7.5 & 7.6 Trigonometry Ratios - Day 2

Use a trig ratio to find the value of each variable. Round to the nearest tenth.

1.) \[ \tan 50^\circ = \frac{13}{x} \]
   \[ x \approx 10.9 \]

2.) \[ \sin 36^\circ = \frac{21}{x} \]
   \[ x \approx 58.9 \]

3.) \[ \tan 24^\circ = \frac{9}{x} \]
   \[ x \approx 20.2 \]

Use the 45°-45°-90° Triangle Theorem or the 30°-60°-90° Triangle Theorem to find the sine, cosine, and tangent of the angle.

4.) a 30° angle
   \[ \sin 30^\circ = \frac{x}{2} \]
   \[ \tan 30^\circ = \frac{x}{\sqrt{3}} \]

5.) a 45° angle
   \[ \tan 45^\circ = \frac{x}{1} \]
   \[ \cos 45^\circ = \frac{x}{\sqrt{2}} \]

6.) a 60° angle
   \[ \sin 60^\circ = \frac{x}{2} \]
   \[ \cos 60^\circ = \frac{x}{2} \]

Find the value of \( x \) using the definition of tangent. Then find the value of \( x \) using the 45°-45°-90° Triangle Theorem or the 30°-60°-90° Triangle Theorem. Compare the results.

7.) \[ \tan 45^\circ = \frac{5\sqrt{2}}{x} \]
   \[ x = 5\sqrt{2} \]
   \[ x \approx 7.07 \]

8.) \[ \tan 30^\circ = \frac{4\sqrt{3}}{x} \]
   \[ x = 12 \]

Find the unknown side length. Then find \( \sin A \) and \( \cos A \). Write each answer as a fraction in simplest form and as a decimal. Round to four decimal places, if necessary. What can you say about these two triangles?

9.) \[ \sin A = \frac{2\sqrt{7}}{4} \]
    \[ \cos A = \frac{2\sqrt{7}}{4} \]

10.) \[ \sin A = \frac{3\sqrt{7}}{12} \]
     \[ \cos A = \frac{3\sqrt{7}}{12} \]

Find the area of the triangle. Round your answer to the nearest tenth.

11.) \[ \tan 40^\circ = \frac{11}{x} \]
    \[ x \approx 13.1 \]

12.) \[ \tan 32^\circ = \frac{x}{24} \]
    \[ x \approx 15 \]
Find the perimeter of the triangle. Round to the nearest tenth.

13.) \( \tan 36^\circ = \frac{x}{49} \)
\[
x \approx 35.6
\]
\( \cos 36^\circ = \frac{49}{y} \)
\[
y \approx 60.6
\]
\( \rho = 49 + 35.6 + 60.6 = 145.8 \)

14.) \( \tan 71^\circ = \frac{34}{x} \)
\[
x \approx 11.7
\]
\( \cos 71^\circ = \frac{34}{y} \)
\[
y \approx 35.96
\]
\( \rho = 34 + 11.7 + 36 = 81.7 \) ft

15.) A chair lift on a ski slope has an angle of elevation of 28° and covers a total distance of 4640 feet. To the nearest foot, what is the vertical height \( h \) covered by the chair lift?

\[
\sin 28^\circ = \frac{h}{4640}
\]
\[
h \approx 2178 \] ft

16.) You are using extension ladders to paint a chimney that is 33 feet tall. The length of an extension ladder ranges in one-foot increments from its minimum length to its maximum length. For safety, you should always use an angle of about 75.5° between the ground and the ladder. (draw a new picture for each!)

a.) Your smallest extension ladder has a maximum length of 17 feet. How high does this ladder safely reach on a vertical wall?

\[
\sin 75.5^\circ = \frac{x}{17} \approx 16.5 \] ft

b.) You place the base of the ladder 3 feet from the chimney. How many feet long should the ladder be?

\[
\cos 75.5^\circ = \frac{3}{x} \]
\[
x \approx 12 \] ft

c.) To reach the top of the chimney, you need a ladder that reaches 30 feet high. How many feet long should the ladder be?

\[
\sin 75.5^\circ = \frac{30}{x} \]
\[
x \approx 31 \] ft

17.) You are 50 feet from the screen at a drive-in movie. Your eye is on a horizontal line with the bottom of the screen and the angle of elevation to the top of the screen is 58°. How tall is the screen?

\[
\tan 58^\circ = \frac{x}{50} \]
\[
x \approx 86 \] ft
SOHCAHTOA Code Breaker

<table>
<thead>
<tr>
<th>To</th>
<th>Mall</th>
<th>What</th>
<th>90</th>
<th>Why</th>
<th>It</th>
<th>Go</th>
<th>Shop</th>
<th>Because</th>
<th>Reflex</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>16</td>
<td>34</td>
<td>8</td>
<td>14</td>
<td>60</td>
<td>50</td>
<td>41</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>The</td>
<td>How</td>
<td>Obtuse</td>
<td>Was</td>
<td>Sine</td>
<td>Cos</td>
<td>Degrees</td>
<td>Angle</td>
<td>Beach</td>
<td>On</td>
</tr>
<tr>
<td>21</td>
<td>18</td>
<td>10</td>
<td>27</td>
<td>65</td>
<td>15</td>
<td>155</td>
<td>62</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Not</td>
<td>Like</td>
<td>Over</td>
<td>30</td>
<td>Tan</td>
<td>Did</td>
<td>Right</td>
<td>Hot</td>
<td>An</td>
<td>Acute</td>
</tr>
<tr>
<td>23</td>
<td>48</td>
<td>38</td>
<td>79</td>
<td>83</td>
<td>32</td>
<td>33</td>
<td>40</td>
<td>12</td>
<td>56</td>
</tr>
</tbody>
</table>

Find the missing side or angle labeled (rounded to the nearest whole number), then use the code above to translate your answer into part of the coded joke on the other side.
As you decode your answers, fill in the gaps below.

Why did an obtuse angle go to the beach?

Because it was over 90 degrees.