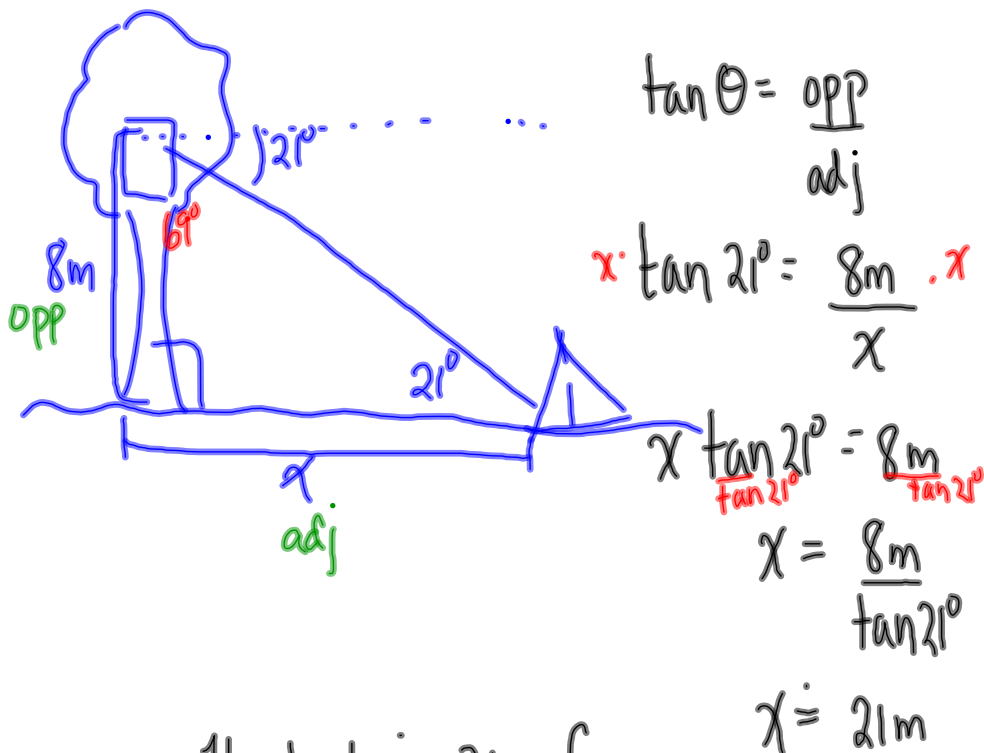
inverse
sine
(use 2nd sin)

$$\theta = \sin^{-1} \left(\frac{18\text{m}}{500\text{m}} \right)$$

$$\theta = 2.1^\circ$$

Example 3

If Ralph is in his treehouse, 8m above the ground, and he looks down at his sisters tent, determine how far from the base of the tree that the tent is located. His angle of depression is 21° . Assume the ground is flat.



$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$x \cdot \tan 21^\circ = \frac{8\text{m} \cdot x}{x}$$

$$x \cdot \frac{\tan 21^\circ}{\tan 21^\circ} = \frac{8\text{m}}{\frac{\tan 21^\circ}{\tan 21^\circ}}$$

$$x = \frac{8\text{m}}{\tan 21^\circ}$$

$$x = 21\text{m}$$

The tent is 21m from the base of the tree.