

Practice 7.4B: Solving Right Triangles & Inverses

1. Use the value of the given function to evaluate the remaining ones.

a. $\sin(\theta) = \frac{3}{5}$

i. $\sin(-\theta) = -\frac{3}{5}$

ii. $\csc(\theta) = \frac{5}{3}$

b. $\cos(-\theta) = \frac{2}{7}$

i. $\cos(\theta) = \frac{2}{7}$

ii. $\sec(-\theta) = \frac{7}{2}$

2. Use the value of the given functions to evaluate the remaining ones.

$\sin \theta = \frac{5}{7}$

a. $\csc \theta = \frac{7}{5}$

b. $\cos \theta = \frac{2\sqrt{6}}{7}$

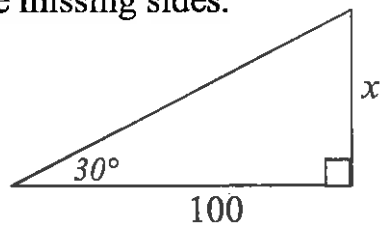
$\tan \theta = \frac{5\sqrt{6}}{12}$

c. $\cot \theta = \frac{2\sqrt{6}}{5}$

d. $\cos(90^\circ - \theta) = \frac{5}{7}$

3. Find the missing sides.

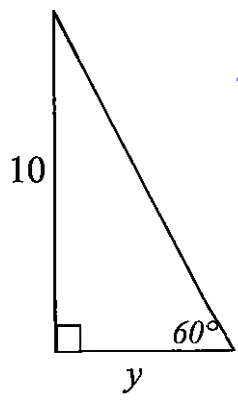
a.



$\tan 30^\circ = \frac{x}{100}$

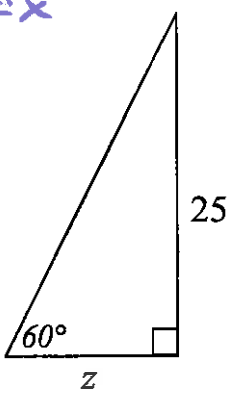
$\cotan 30^\circ = x$
 $\frac{100\sqrt{3}}{3} = x$

b.



$\tan 60^\circ = \frac{10}{y}$
 $y = \frac{10}{\tan 60^\circ} = \frac{10}{\sqrt{3}}$
 $y = \frac{10\sqrt{3}}{3}$

c.

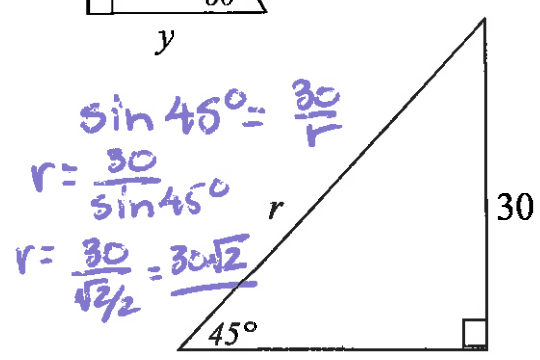


$\tan 60^\circ = \frac{25}{z}$

$z = \frac{25}{\tan 60^\circ}$

$z = \frac{25}{\sqrt{3}} = \frac{25\sqrt{3}}{3}$

d.

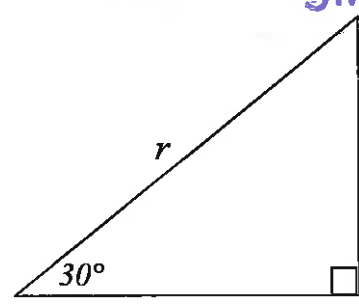


$\sin 45^\circ = \frac{30}{r}$

$r = \frac{30}{\sin 45^\circ}$

$r = \frac{30}{\frac{\sqrt{2}}{2}} = \frac{30\sqrt{2}}{1}$

e.

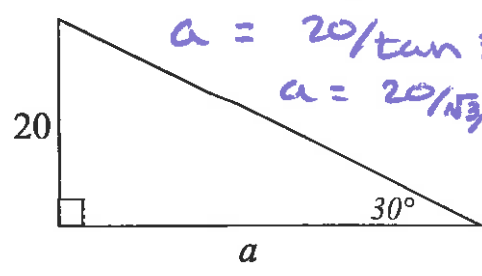


$\sin 30^\circ = \frac{10}{r}$

$r = \frac{10}{\sin 30^\circ}$

$r = \frac{10}{\frac{1}{2}} = 20$

f.

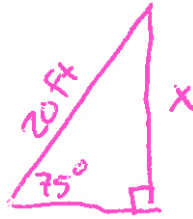


$\tan 30^\circ = \frac{20}{a}$

$a = \frac{20}{\tan 30^\circ}$

$a = \frac{20}{\frac{1}{\sqrt{3}}} = 20\sqrt{3}$

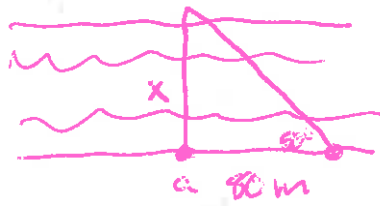
4. A 20ft ladder leaning against the side of a house makes a 75° angle with the ground. How far up the side of the house does the ladder reach? Draw a picture & solve.



$$\sin 75^\circ = \frac{x}{20}$$

$$20 \sin 75^\circ = x = 19.3 \text{ ft}$$

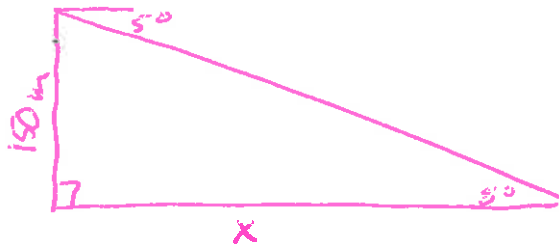
5. A biologist wants to know the width of a river at point a . She walks down river 80m and sights a point at 50° , across the river opposite a . Draw a picture & find the width of the river at a .



$$\tan 50^\circ = \frac{x}{80}$$

$$80 \tan 50^\circ = x = 95.3 \text{ m}$$

6. From a 150m lighthouse on the coast, a Coast Guard officer sights a ship at an angle of depression (downward) of 5° . Draw a picture & find how far the ship is off the coast.



$$\tan 5^\circ = \frac{150}{x}$$

$$x = \frac{150}{\tan 5^\circ} = 1714.5 \text{ m}$$

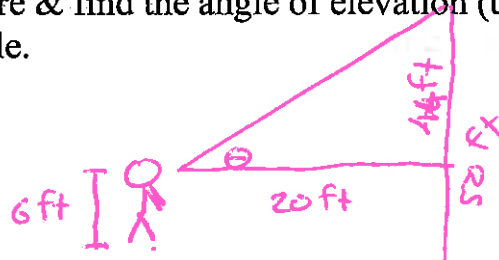
7. A ramp that's 17.5m in length rises to a height of 3.5m from the ground. Draw a picture & find the angle the ramp makes with the ground.



$$\frac{\sin \theta}{\tan \theta} = \frac{3.5}{17.5}$$

$$\sin^{-1}\left(\frac{3.5}{17.5}\right) = \theta = 11.5^\circ$$

8. A man whose eyes are exactly 6ft off the ground stands 20ft from a 50ft flagpole. Draw a picture & find the angle of elevation (upward) he must look up to see the top of the flagpole.



$$\tan \theta = \frac{44}{20}$$

$$\tan^{-1}\left(\frac{44}{20}\right) = 66.556^\circ$$