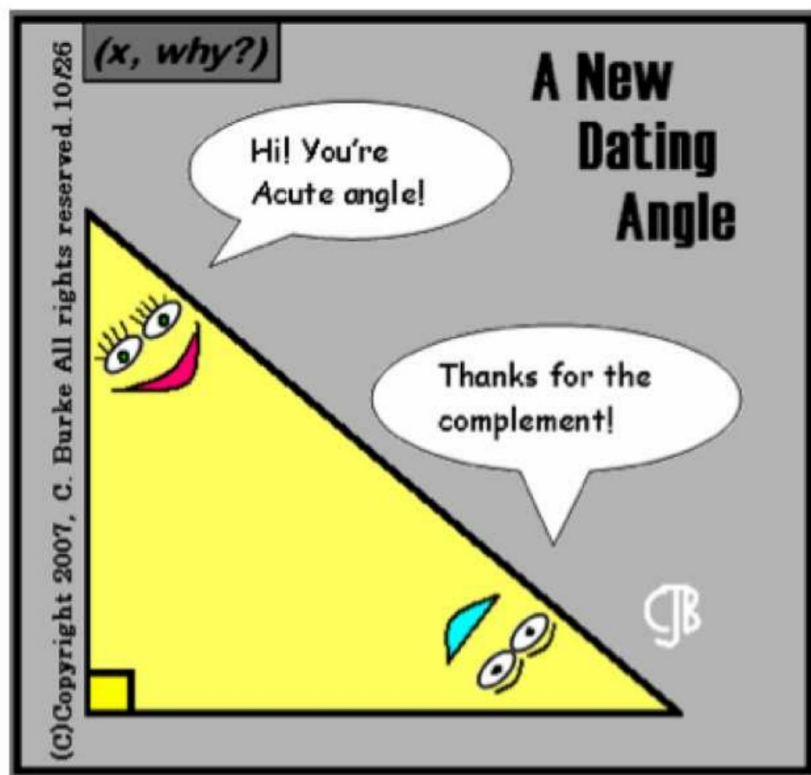


9.1 Right Triangle Trigonometry



What is trigonometry?

Trigonometry is a branch of mathematics that studies relationships involving lengths and angles of triangles.

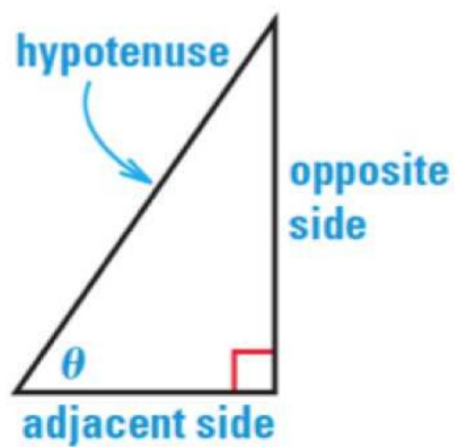
Commonly Used Greek Letters in Trigonometry Used to Represent Angle Measures:

θ

α

β

SOHCAHTOA



$$\sin \theta = \frac{\text{opposite side}}{\text{hyp.}}$$

$$\cos \theta = \frac{\text{adjacent side}}{\text{hyp.}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

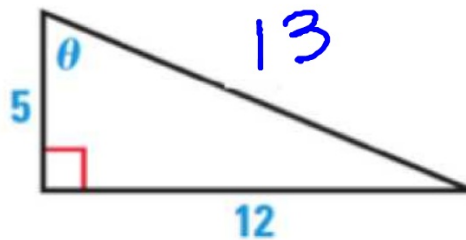
Reciprocal Trigonometric Ratios

Cosecant: $\csc \theta = \frac{1}{\sin \theta} = \frac{\text{hyp.}}{\text{opposite}}$

Secant: $\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hyp.}}{\text{adjacent}}$

Cotangent: $\cot \theta = \frac{1}{\tan \theta} = \frac{\text{adjacent}}{\text{opposite}}$

ex: Find all trigonometric functions of theta.



$$\sin \theta = \frac{12}{13}$$

$$\csc \theta = \frac{13}{12}$$

$$\cos \theta = \frac{5}{13}$$

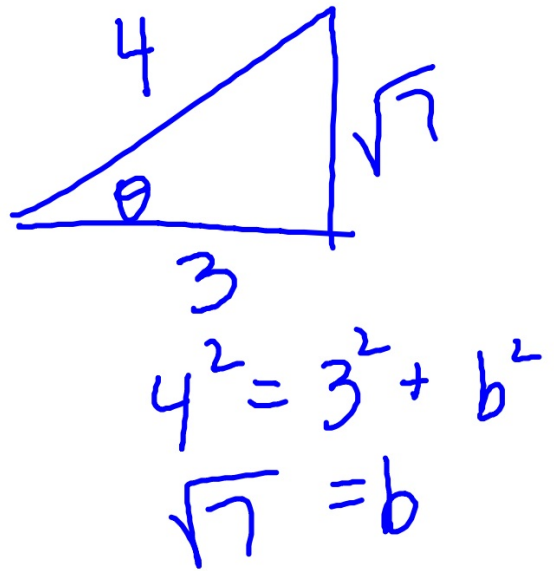
$$\sec \theta = \frac{13}{5}$$

$$\tan \theta = \frac{12}{5}$$

$$\cot \theta = \frac{5}{12}$$

ex: If $\cos \theta = \frac{3}{4}$ find the other trigonometric functions of theta.

$$\cot \theta = \frac{\frac{3}{\sqrt{7}}}{\frac{3\sqrt{7}}{7}}$$



Common Pythagorean Triplets

$$3 - 4 - 5$$

$$5 - 12 - 13$$

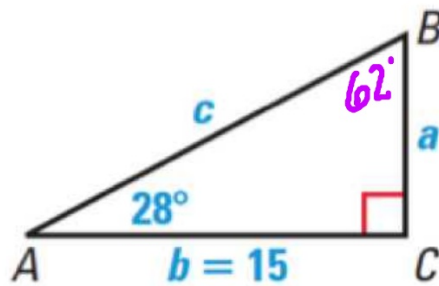
$$8 - 15 - 17$$

$$7 - 24 - 25$$

Memorize these!



ex: Solve $\triangle ABC$.



$$\angle B = 62^\circ$$

$$a =$$

$$c =$$

Find a

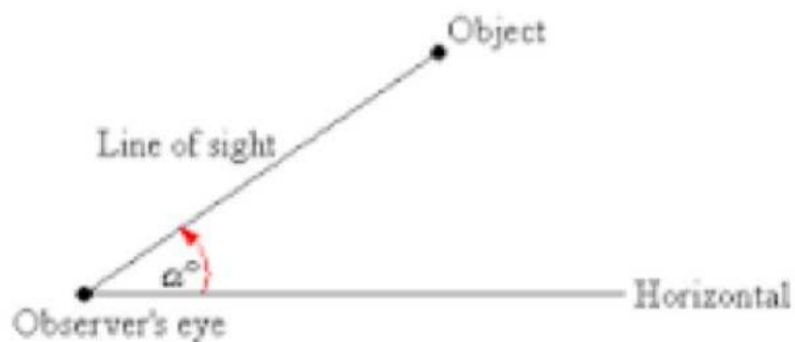
$$\tan 28^\circ = \frac{a}{15}$$
$$7.98 = a$$

find c

$$\frac{\cos 28^\circ}{1} = \frac{15}{c} \Rightarrow c = \frac{15}{\cos 28^\circ}$$
$$c = 16.99$$

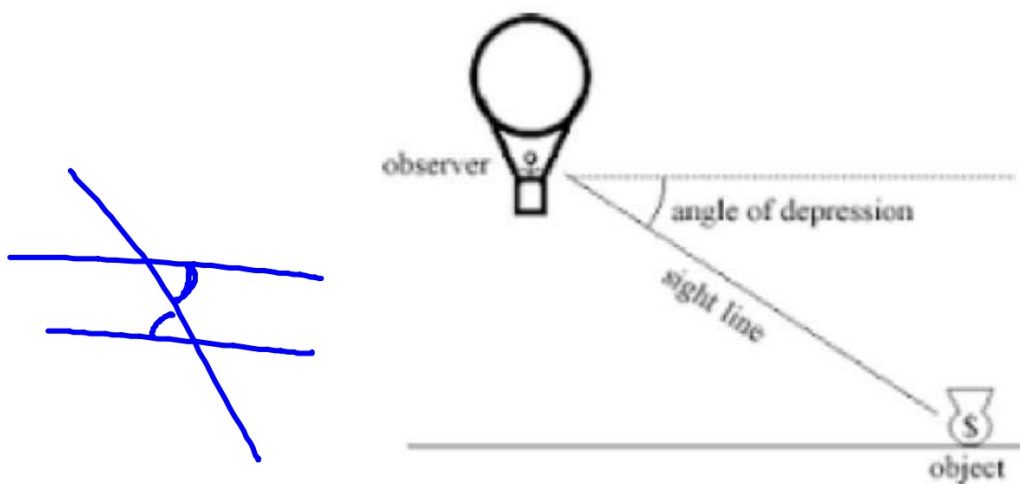
Vocabulary

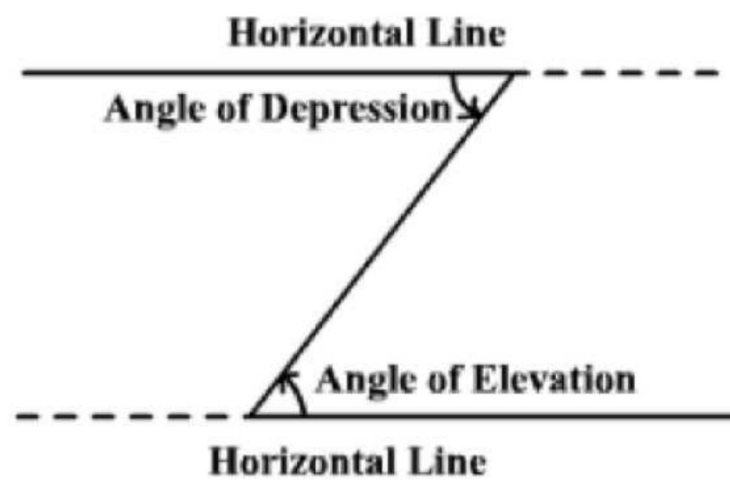
- angle of elevation - the angle between one's line of sight and the horizontal



Vocabulary

- angle of depression - the angle between one's line of sight and the horizontal





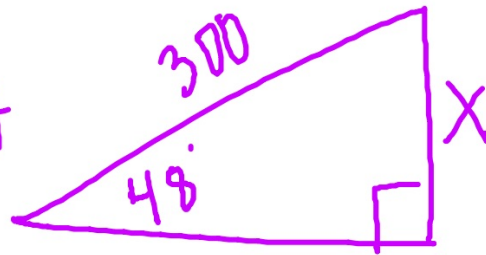
***The angle of depression and elevation
are CONGRUENT!***



ex: A parasailer is attached to a boat with a rope 300 feet long. The angle of elevation from the boat to the parasailer is ~~48°~~. Estimate the parasailer's height above the boat.

48°

$$X = 222.99 \text{ ft}$$



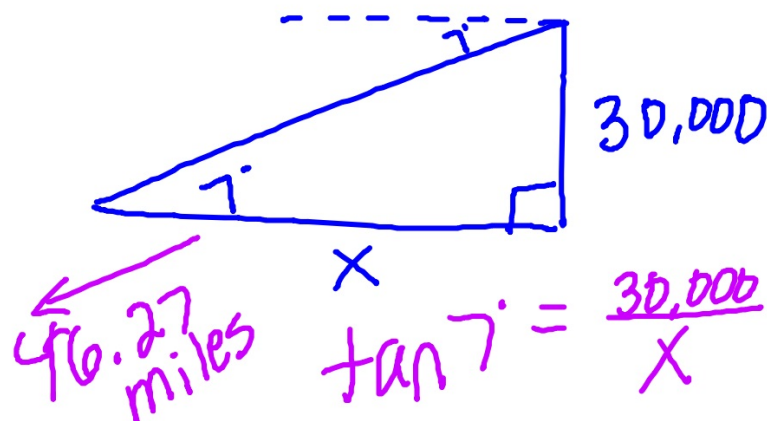


ex: If a plane that is cruising at an altitude of 30,000 ft wants to land safely it must begin its descent so that the angle of depression to the airport is 7° .

horizontal

a) How many miles from the airport must the plane begin descending?

$$1 \text{ mile} = 5280 \text{ ft}$$





ex: If a plane that is cruising at an altitude of 30,000 ft wants to land safely it must begin its descent so that the angle of depression to the airport is 7° .

b) How many miles will the plane travel before landing?

46.62 miles