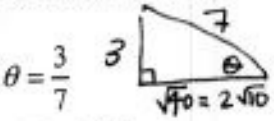
HW 10-2H
Solving Right Triangles

Name: Key
Class: _____

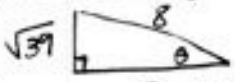
Assume θ is an acute angle in a right triangle; evaluate the 5 remaining trigonometric functions.

1. $\sin\theta = \frac{3}{7}$



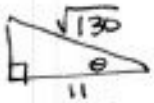
$\cos\theta = \frac{2\sqrt{10}}{7}$ $\csc\theta = 7/3$ $\sec\theta = \frac{7}{2\sqrt{10}}$ $\cot\theta = \frac{2\sqrt{10}}{3}$ $\tan\theta = \frac{3}{2\sqrt{10}}$

2. $\cos\theta = \frac{5}{8}$



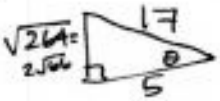
$\sec\theta = 8/5$ $\sin\theta = \frac{\sqrt{39}}{8}$ $\csc\theta = \frac{8}{\sqrt{39}}$ $\tan\theta = \frac{\sqrt{39}}{5}$ $\cot\theta = \frac{5}{\sqrt{39}}$

3. $\cot\theta = \frac{11}{3}$



$\csc\theta = \frac{\sqrt{130}}{3}$ $\sec\theta = \frac{\sqrt{130}}{11}$ $\sin\theta = \frac{3}{\sqrt{130}}$ $\cos\theta = \frac{11}{\sqrt{130}}$ $\tan\theta = \frac{3}{11}$

4. $\sec\theta = \frac{17}{5}$



$\sin\theta = \frac{2\sqrt{66}}{17}$ $\cos\theta = \frac{5}{17}$ $\tan\theta = \frac{2\sqrt{66}}{5}$ $\csc\theta = \frac{17}{2\sqrt{66}}$ $\cot\theta = \frac{5}{2\sqrt{66}}$

Use a calculator to evaluate the following expressions. (Hint: check your mode). Round your answer to the nearest thousandth (3 decimal places).

5. $\sin 74^\circ$ .961

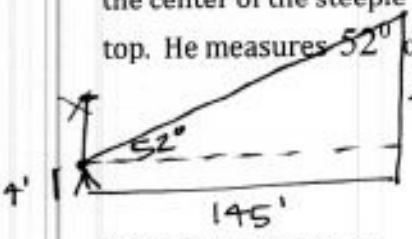
6. $\sin 74$ -.985

7. $\tan\frac{\pi}{12}$ .268

8. $\csc 19^\circ = \frac{1}{\sin 19^\circ}$ 3.072

9. $\cot\frac{\pi}{8} = \frac{1}{\tan \pi/8}$ 2.414

10. Mr. Lewis places his survey scope on the top of a 4' tripod. He is 145 feet from the center of the steeple of a prominent building in our area with a bronze statue on top. He measures 52° of elevation to the top of the statue. How tall is the building?



$145 \cdot \tan 52^\circ = \frac{x}{145} \cdot 145$

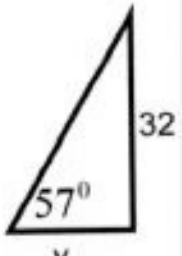
$185.6 = x$

$+ 4$ (tripod height)

189.6ft

Solve for the variable.

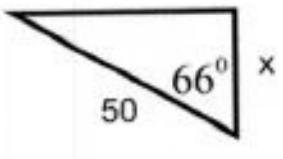
11.



$\frac{y \cdot \tan 57^\circ}{\tan 57^\circ} = \frac{32}{y} \cdot \frac{y}{\tan 57^\circ}$

$y = 20.8$

12.

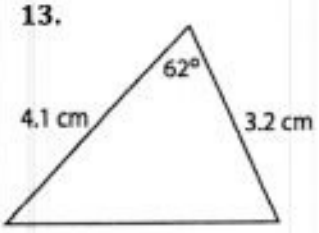


$50 \cdot \cos 66^\circ = \frac{x}{50} \cdot 50$

$x = 20.3$

Find the area of each triangle to the nearest tenth

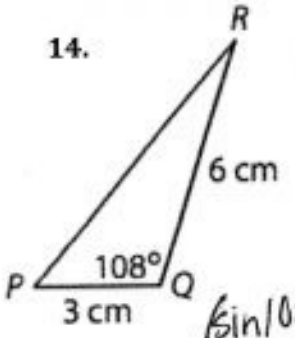
13.



$A = \frac{1}{2}(4.1)(3.2)\sin 62°$

$A = 5.8\ cm^2$

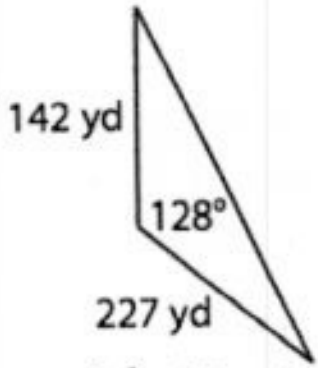
14.



$A = \frac{1}{2}(3)(6)(\sin 108°)$

$A = 8.6\ cm^2$

15.

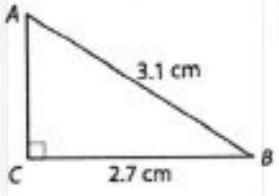


$A = \frac{1}{2}(142)(227)\sin 128°$

$A = 12700.4\ yd^2$

Solve each right triangle. Round lengths to the nearest tenth and angles to the nearest degree.

3.



$\sin A = \frac{2.7}{3.1}$

$A = \sin^{-1}\left(\frac{2.7}{3.1}\right)$

$A = 61°$

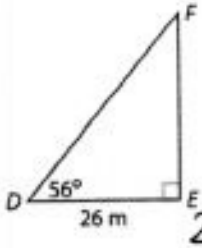
$2.7^2 + b^2 = 3.1^2$ → $b = 1.5$

$A = 61°$ $a = 2.7$

$B = 29°$ $b = 1.5$

$C = 90°$ $c = 3.1$

4.



$\frac{e \cdot \cos 56}{\cos 56} = \frac{26}{\cos 56}$

$e = 46.5$

$26 \cdot \tan 56° = \frac{d}{26} \cdot 26$

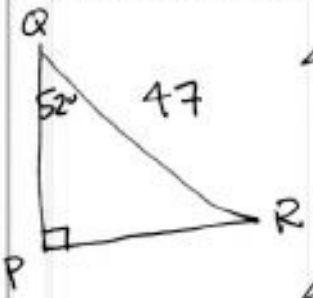
$d = 38.5$

$D = 56°$ $d = 38.5$

$E = 90°$ $e = 46.5$

$F = 34°$ $f = 26$

5. Right $\triangle PQR$ with $\overline{PQ} \perp \overline{PR}$, $QR = 47$ mm, and $m\angle Q = 52°$



$47 \cdot \sin 52 = \frac{q}{47} \cdot 47$

$q = 37$

$47 \cdot \cos 52 = \frac{r}{47} \cdot 47$

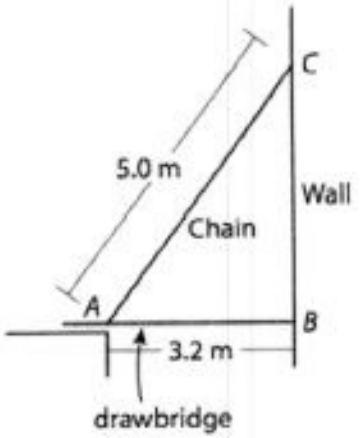
$r = 28.9$

$P = 90°$ $p = 47$

$Q = 52°$ $q = 37$

$R = 38°$ $r = 28.9$

10. History A drawbridge at the entrance to an ancient castle is raised and lowered by a pair of chains. The figure represents the drawbridge when flat. Find the height of the suspension point of the chain, to the nearest tenth of a meter, and the measures of the acute angles the chain makes with the wall and the drawbridge, to the nearest degree.



$5.0^2 = 3.2^2 + a^2$

$a = 3.8$

$\cos A = \frac{3.2}{5.0}$

$A = \cos^{-1}\left(\frac{3.2}{5.0}\right)$

$A = 50°$

$A = 50°$ $a = 3.8$

$B = 90°$ $b = 5.0$

$C = 40°$ $c = 3.2$

Review

Evaluate the following without a calculator

1. $\csc\frac{\pi}{3} = \frac{2\sqrt{3}}{3}$
2. $\tan\frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$
3. $\sec\frac{7\pi}{4} = \sqrt{2}$