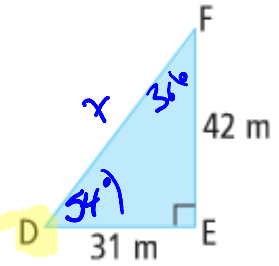
3.3a Solving Right Triangles

Quiz Today

3.3a Solving Right Triangles

- Solve the triangle shown.
  (Calculate all unknown angle measures and side lengths)



$\tan D = \frac{42}{31}$

$D = \tan^{-1}(42/31)$

$\angle D = 54°$

$\angle F = 90 - 54 = 36°$

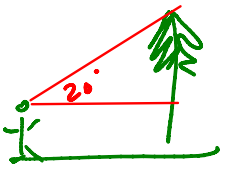
$\sin 54 = \frac{42}{x}$

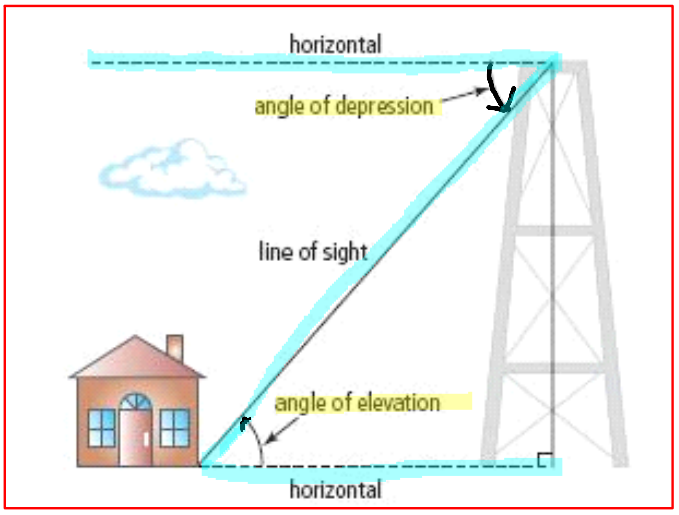
$x = \frac{42}{\sin 54}$

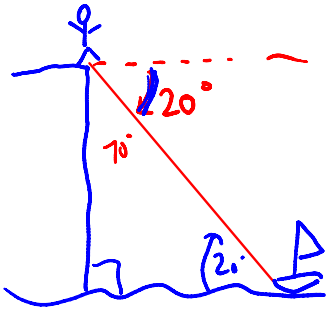
x

$DF = 52$

Angles of Elevation and Depression:





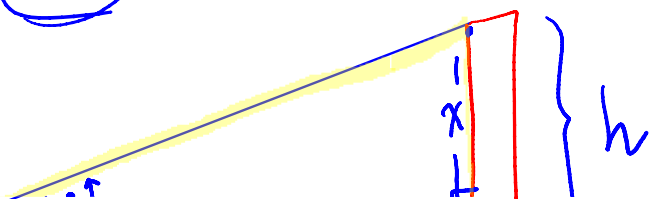


Angles of elevation and depression are always measured up or down from the horizontal (as in the diagram)

Note: the angles are alternate interior (z), so they are equal.

- A surveyor needs to determine the height of a large grain silo. He positions his transit 65 m from the silo and records and angle of elevation of 52°. If the height of the transit is 1.7 m, determine the height of the silo

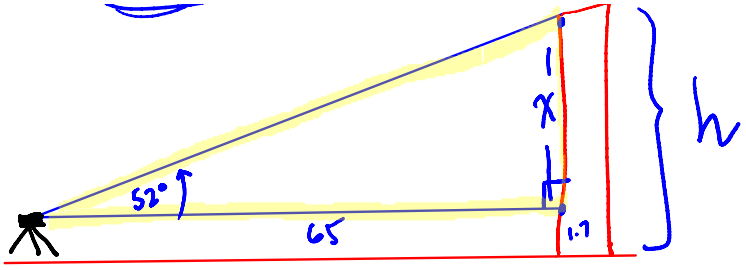
$\tan 52 = \frac{x}{65}$



$\tan 52 = \frac{x}{65}$

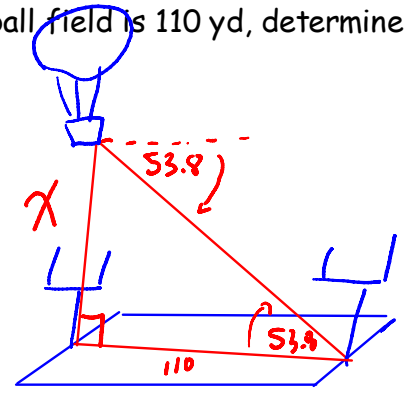
$x = 65 \tan 52$

$x = 83.2$



$h = x + 1.7 = 83.2 + 1.7 = \boxed{84.9\,m}$

- A balloonist decides to use an empty football field for his landing area. When the balloon is directly over the goal post, he measures the angle of depression to the base of the other goal post to be 53.8°. Given that the distance between goal posts in a Canadian football field is 110 yd, determine the height of the balloon.



$\tan 53.8 = \frac{x}{110}$

$x = 110 \tan 53.8$

$x = 150.3\ m$

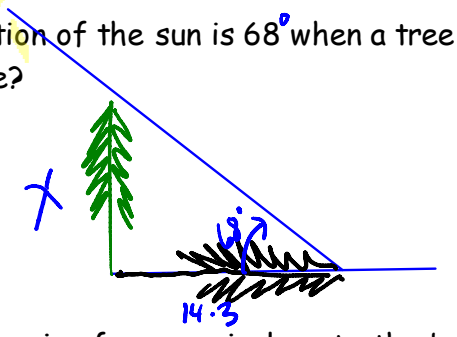
- A mountain road rises 1 m for every 5 m along the road. Determine the angle of inclination (slope or grade) of the road.

$\sin\theta = 1/5$

$\theta = \sin^{-1}(1/5)$

$\theta = 11.5°$

- The angle of elevation of the sun is 68° when a tree casts a shadow 14.3 m long. How tall is the tree?



$\tan 68 = \frac{x}{14.3}$

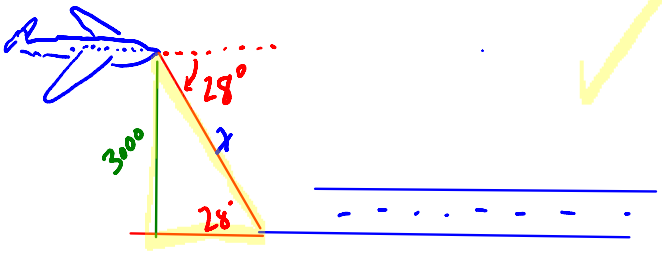
$x = 14.3 \tan 68$

$x = 35.4\ m$

- The angle of depression from an airplane to the beginning of the runway is 28°. If the altitude of the airplane is 3000 m, determine the distance from the airplane to the beginning of the runway.

$\sin 28 = \frac{3000}{x}$

$x = \frac{3000}{\sin 28}$



$x = 6390\ m$

Assignment p131 #1ac,2,4,5ac,6-8,10