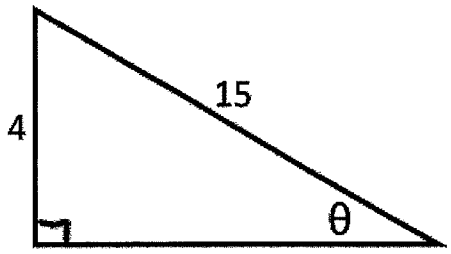
Name_____ Algebra 2 Practice Quiz

SOHCAHTOA - Law of Sines - Law of Cosines

1. Evaluate the six trig functions of the angle θ. Write your answers in simplest radical form. Show/explain your work.

$\sin\theta = \frac{4}{15}$ $\cos\theta = \frac{\sqrt{209}}{15}$ $\tan\theta = \frac{4}{\sqrt{209}}$




$\csc\theta = \frac{15}{4}$ $\sec\theta = \frac{15}{\sqrt{209}}$ $\cot\theta = \frac{\sqrt{209}}{4}$

$4^2 + x^2 = 15^2$

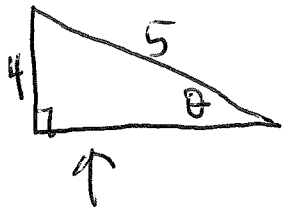
$16 + x^2 = 225$

$x^2 = 209$

$x = \sqrt{209}$

2. Let θ be an acute angle of a right triangle. Draw and label the triangle. Then find the values of the other five trig functions of θ. Write your answers in simplest radical form. Show/explain your work.

$\sin\theta = \frac{4}{5}$ $\cos\theta = \frac{3}{5}$ $\tan\theta = \frac{4}{3}$ $\csc\theta = \frac{5}{4}$




$x^2 + 4^2 = 5^2$

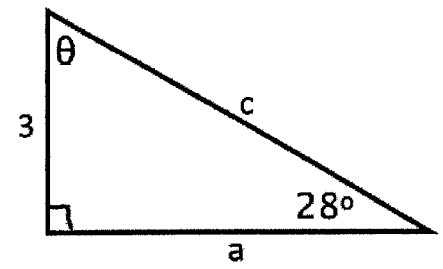
$x^2 + 16 = 25$

$x^2 = 9$

$x = 3$

$\sec\theta = \frac{5}{3}$ $\cot\theta = \frac{3}{4}$

3. Find each missing side and angle. Round answers to the nearest hundredth. Show work.




$\tan 28 = \frac{3}{a}$ $\quad \sin 28 = \frac{3}{c}$

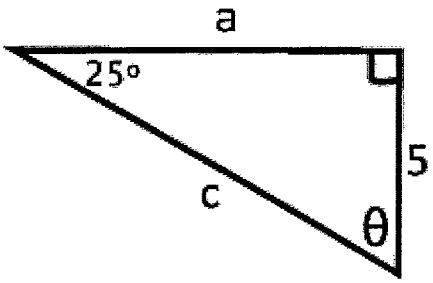
$a = \frac{3}{\tan 28} = 5.64$ $\quad c = \frac{3}{\sin 28}$

$c = 6.39$

$\theta = 90 - 28 = 62°$

a = 5.64 c = 6.39 θ = 62°

4. Find each missing side and angle. Round answers to the nearest hundredth. Show work.




$\tan 25 = \frac{5}{a}$ $\quad \sin 25 = \frac{5}{c}$

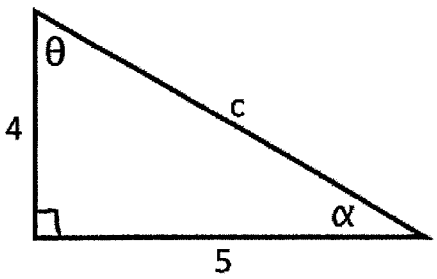
$a = \frac{5}{\tan 25}$ $\quad c = \frac{5}{\sin 25}$

$a = 10.72$ $\quad c = 11.83$

$\theta = 90 - 25 = 65°$

a = 10.72 c = 11.83 θ = 65°

5. Find each missing side and angle. Round answers to the nearest hundredth. Show work.




$\tan\theta = \frac{5}{4}$

$\theta = 51.34$

$\alpha = 90 - 51.34$

$= 38.66$

$4^2 + 5^2 = c^2$

$41 = c^2$ $\quad c = 6.40$

c = 6.40 α = 38.66 θ = 51.34

6. Solve triangle *ABC* with $a = 6$, $A = 31°$, and $B = 16°$. (Find all missing sides and angles)

$\frac{\sin A}{a} = \frac{\sin B}{b}$

$\angle C = 180 - (31 + 16) = \boxed{133°}$

$\frac{\sin 31}{6} = \frac{\sin 16}{b}$

$\boxed{b = 3.21}$

$\frac{\sin A}{a} = \frac{\sin C}{c} \rightarrow \frac{\sin 31}{6} = \frac{\sin 133}{c}$

$\boxed{c = 8.52}$

7. Solve triangle *ABC* given that $A = 44°$, $B = 42°$, and $b = 64$. (Find all missing sides and angles)

$\frac{\sin A}{a} = \frac{\sin B}{b}$

$\angle C = 180 - (44 + 42) = \boxed{94°}$

$\frac{\sin 44}{a} = \frac{\sin 42}{64}$

$\boxed{a = 66.44}$

$\frac{\sin B}{b} = \frac{\sin C}{c} \rightarrow \frac{\sin 42}{64} = \frac{\sin 94}{c}$

$\boxed{c = 95.41}$

8. Solve triangle *ABC* with $b = 3$, $c = 9$, and $A = 98°$. (Find all missing sides and angles)

$a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = 3^2 + 9^2 - 2(3)(9)\cos 98$

$\boxed{a = 9.87}$

$\frac{\sin A}{a} = \frac{\sin B}{b}$

$\frac{\sin 98}{9.87} = \frac{\sin B}{3} \rightarrow \boxed{B = 17.52°}$

$C = 180 - (98 + 17.52)$

$= 64.5°$

OR...

$\frac{\sin 98}{9.87} = \frac{\sin C}{9} \rightarrow$

$\boxed{C = 64.55°}$

9. Solve triangle *ABC* given that $a = 20$, $b = 21$, and $c = 10$. (Find all missing sides and angles)

$b^2 = a^2 + c^2 - 2ac \cos B$

$21^2 = 20^2 + 10^2 - 2(20)(10)\cos B$

$441 = 500 - 400 \cos B$

$-59 = -400 \cos B$

$0.1475 = \cos B$

$\boxed{81.52° = B}$

$\frac{\sin 81.52}{21} = \frac{\sin A}{20}$ $\boxed{A = 70.38°}$

$\angle C = 180 - (81.52 + 70.38)$

$\boxed{C = 28.1°}$