Geometry 3313   Name___Key___

12.1 Day 3 – Inverse Trigonometric Functions Practice

12.1 Trigonometric Ratios
a.   Given a right triangle, I can define the sine, cosine, and tangent ratios from an unknown angle.
b.   I can use Trigonometric Ratios to solve for unknown sides and angles in a right triangle.

Answer each question.

1. Which trigonometric ratios could you use to find $m\angle B$ in the right triangle below? Write two equations to demonstrate your solution.
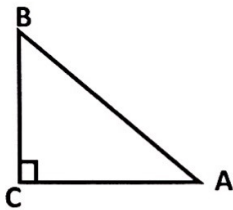
2. In $\triangle CAT$, $\sin A = \dfrac{4}{7}$. What is the measure of $\angle T$, assuming that $\angle C$ is the right angle?
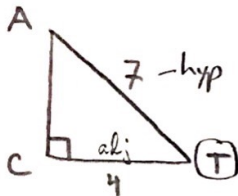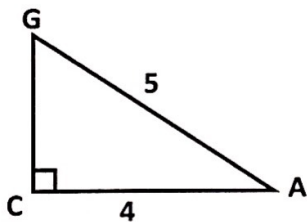
$$\cos T = \frac{4}{7}$$

$$T = \cos^{-1}\left(\frac{4}{7}\right)$$
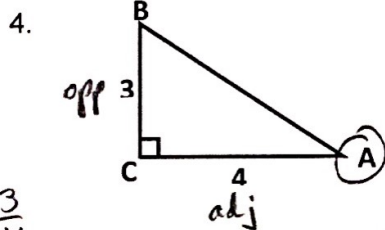
$$\boxed{m\angle T = 55.2°}$$

3. You want to find the measure of angle G in the triangle below. You type $\sin\left(\frac{4}{5}\right)$ into your calculator. Why is this wrong? How can you correct this to find the measure of angle G?

$\sin\left(\frac{4}{5}\right)$ will not give an angle as an answer. Only inverses give angles.

$$G = \sin^{-1}\left(\frac{4}{5}\right) \qquad G = 53.1°$$

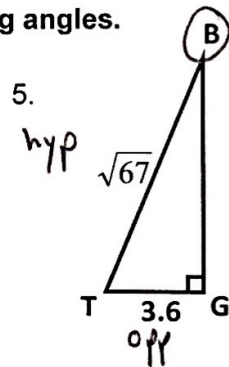**Use the inverse trigonometric ratios to find the missing angles.**

4.

$$\tan A = \frac{3}{4}$$

$$A = \tan^{-1}\left(\frac{3}{4}\right) \qquad B = 90 - 36.9$$

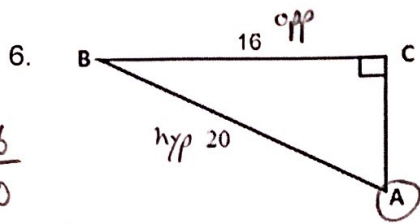$$A = 36.9°$$

$$m\angle A = 36.9° \quad m\angle B = 53.1°$$

5.

$$\sin B = \frac{3.6}{\sqrt{67}}$$

$$B = \sin^{-1}\left(\frac{3.6}{\sqrt{67}}\right)$$

$$B = 26.1°$$

$$90 - 26.1 = 63.9$$

$$m\angle B = 26.1° \quad m\angle T = 63.9°$$
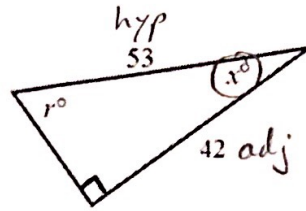
6.

$\sin A = \dfrac{16}{20}$

$A = \sin^{-1}\left(\dfrac{16}{20}\right)$

$A = 53.1°$ 　　　$90 - 53.1 = 36.9°$

$m\angle A = 53.1°$　$m\angle B = 36.9°$

7.

$\cos X = \dfrac{42}{53}$

$X = \cos^{-1}\left(\dfrac{42}{53}\right)$ 　$90 - 37.6 = 52.4°$

$x = 37.6°$ 　$r = 52.4°$

Solve the right triangles.

8.
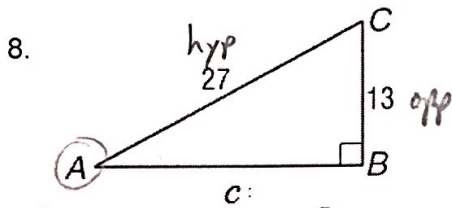
$c^2 + 13^2 = 27^2$
$c^2 + 169 = 729$
$c^2 = 560$
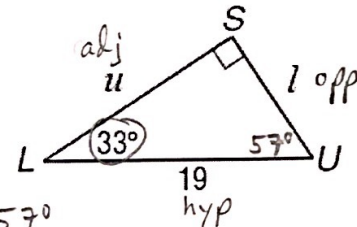$c = \sqrt{560}$
$c = 4\sqrt{35}$

$\sin A = \dfrac{13}{27}$

$A = \sin^{-1}\left(\dfrac{13}{27}\right)$

$A = 28.8°$

$\begin{array}{r} 90 \\ -28.8 \\ \hline 61.2 \end{array}$

$m\angle A = 28.8°$　$m\angle C = 61.2°$　$c = 4\sqrt{35}$
　　　　　　　　　　　　　　　　　　≈ 23.7

9.

$90 - 33 = 57°$

$\sin 33° = \dfrac{l}{19}$　$\cos 33° = \dfrac{u}{19}$

$19 \sin 33 = l$　$19 \cos 33° = 15.9$

$m\angle U = 57°$　$u = 15.9$　$l = 10.3$

11.
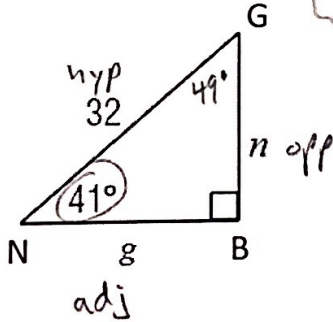
$\sin 41 = \dfrac{n}{32}$　$\cos 41 = \dfrac{g}{32}$

$32 \sin 41 = n$　$32 \cos 41 = g$

$m\angle G = 49°$　$n = 21.0$　$g = 24.2$

Solve the following application problem

12. Carpentersville restricts the height of flagpoles to 25 feet on any property. Michelle wants to determine whether D-C is in compliance with the regulation. Her eye level is 5.5 feet above the ground and she stands 36 feet from the base of the flag pole. If the angle of elevation is 25°, what is the height of the flagpole to the nearest tenth of a foot?

$\tan 25° = \dfrac{y}{36}$ 　　　$X = 16.8 + 5.5$

$36 \tan 25 = y = 16.8$ 　$\boxed{X = 22.3 \text{ ft}}$