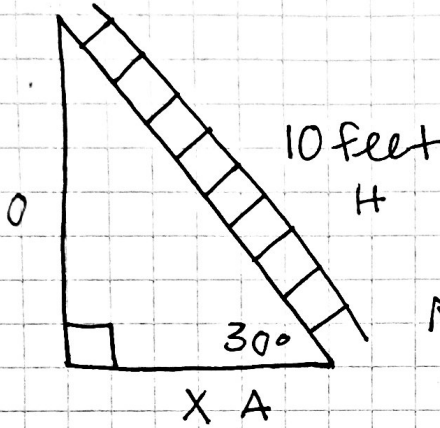# 7.2 More on Trig Ratios

1 A 10 feet tall ladder is leaning against a wall. ~~The ladder reaches 7 feet tall. How far away~~ If it is angled 30° from the wall, how far away from the wall is the base of the ladder? Round to the nearest hundreth.
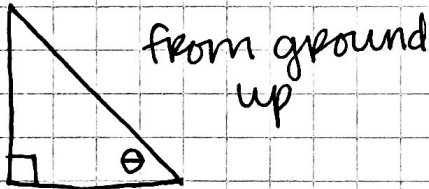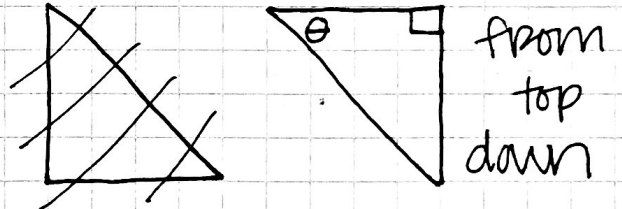
$$10 \cdot \cos 30 = \frac{x}{10} \cdot 10$$

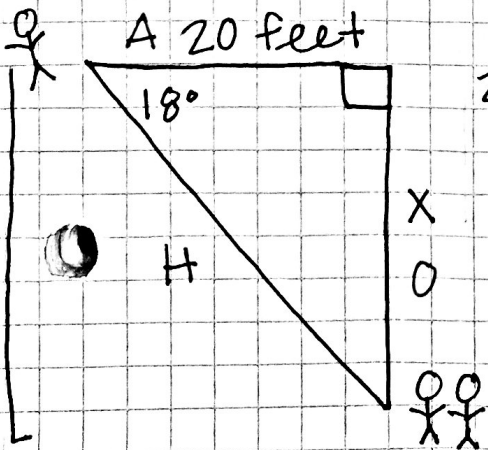10 feet

$$10 \cos 30 = \boxed{8.66 \text{ feet}}$$

30°

X A

same!

* Angle of Elevation
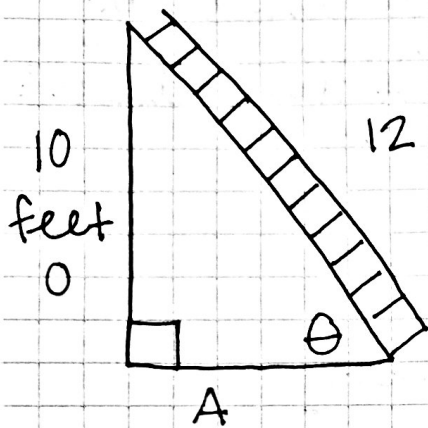
from ground up

* Angle of Depression

from top down

A mom is looking out of a third story window at her kids playing below. The kids are 20 feet away from the building. If the angle of depression is 18°, how high is the mom?

A 20 feet

18°

$$20 \cdot \tan 18 = \frac{x}{20} \cdot 20$$

X

$$20 \tan 18 = \boxed{6.49 \text{ feet}}$$

A 12 foot ladder is leaning against a 10 foot wall. What is the angle of elevation between the ladder + the ground?

10 feet O

12 feet
H

$sin^{-1}(\sin\theta)=\left(\frac{10}{12}\right)^{sin^{-1}}$

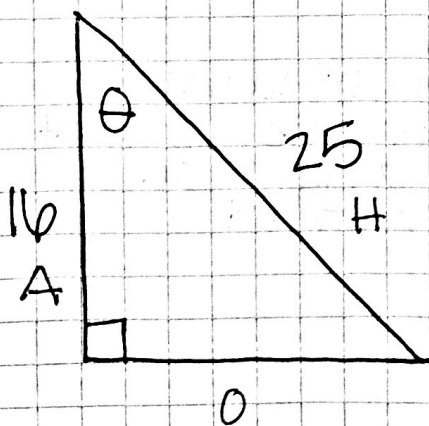$\theta = \sin^{-1}\left(\frac{10}{12}\right) = \boxed{56.44°}$

A

* Finding missing angles
· use inverse trig - cancels out trig ratio

$$\theta = \sin^{-1}\left(\frac{O}{H}\right)$$

$$\theta = \cos^{-1}\left(\frac{A}{H}\right)$$

$$\theta = \tan^{-1}\left(\frac{O}{A}\right)$$

25
H

16
A

θ

O

$\cos\theta = \frac{16}{25}$

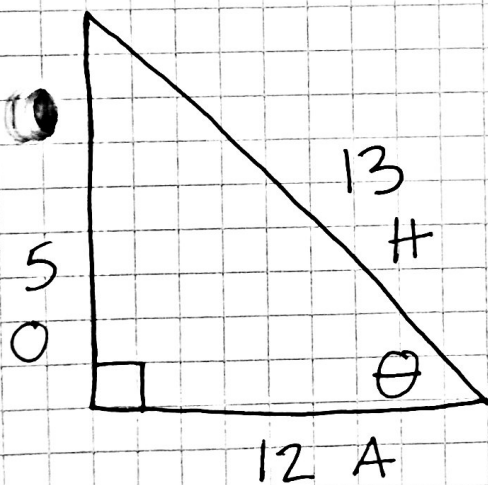$\theta = \cos^{-1}\left(\frac{16}{25}\right)$

$\approx \boxed{50.21°}$

* Reciprocal trig - flips normal trig ratio

$$\sin \theta = \frac{opp}{hyp} \longrightarrow$$ cosecant $$\csc \theta = \frac{hyp}{opp} \quad \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{Adj}{hyp} \longrightarrow$$ secant $$\sec \theta = \frac{hyp}{Adj} \quad \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{opp}{Adj} \longrightarrow$$ cotangant $$\cot \theta = \frac{Adj}{opp} \quad \frac{1}{\tan \theta}$$

Identify each ratio

$\sin \theta = 5/13$	$\csc \theta = 13/5$
$\cos \theta = 12/13$	$\sec \theta = 13/12$
$\tan \theta = 5/12$	$\cot \theta = 12/5$

13 H

5 O

12 A

θ