SOHCAHTOA

$$\text{Sin}A = \frac{\text{leg opposite } \angle A}{\text{hypotenuse}}$$

$$\text{Cos}A = \frac{\text{leg adjacent to } \angle A}{\text{hypotenuse}}$$

$$\text{Tan}A = \frac{\text{Leg Opposite } \angle A}{\text{Leg Adjacent to } \angle A}$$

Trigonometry

Find sin R, cos R, tan R, sin S, cos S, and tan S. Express each ratio as a fraction and as a decimal to the nearest hundredth.

1. $r = 16, s = 30, t = 34$

sinR 16/34 sinS 30/34
cosR 30/34 cosS 16/34
tanR 16/30 tanS 30/16

2. $r = 10, s = 24, t = 26$

sinR 10/26 sinS 24/26
cosR 24/26 cosS 10/26
tanR 10/24 tanS 24/10

Use a special right triangle to express each trigonometric ratio as a fraction and as a decimal to the nearest hundredth.

3. sin 30° $\frac{1}{2}$

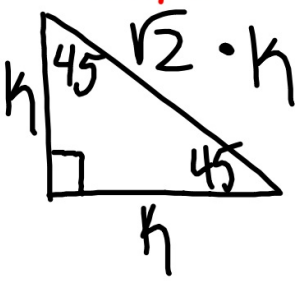
4. tan 45° 1

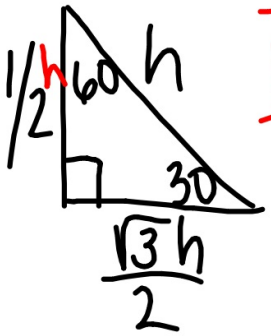
5. cos 60° $\frac{1}{2}$

6. sin 60° $\frac{\sqrt{3}}{2}$

7. tan 30° $\frac{1}{\sqrt{3}}$

8. cos 45° $\frac{\sqrt{2}}{2}$





$\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{\sqrt{3}}{3}$

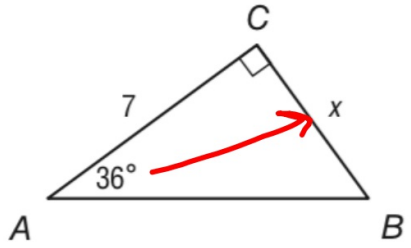
$\frac{1}{2} \cdot \frac{2}{\sqrt{3}}$

$\frac{k}{\sqrt{2}k}$

$\frac{1}{\sqrt{2}}$

Find x.

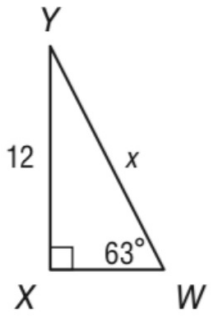
9.



$\tan 36 = \frac{x}{7}$

$x = 5.09$

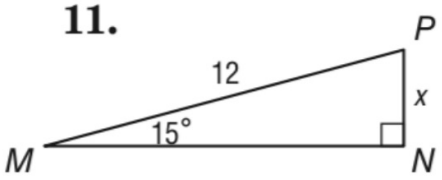
10.



$\sin 63 = \frac{12}{X}$

$X = \frac{12}{\sin 63} = 3.4$

11.

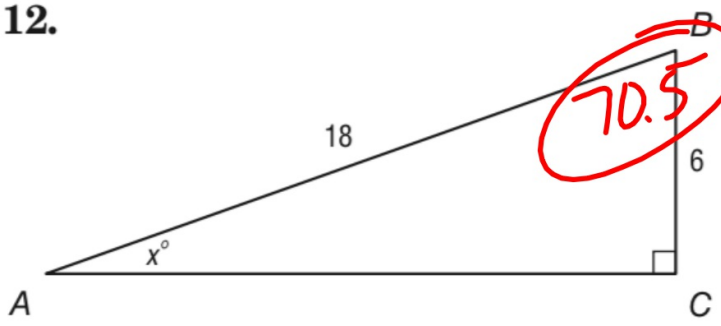


$\sin 15 = \frac{X}{12}$

$X = 3.11$

Use a calculator to find the measure of $\angle B$ to the nearest tenth.

12.



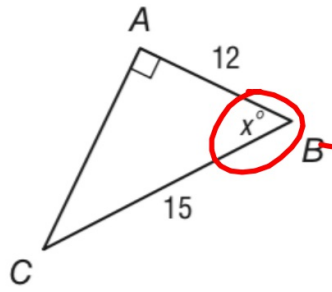
70.5

$\sin^{-1}(6/18)$

$= 19.5$

Use a calculator to find the measure of $\angle B$ to the nearest tenth.

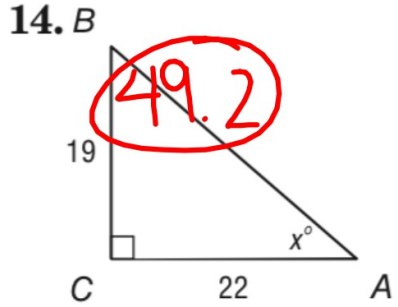
13.



$\cos^{-1}(12/15)$

$\rightarrow 36.9$

Use a calculator to find the measure of $\angle B$ to the nearest tenth.

14. 

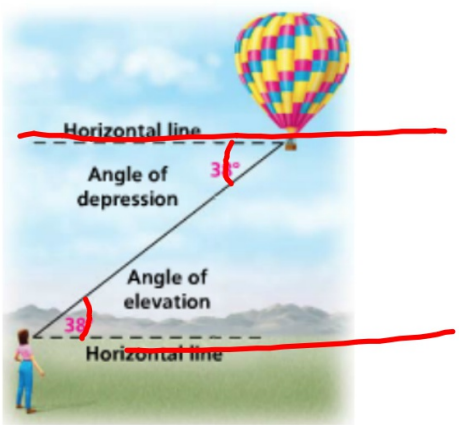
$\tan^{-1}(19/22)$
40.8

Geometry 8-5: Angles of Elevation and Depression

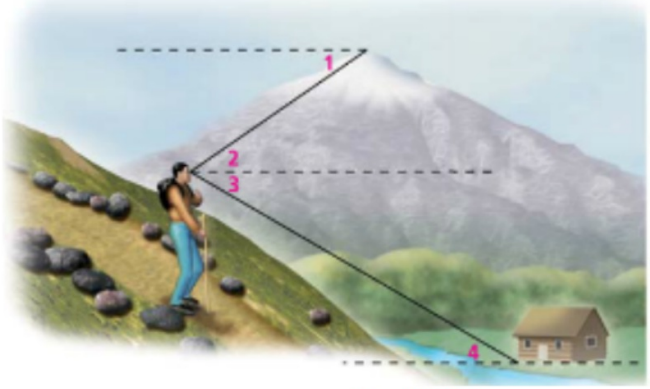
Ob.: I can use angles of elevation and depression to solve problems.

Suppose a person on the ground look up and sees a hot-air balloon at a 38° angle. This is called an angle of elev. The word "elevation" refers to an angle above a horizontal line. At the same time, a person in the hot-air balloon sees the person on the ground at a 38° angle. This is called an angle of dep. The word "depression" refers to an angle below a horizontal line.

Examine the diagram below. The angle of elevation is congruent to the angle of depression because they are alt int ∠'s.



Example 1: Describe each angle as it relates to the situation shown below.



a) $\angle 1$ depression

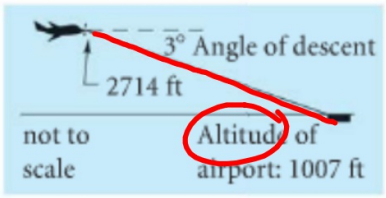
b) $\angle 2$ elevation

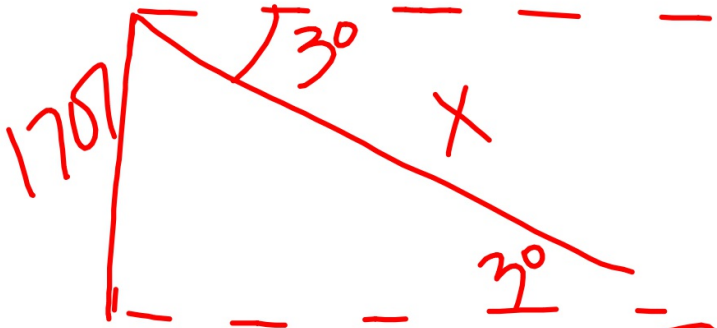
c) $\angle 3$ dep-

d) $\angle 4$ elevation

Angles of elevation and angles of depression are used in real-life situations that involve right triangles.

Example 2: To approach a runway at an airport, the pilot begins a 3° descent from an altitude of 2714 ft. The airport is at an elevation of 1007 ft above sea level. How many miles from the runway is the airplane at the start of this approach?





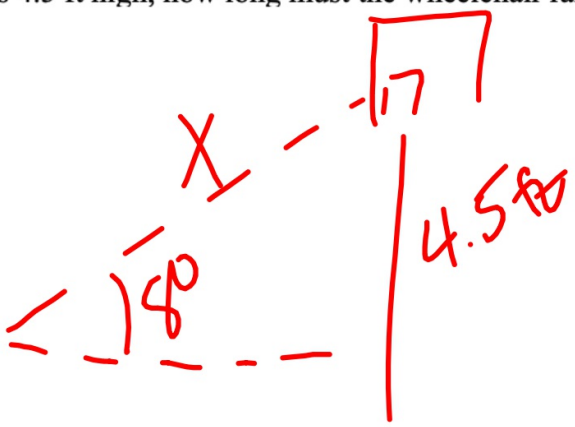
$\sin 3 = \frac{1707}{x}$

$x = \frac{1707}{\sin 3}$

$\frac{32616}{5280}$

$= 6.2 \text{ mi}$

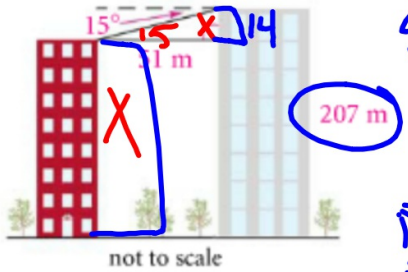
Example 3: Federal guidelines are very strict about heights of public entrances for wheelchairs. If the angle is too high, it can be difficult for people to make it up the ramp safely. Generally, wheelchair ramps have an angle of elevation of at most 8°. If the ramp needs to get to the entrance of a building that is 4.5 ft high, how long must the wheelchair ramp be?



$\sin 8 = \frac{4.5}{X}$

$X = \frac{4.5}{\sin 8} = 32.2$ ft

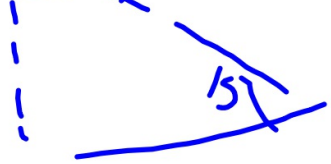
Example 4: Two office buildings are 51 m apart. The height of the taller building is 207 m. The angle of depression from the top of the taller building to the top of the shorter building is 15°. Find the height of the shorter building to the nearest meter.



$51 \cdot \tan 15 = \frac{X}{51} \cdot 51$

$X = 14\text{m}$

207 − 14 = 193m



Classwork: Exit Slip on Angles of Elevation & Depression

Hwk #17 - due tomorrow

Sec 8-5,

Pages 447-449,

Problems 1-4, 11, 14, 15, 17, 28, 29

IXL #10 - R.1 & R.8 due Friday at 4pm!