

Name: _____ Period: _____ Date: _____
4-1 Right Triangle Trigonometry Quiz Review

1. Using the diagram below, solve the right triangle. Round angle measures to the nearest degree and segment lengths to the nearest tenth.

$x^2 + 12^2 = 42^2$
 $x^2 = 1620$
 $x = 40.2$
 side b
 $\sin A = \frac{12}{42}$
 $A = 16.6$

$m\angle A = 16.6$ $a = 12$
 $m\angle B = 73.4$ $b = 40.2$
 $m\angle C = 90$ $c = 42$

$180 - 90 - 16.6 = 73.4$

2. Using the diagram below, solve the right triangle. Round angle measures to the nearest degree and segment lengths to the nearest tenth.

$\tan 25 = \frac{15}{b}$
 $b = \frac{15}{\tan 25} = 32.2$
 $\sin 25 = \frac{15}{c}$
 $c = \frac{15}{\sin 25}$

$m\angle A = 25^\circ$ $a = 15$
 $m\angle B = 65^\circ$ $b = 32.2$
 $m\angle C = 90^\circ$ $c = 35.5$

$180 - 90 - 25 = 65$

3. If $\sin \theta = \frac{4}{7}$, find the other 5 trigonometric values of θ . Answers must be in exact form, not decimals.

$\cos(\theta) = \frac{\sqrt{33}}{7}$, $\tan(\theta) = \frac{4}{\sqrt{33}}$, $\csc(\theta) = \frac{7}{4}$, $\sec(\theta) = \frac{7}{\sqrt{33}}$, $\cot(\theta) = \frac{\sqrt{33}}{4}$

$x^2 + 4^2 = 7^2$
 $x^2 + 16 = 49$
 $x^2 = 33$
 $x = \sqrt{33}$

4. If $\tan \theta = 3$, find the other 5 trigonometric values of θ . Answers must be in exact form, not decimals.

$\sin(\theta) = \frac{3}{\sqrt{10}}$, $\cos(\theta) = \frac{1}{\sqrt{10}}$, $\csc(\theta) = \frac{\sqrt{10}}{3}$, $\sec(\theta) = \frac{\sqrt{10}}{1}$, $\cot(\theta) = \frac{1}{3}$

$\frac{3}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$
 $\frac{1}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

5. Find the missing side or angle. Round sides to the nearest tenth and angle to the nearest angle.

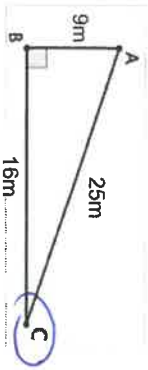
a. $\cos \theta = \frac{15.1}{16.5}$
 $\theta = 23.8 \approx 24^\circ$

b. $\cos 70 = \frac{x}{28}$
 $x = 8.2$

c. $\tan 28 = \frac{x}{20}$
 $x = 10.6$

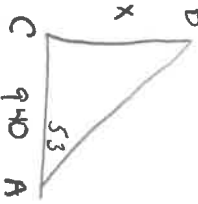
d. $\sin \theta = \frac{12}{48}$
 $\theta = 14.5^\circ \approx 15^\circ$

6. Find the six trigonometric values of angle C below.



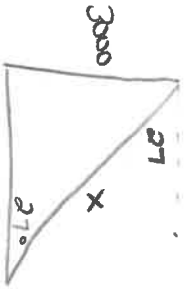
$$\begin{aligned} \sin C &= \frac{9}{25} & \csc C &= \frac{25}{9} \\ \cos C &= \frac{16}{25} & \sec C &= \frac{25}{16} \\ \tan C &= \frac{9}{16} & \cot C &= \frac{16}{9} \end{aligned}$$

7. A boy visiting New York City views the Empire State building from a point on the ground, A, which is 940 feet from foot, C, of the building. The angle of elevation of the top, B, of the building as seen by the boy is 53 degrees. Find the height of the building to the nearest foot.



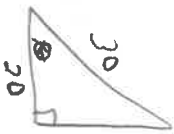
$$\begin{aligned} \tan 53 &= \frac{940}{x} \\ x &= \frac{940}{\tan 53} = \boxed{708.3 \text{ ft}} \end{aligned}$$

8. From an airplane which is flying at an altitude of 3000 feet, the angle of depression of an airport ground signal is 27 degrees. Find to the nearest hundred feet the distance between the airplane and the airport signal.



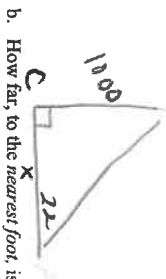
$$\begin{aligned} \sin 27 &= \frac{3000}{x} \\ x &= \frac{3000}{\sin 27} \\ x &= 1361.97 \\ &\Rightarrow \boxed{1400 \text{ ft}} \end{aligned}$$

9. A 30-foot steel girder is leaning against a wall. The foot of the girder is 20 feet from the wall. Find to the nearest degree the angle which the girder makes with the ground.



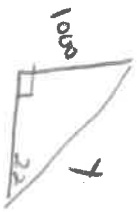
$$\cos \theta = \frac{20}{30} \Rightarrow \boxed{\theta = 48.2 \text{ ft}}$$

10. An airplane A is 1000 feet above the ground and directly over a church C. The angle of elevation of the plane as seen by a boy at a point B on the ground some distance from the church is 22 degrees.



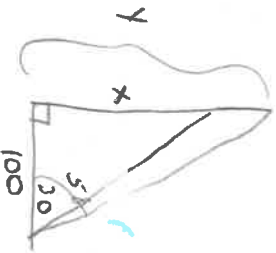
$$\begin{aligned} \tan 22 &= \frac{1000}{x} \\ x &= \frac{1000}{\tan 22} \Rightarrow \boxed{2475 \text{ ft}} \end{aligned}$$

b. How far, to the nearest foot, is the boy from the plane?



$$\begin{aligned} \sin 22 &= \frac{1000}{y} \\ y &= \frac{1000}{\sin 22} \Rightarrow \boxed{2669 \text{ ft}} \end{aligned}$$

11. A person standing 100 feet from the bottom of a cliff notices a tower on top of the cliff. The angle of elevation to the top of the cliff is 30 degrees, and the angle of elevation to the top of the tower is 58 degrees. How tall is the tower?



$$\tan 30 = \frac{x}{100} \quad x = 57.7$$

$$\tan 58 = \frac{y}{100} \quad y = 160.$$

$$\begin{aligned} \text{Tower} &= 160 - 57.7 \\ &= \boxed{102.3 \text{ ft}} \end{aligned}$$