Unit 5 Trigonometry Quiz Review

**If you can do ALL of this Review... you will likely do well on the quiz. Do ALLLLLLLLL of this Review!!!

What you’ll need to do...
*Find side lengths of a 45-45-90 triangle.
*Find side lengths of a 30-60-90 triangle.
*Find \( \sin 30, \cos 30, \tan 30, \sin 60, \cos 60, \tan 60, \cos 45, \sin 45 \), and \( \tan 45 \) without a calculator.

Find the value of each variable. Leave answers in simplest radical form.

1. \( \sqrt{72} = \frac{6\sqrt{2}}{x} \)

2. \( 2x = 14 \Rightarrow x = 7 \)

3. \( x\sqrt{3} = 15 \)

4. \( x\sqrt{2} = 10 \Rightarrow x = \frac{10}{\sqrt{2}} \)

5. Find the value of each trigonometric ratio without a calculator (these will be on the "no calculator" portion of the quiz).

\[
\begin{align*}
\sin 30 &= \frac{\text{opp}}{\text{hyp}} = \frac{x}{2x} = \frac{1}{2} \\
\cos 30 &= \frac{\text{adj}}{\text{hyp}} = \frac{x\sqrt{3}}{2x} = \frac{\sqrt{3}}{2} \\
\tan 30 &= \frac{\text{opp}}{\text{adj}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \\
\sin 60 &= \frac{\text{opp}}{\text{hyp}} = \frac{x\sqrt{3}}{2x} = \frac{\sqrt{3}}{2} \\
\cos 60 &= \frac{\text{adj}}{\text{hyp}} = \frac{x}{2x} = \frac{1}{2} \\
\tan 60 &= \frac{\text{opp}}{\text{adj}} = \frac{x\sqrt{3}}{x} = \sqrt{3} \\
\sin 45 &= \frac{\text{opp}}{\text{hyp}} = \frac{x}{2x} = \frac{1}{\sqrt{2}} \\
\cos 45 &= \frac{\text{adj}}{\text{hyp}} = \frac{x\sqrt{2}}{x\sqrt{2}} = \frac{1}{\sqrt{2}} \\
\tan 45 &= \frac{\text{opp}}{\text{adj}} = \frac{x}{x} = 1
\end{align*}
\]
What you’ll need to do...

*Use trigonometry to find missing side lengths.

*Use trigonometry to find missing angle measures.

Find the value of each variable to the nearest hundredth. Show all your work!!!!!

6. \[
\sin \theta = \frac{\text{opp}}{\text{hyp}} \\
\sin 62^\circ = \frac{x}{32} \\
x = 32 \cdot \sin 62^\circ \\
x \approx 28.25
\]

7. \[
\cos \theta = \frac{\text{adj}}{\text{hyp}} \\
\cos x = \frac{35}{42} \\
x = \cos^{-1} \left( \frac{35}{42} \right) \\
x \approx 33.56^\circ
\]

8. \[
\tan \theta = \frac{\text{opp}}{\text{adj}} \\
\tan 24^\circ = \frac{26}{x} \\
x \cdot \tan 24^\circ = 26 \\
x \approx 58.40
\]

9. At a certain time, a vertical pole 4 meters tall casts a shadow 6 meters long. Find, to the nearest degree, the angle of elevation of the sun.

\[
\tan \theta = \frac{\text{opp}}{\text{adj}} \\
\tan \theta = \frac{1}{4} \\
\theta = \tan^{-1} \left( \frac{1}{4} \right) \\
\theta \approx 16^\circ
\]

10. Miguel looks out from the crown of the Statue of Liberty approximately 250 feet above ground. He sights a ship coming into New York harbor and measures the angle of depression at 18°. Find the distance from the base of the statue to the ship to the nearest foot.

\[
\tan \theta = \frac{\text{opp}}{\text{adj}} \\
\tan 18^\circ = \frac{250}{x} \\
x = \frac{250}{\tan 18^\circ} \\
x \approx 769.57 \text{ ft}
\]
11. Jenna is a landscaper. She wishes to determine the height of a tree. Holding a drafter’s 45° triangle so that one leg is horizontal, she sights the top of the tree along the hypotenuse as shown. If she is 6 yards from the tree and her eyes are 5 feet from the ground, find the height of the tree.

\[ \text{height} = 18 + 5 = 23 \text{ ft} \]

12. Jenna wants to measure the height of another tree but she has misplaced her drafter’s triangle. Instead she uses a clinometer, another kind of angle measuring device, and determines the angle of elevation from her eye to the top of the tree to be 53°. What is the height of the tree?

\[ \tan \theta = \frac{\text{opp}}{\text{adj}} \]
\[ \tan 53 = \frac{x}{18} \]
\[ x = 18 \cdot \tan 53 \]
\[ x \approx 24 \text{ ft} \]
What you'll need to do...

* Write trigonometric ratios given a right triangle.
* Understand that the sine of an angle is equal to the cosine of the angle's complement.
* Solve equations involving trigonometry.

13. Use the triangle to MATCH each trigonometric ratio with the equivalent fraction.

![Diagram of a right triangle with sides labeled 45, 53, 28, 53, 28, 45, and 45, 28.]

\[
\begin{align*}
\sin D &= \frac{45}{53} \\
\cos D &= \frac{28}{53} \\
\tan D &= \frac{53}{28} \\
\sin F &= \frac{28}{45} \\
\cos F &= \frac{53}{45} \\
\tan F &= \frac{45}{28}
\end{align*}
\]

14. Which of the following is equivalent to \( \cos 70^\circ \)? You may NOT use a calculator on this question. Circle ALL the correct answers.

A. \( \cos 20^\circ \)  
B. \( \sin 20^\circ \)  
C. \( \cos 35^\circ \)  
D. \( \sin 35^\circ \)  
E. \( \sin 70^\circ \)

\[\cos 70^\circ = \heartsuit\]

So, \( \sin 20^\circ = \heartsuit\)

\[70 + 20 = 90\]
Solve each equation for \( x \). Round your answers to the nearest thousandth.

15. \( \tan(x) = \frac{10}{17} \)
   \[ x = \tan^{-1}\left(\frac{10}{17}\right) \]
   \[ x \approx 30.466 \]

16. \( \sin 50 = \frac{y}{13} \)
   \[ x = 13 \cdot \sin 50 \]
   \[ x \approx 9.959 \]

17. \( \cos 76 = \frac{12}{x} \)
   \[ x \cdot \cos 76 = 12 \]
   \[ x = \frac{12}{\cos 76} \]
   \[ x \approx 49.603 \]

18. \( \sin(x) = (0.68) \)
   \[ x = \sin^{-1}(0.68) \]
   \[ x \approx 42.844 \]

BONUS: Find the area of the regular octagon whose side length is 10 inches.

\[
\tan 67.5 = \frac{x}{5}
\]

\[ x = 5 \cdot \tan 67.5 \]
\[ x \approx 12.07 \]

Area of one triangle = \( \frac{1}{2} \cdot 10 \cdot 12.07 \)
\[ \approx 60.36 \]

Area of octagon = \( 8 \cdot 60.36 \)
\[ \approx 482.8 \text{ in}^2 \]