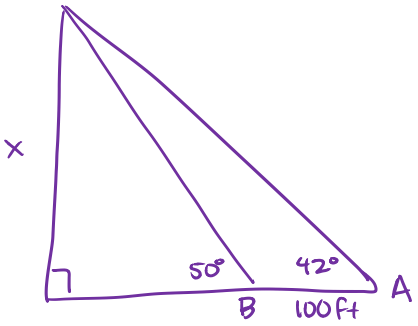
10.1
Notes

# (PART 2) RIGHT TRIANGLE APPLICATIONS

**OBJECTIVES**: 1) Solve a right triangle application problem.
2) Express lengths and areas using trigonometric functions.

## RIGHT TRIANGLE APPLICATIONS

1) The angle of elevation to the top of a building at point *A* is 50°. At point *B* which is 100 ft further away from the building than point *A*, the angle of elevation to the top of the building is 42°. Find the height of the building in feet.




$\tan 50° = \frac{x}{c}$ $\quad x = c\tan 50°$

$\tan 42° = \frac{x}{c+100}$

So:

$x = \frac{100 + \tan 42°}{\tan 50° - \tan 42°} \cdot \tan 50°$

$x = \tan 42°\,(c+100)$

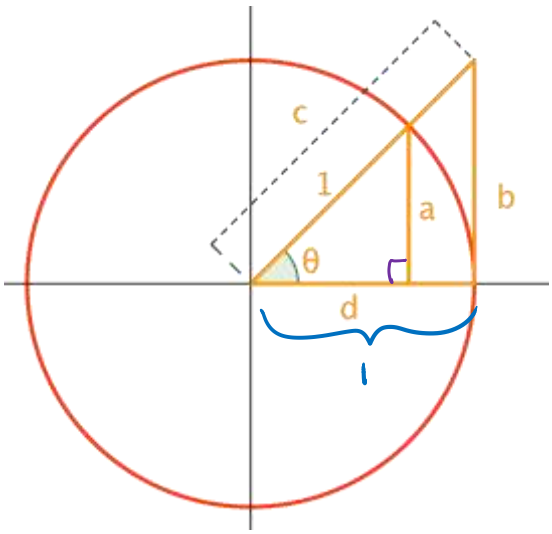
$c\tan 50° = c\tan 42° + 100\tan 42°$

$c\tan 50° - c\tan 42° = 100\tan 42°$

$c(\tan 50° - \tan 42°) = 100 + \tan 42°$

$c = \frac{100 + \tan 42°}{\tan 50° - \tan 42°}$

2) Find a, b, c, and d in terms of $\theta$.




$a = \sin\theta$

$d = \cos\theta$

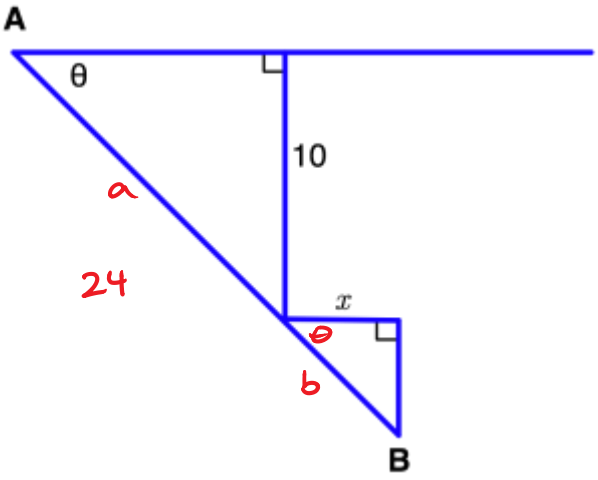
$\tan\theta = \frac{b}{1}$

$b = \tan\theta$

$\cos\theta = \frac{1}{c}$

$c = \frac{1}{\cos\theta} = \sec\theta$

3) In the figure below, AB is 24in. Express *x* as a function of θ.




$\sin\theta = \frac{10}{a}$ $\quad a = \frac{10}{\sin\theta}$

$\cos\theta = \frac{x}{b}$

$b = \frac{x}{\cos\theta}$

$a + b = 24$

$\frac{10}{\sin\theta} + \frac{x}{\cos\theta} = 24$

$x = \left(24 - \frac{10}{\sin\theta}\right)\cos\theta$

$\boxed{x = 24\cos\theta - 10\cot\theta}$