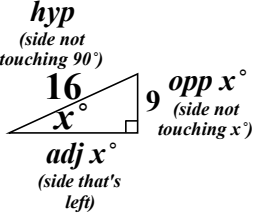
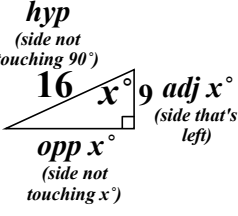
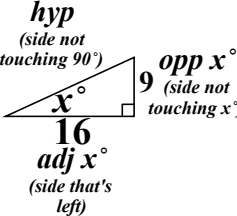
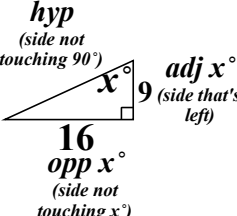
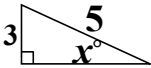
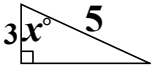
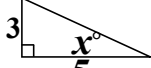
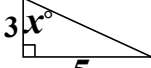
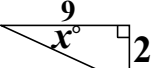
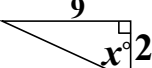
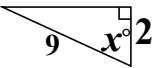
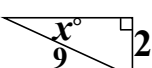
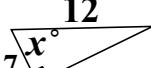
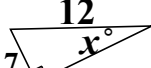
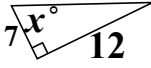
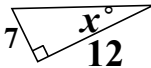


Name: _____

Creating Trig Ratios to Determine Angles

So far, we have only used trigonometry to determine side measures on right triangles, but it can also be used to determine angle measures. There are three steps in this process: 1. Use SohCahToa to set up your ratio **using the angle you want**; 2. Use long division to re-write your fraction as a decimal to 4 places; and 3. Use subtraction to find the closest value on the trigonometry table. Today, we are going to focus on each step, one at a time.

Step 1: SohCahToa when you want a specific angle

<p>EXAMPLE:</p>  <p>S o h C a h T o a $\frac{9}{16}$ $\frac{16}{9}$ $\frac{16}{9}$</p> $\sin(x^\circ) = \frac{9}{16}$	<p>EXAMPLE:</p>  <p>S o h C a h T o a $\frac{16}{9}$ $\frac{9}{16}$ $\frac{16}{9}$</p> $\cos(x^\circ) = \frac{9}{16}$	<p>EXAMPLE:</p>  <p>S o h C a h T o a $\frac{9}{16}$ $\frac{16}{9}$ $\frac{16}{9}$</p> $\tan(x^\circ) = \frac{9}{16}$	<p>EXAMPLE:</p>  <p>S o h C a h T o a $\frac{16}{9}$ $\frac{9}{16}$ $\frac{16}{9}$</p> $\tan(x^\circ) = \frac{16}{9}$
<p>1.</p> 	<p>2.</p> 	<p>3.</p> 	<p>4.</p> 
<p>5.</p> 	<p>6.</p> 	<p>7.</p> 	<p>8.</p> 
<p>9.</p> 	<p>10.</p> 	<p>11.</p> 	<p>12.</p> 

Step 2: Long Division to 4 decimal places

<p>EXAMPLE: $\frac{9}{16}$</p> $\frac{9}{16} = \boxed{0.5265}$ $\begin{array}{r} 0.56250 \\ 16 \overline{) 9.00000} \\ \underline{-80} \\ 100 \\ \underline{-96} \\ 40 \\ \underline{-32} \\ 80 \\ \underline{-80} \\ 0 \end{array}$ $\begin{array}{r} 3 \\ 16 \\ \times 5 \\ \hline 80 \end{array}$ $\begin{array}{r} 3 \\ 16 \\ \times 6 \\ \hline 96 \end{array}$ $\begin{array}{r} 1 \\ 16 \\ \times 2 \\ \hline 32 \end{array}$			<p>EXAMPLE: $\frac{16}{9}$</p> $\frac{16}{9} = \boxed{1.5556}$ $\begin{array}{r} 1.55555 \\ 9 \overline{) 16.00000} \\ \underline{-9} \\ 50 \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 50 \end{array}$ $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$		
13. $\frac{3}{5}$	14. $\frac{5}{3}$	15. $\frac{2}{9}$	16. $\frac{9}{2}$	17. $\frac{7}{12}$	18. $\frac{12}{7}$

Step 3: Subtracting to find the closest value from the table of values

<p>EXAMPLE: $\sin(x^\circ) = \frac{9}{16}$ $\sin(x^\circ) = 0.5625$</p> <p>34° 0.5592 $x^\circ \approx \boxed{34^\circ}$ 35° 0.5736</p> <table border="1"> <tr> <td> $\begin{array}{r} 34^\circ \ 0.5592 \\ \underline{5625} \\ -5592 \\ \hline 33 \end{array}$ <p>Smaller difference!</p> </td> <td> $\begin{array}{r} 35^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$ </td> </tr> </table>	$\begin{array}{r} 34^\circ \ 0.5592 \\ \underline{5625} \\ -5592 \\ \hline 33 \end{array}$ <p>Smaller difference!</p>	$\begin{array}{r} 35^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$	<p>EXAMPLE: $\cos(x^\circ) = \frac{9}{16}$ $\cos(x^\circ) = 0.5625$</p> <p>55° 0.5736 56° 0.5592 $x^\circ \approx \boxed{56^\circ}$</p> <table border="1"> <tr> <td> $\begin{array}{r} 55^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$ </td> <td> $\begin{array}{r} 56^\circ \ 0.5592 \\ \underline{5592} \\ -5625 \\ \hline 33 \end{array}$ <p>Smaller difference!</p> </td> </tr> </table>	$\begin{array}{r} 55^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$	$\begin{array}{r} 56^\circ \ 0.5592 \\ \underline{5592} \\ -5625 \\ \hline 33 \end{array}$ <p>Smaller difference!</p>	<p>EXAMPLE: $\tan(x^\circ) = \frac{9}{16}$ $\tan(x^\circ) = 0.5625$</p> <p>29° 0.5543 $x^\circ \approx \boxed{29^\circ}$ 30° 0.5774</p> <table border="1"> <tr> <td> $\begin{array}{r} 29^\circ \ 0.5543 \\ \underline{5543} \\ -5625 \\ \hline 149 \end{array}$ </td> <td> $\begin{array}{r} 30^\circ \ 0.5774 \\ \underline{5774} \\ -5625 \\ \hline 82 \end{array}$ <p>Smaller difference!</p> </td> </tr> </table>	$\begin{array}{r} 29^\circ \ 0.5543 \\ \underline{5543} \\ -5625 \\ \hline 149 \end{array}$	$\begin{array}{r} 30^\circ \ 0.5774 \\ \underline{5774} \\ -5625 \\ \hline 82 \end{array}$ <p>Smaller difference!</p>	<p>EXAMPLE: $\tan(x^\circ) = \frac{5}{3}$ $\tan(x^\circ) = 1.7778$</p> <p>60° 1.7321 61° 1.8040 $x^\circ \approx \boxed{61^\circ}$</p> <table border="1"> <tr> <td> $\begin{array}{r} 61^\circ \ 1.8040 \\ \underline{18040} \\ -17778 \\ \hline 262 \end{array}$ <p>Smaller difference!</p> </td> <td> $\begin{array}{r} 60^\circ \ 1.7321 \\ \underline{17321} \\ -17778 \\ \hline 457 \end{array}$ </td> </tr> </table>	$\begin{array}{r} 61^\circ \ 1.8040 \\ \underline{18040} \\ -17778 \\ \hline 262 \end{array}$ <p>Smaller difference!</p>	$\begin{array}{r} 60^\circ \ 1.7321 \\ \underline{17321} \\ -17778 \\ \hline 457 \end{array}$
$\begin{array}{r} 34^\circ \ 0.5592 \\ \underline{5625} \\ -5592 \\ \hline 33 \end{array}$ <p>Smaller difference!</p>	$\begin{array}{r} 35^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$										
$\begin{array}{r} 55^\circ \ 0.5736 \\ \underline{5736} \\ -5625 \\ \hline 111 \end{array}$	$\begin{array}{r} 56^\circ \ 0.5592 \\ \underline{5592} \\ -5625 \\ \hline 33 \end{array}$ <p>Smaller difference!</p>										
$\begin{array}{r} 29^\circ \ 0.5543 \\ \underline{5543} \\ -5625 \\ \hline 149 \end{array}$	$\begin{array}{r} 30^\circ \ 0.5774 \\ \underline{5774} \\ -5625 \\ \hline 82 \end{array}$ <p>Smaller difference!</p>										
$\begin{array}{r} 61^\circ \ 1.8040 \\ \underline{18040} \\ -17778 \\ \hline 262 \end{array}$ <p>Smaller difference!</p>	$\begin{array}{r} 60^\circ \ 1.7321 \\ \underline{17321} \\ -17778 \\ \hline 457 \end{array}$										
<p>19. $\sin(x^\circ) = \frac{3}{5}$ $\sin(x^\circ) = 0.6000$</p> <p>36° 0.5878 or 37° 0.6018</p>	<p>20. $\cos(x^\circ) = \frac{3}{5}$ $\cos(x^\circ) = 0.6000$</p> <p>53° 0.6018 or 54° 0.5878</p>	<p>21. $\tan(x^\circ) = \frac{3}{5}$ $\tan(x^\circ) = 0.6000$</p> <p>30° 0.5774 or 31° 0.6009</p>	<p>22. $\tan(x^\circ) = \frac{5}{3}$ $\tan(x^\circ) = 1.6667$</p> <p>59° 1.6643 or 60° 1.7321</p>								
<p>23. $\tan(x^\circ) = \frac{2}{9}$ $\tan(x^\circ) = 0.2222$</p> <p>12° 0.2126 or 13° 0.2309</p>	<p>24. $\tan(x^\circ) = \frac{9}{2}$ $\tan(x^\circ) = 4.5000$</p> <p>77° 4.3315 or 78° 4.7046</p>	<p>25. $\cos(x^\circ) = \frac{2}{9}$ $\cos(x^\circ) = 0.2222$</p> <p>77° 0.2250 or 78° 0.2079</p>	<p>26. $\sin(x^\circ) = \frac{2}{9}$ $\sin(x^\circ) = 0.2222$</p> <p>12° 0.2079 or 13° 0.2250</p>								