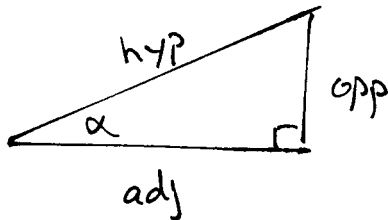


Intro to Trigonometry (continued)

SOH CAH TOA



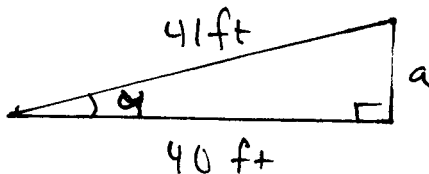
$$\sin \alpha = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \alpha = \frac{\text{adj}}{\text{hyp}}$$

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

Warmup

(1)



what is a ?

$$a^2 + 40^2 = 41^2$$

$$a^2 + 1600 = 1681$$

$$a^2 = 1681 - 1600 = 81$$

$$a = 9$$

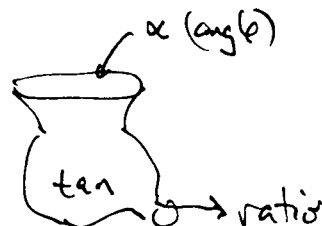
what are (without a calculator)

$$\sin \alpha = \frac{\text{opp}}{\text{hyp}} = \frac{9}{41} = .220$$

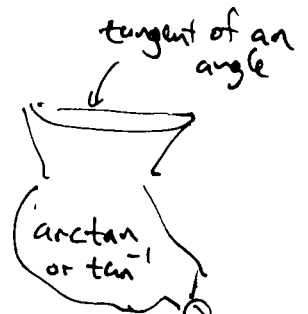
$$\cos \alpha = \frac{\text{adj}}{\text{hyp}} = \frac{40}{41} \approx .976$$

$$\tan \alpha = \frac{\text{opp}}{\text{adj}} = \frac{9}{40} = .225$$

Bonus: what is α itself (the angle)?



ratio

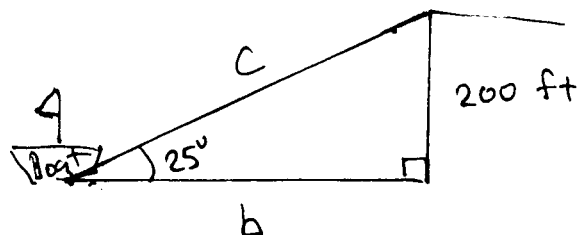


angle (α)

$$\alpha = \tan^{-1}(.225) = \arctan(.225) = 12.7^\circ$$

(2)

The angle of elevation ~~of~~ from a boat to the top of a cliff is 25° .



a) How far is the base of the cliff from the boat?

b) How far is the top of the cliff from the boat?

$$a) \quad \tan 25^\circ = \frac{200 \text{ ft}}{b} \Rightarrow b \tan 25^\circ = 200$$

$$\Rightarrow b = \frac{200}{\tan 25^\circ} = \frac{200}{.466}$$

OR: $\tan 25^\circ = \frac{200}{b}$

$$.466 = \frac{200}{b}$$

$$\text{So } b = \frac{200}{.466} = 429.2 \text{ ft}$$

$$= \boxed{428.9 \text{ ft}}$$

↑
more accurate

Given: $\sin 25^\circ = .423$
 $\cos 25^\circ = .906$
 $\tan 25^\circ = .466$

$$b) \quad \sin 25^\circ = \frac{200 \text{ ft}}{c}$$

$$c (\sin 25^\circ) = 200$$

$$c = \frac{200}{\sin 25^\circ} \approx \frac{200}{.423} = \boxed{473.2 \text{ ft}}$$

MORE EXAMPLES: See Worksheet #5 (done in class today).