Solving Problems with 2 Right Triangles
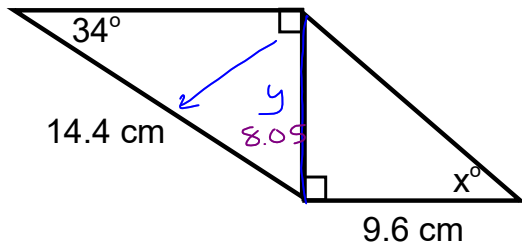
Find the length of x.

22.9 cm

common side

10.04 y

26° 49°

x
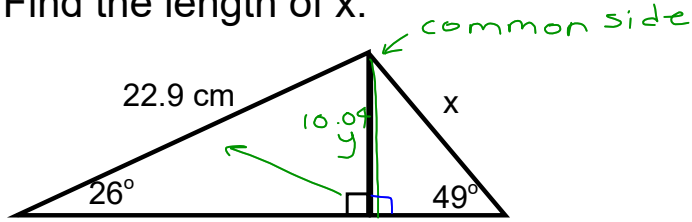
$\theta = 26$ $O = y$ $A =$ $H = 22.9$

$(22.9) \sin 26 = \dfrac{y}{22.9} (22.9)$

$y = 10.04$

$\theta = 49$
$O = 10.04$
$A =$
$H = x$

$\sin 49 = \dfrac{10.04}{x}$

$x = \dfrac{10.04}{(\sin 49)}$

$x = \boxed{13.3 \text{ cm}}$

Find the measure of angle x.

34°

14.4 cm

y

8.05

x°

9.6 cm

$\theta = 34$
$O = y$
$A =$
$H = 14.4$

$(14.4) \sin 34 = \dfrac{y}{14.4} (14.4)$

$y = 8.05$

$\theta = x$
$O = 8.05$
$A = 9.6$
$H =$

$\tan x = \dfrac{8.05}{9.6}$

$x = \tan^{-1}\left(\dfrac{8.05}{9.6}\right)$

$x = 40°$

The angle of elevation of the top of a tree is 27°. From the same point on the ground, the angle of elevation of a hawk flying directly above the tree is 43°. The tree is 12.7 m tall. How high is the hawk above the ground?

$$23.25-12.7$$
$$= 10.55 \, m$$

12.7 m

43° 27°

x
24.93

$\theta = 27$
$O = 12.7$
$A = x$
$H =$
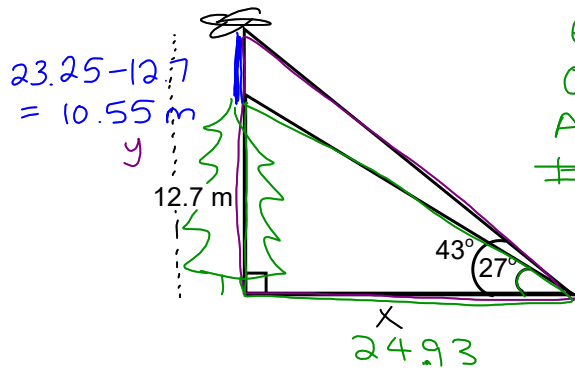
$\theta = 43$
$O = y$
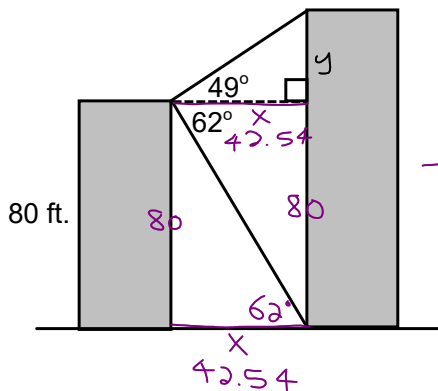$A = 24.93$
$H =$

$\tan 27 = \dfrac{12.7}{x}$

$x = \dfrac{12.7}{\tan 27}$

$x = 24.93$

$\tan 43 = \dfrac{y}{24.93}$

$(24.93)\tan 43 = y$

$\boxed{23.25 \, m = y}$

From the top of an 80-ft building, the angle of elevation of the top of the taller building is 49° and the angle of depression of the base of this building is 62°. Determine the height of the taller building to the nearest foot.

80 ft.

49°
62° x
42.54

y

80
80

62°
x
42.54

$\theta = 62$
$O = 80$
$A = x$
$H =$

$\theta = 49$
$O = y$
$A = 42.54$
$H =$

$\tan 62 = \dfrac{80}{x}$

$x = \dfrac{80}{(\tan 62)}$

$x = 42.54 \, ft$

$\tan 49 = \dfrac{y}{42.54}$

$y = 48.94 \, ft$

Total height $= 48.94 + 80$
$= \boxed{128.94 \, ft}$