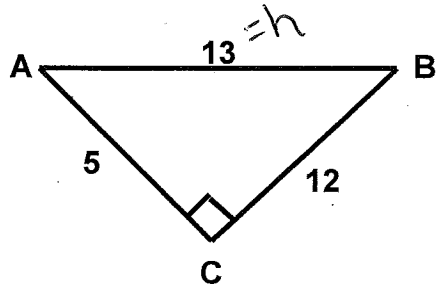
Algebra 2
Chapter 12 Review $S\frac{O}{H}$ $C\frac{A}{H}$ $T\frac{O}{A}$

Name:_____

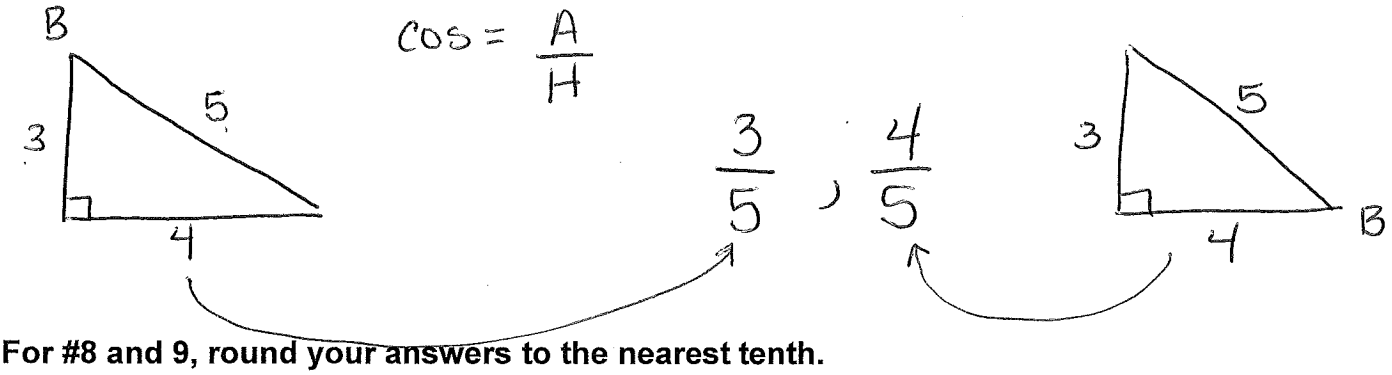
Hour:_____

Find the indicated trig ratios. Write your answer as a simplified fraction.



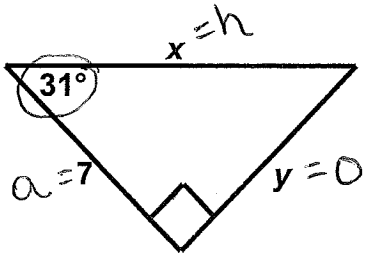
1. $\cos A = \frac{5}{13}$
2. $\sin A = \frac{12}{13}$
3. $\tan A = \frac{12}{5}$
4. $\cos B = \frac{12}{13}$
5. $\tan B = \frac{5}{12}$
6. $\sin B = \frac{5}{13}$

7. The sides of right ΔABC have lengths 3 ft, 4 ft, and 5 ft. What could be the cosine of $\angle B$?



For #8 and 9, round your answers to the nearest tenth.

8.



$x \cdot \cos 31 = \frac{7}{x} \cdot x$

$x = 8.2$

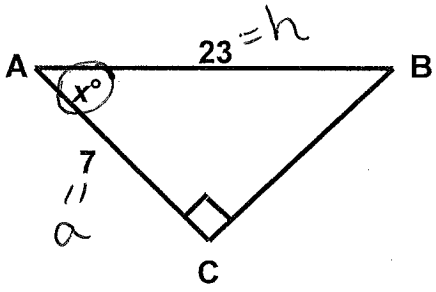
$y = 4.2$

$\frac{x \cdot \cos 31}{\cos 31} = \frac{7}{\cos 31}$

$x = 8.2$

$7 \cdot \tan 31 = \frac{y}{7} \cdot 7$

9.



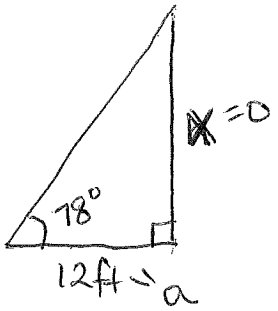
$x = 72.3°$

$(\cos x) = \frac{7}{23}$

$\cos^{-1}(\cos x) = \cos^{-1}\left(\frac{7}{23}\right)$

For #10 – 14, draw a picture, label all known quantities, show your equations, and label your answer. Round to the nearest tenth.

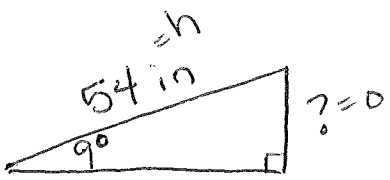
10. From a point on the ground 12 feet in front of a building, the angle of elevation to the top of the building is 78°. How tall is the building?



$12 \cdot \tan 78 = \frac{x}{12} \cdot 12$

56.5 ft

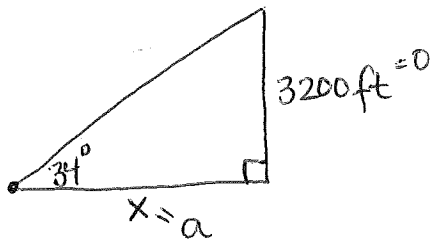
11. A dolly ramp is 54 inches long and rises at an angle of 9 degrees. How high is the ramp off the ground?



$54 \cdot \sin 9 = \frac{x}{54} \cdot 54$

x = 8.4 in

12. An air traffic controller looks up at an airplane and measures a 34° angle with the ground. The pilot reports that the plane's altitude is 3200 feet. Find the horizontal distance between the plane and the airport.

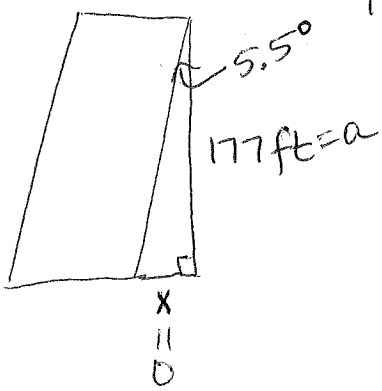


$x \cdot \tan 34° = \frac{3200}{x} \cdot x$

$\frac{x \cdot \tan 34}{\tan 34} = \frac{3200}{\tan 34}$

x = 4744.2 ft

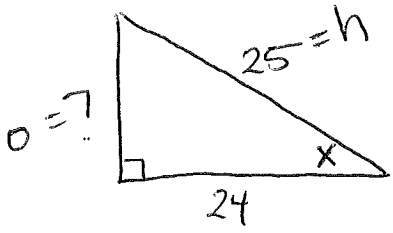
13. The Leaning Tower of Pisa leans about 5.5° from vertical. Ella Vator is standing on a ledge 177 feet above the ground when she drops her phone. How far from the base will the phone land?



$177 \cdot \tan 5.5 = \frac{x}{177} \cdot 177$

17.0 ft

14. Find the smaller acute angle in a right triangle with side lengths of 7, 24, and 25.



$\sin x = \frac{7}{25}$

$x = \sin^{-1}\left(\frac{7}{25}\right)$

$\boxed{x = 16.3^\circ}$

15. Explain why sine and cosine are always less than 1.

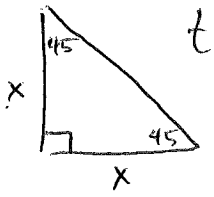
$\sin\theta = \frac{\text{opp.}}{\text{hyp.}}$ $\cos\theta = \frac{\text{adj.}}{\text{hyp.}}$

Since the hypotenuse is in the denominator of both, and it is the longest side, the sin + cos are always < 1

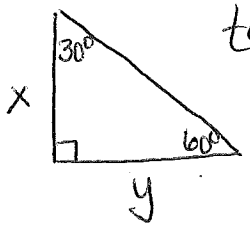
16. For what angle measures is the tangent ratio less than one? $\theta < 45^\circ$

For what angle measures is the tangent ratio greater than one? $\theta > 45^\circ$

Explain. $\tan = \frac{\text{opp}}{\text{adj.}}$



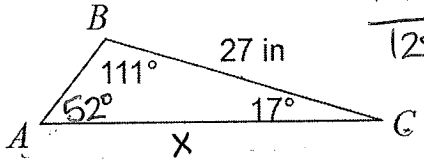
$\tan 45 = \frac{x}{x} = 1$



$\tan 60 = \frac{x}{y} > 1$

For #20 – 23, round your answers to the nearest tenth.

17. Find *AC*.



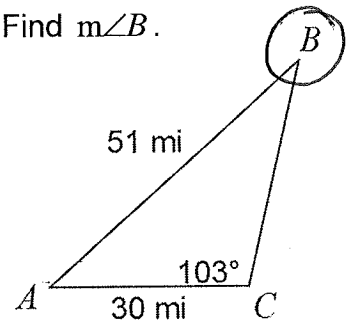
$111 + 17 = 128^\circ$ $180 - 128 = 52$

$\frac{\sin 52^\circ}{27} = \frac{\sin 111^\circ}{x}$

$\frac{x \cdot \sin 52}{\sin 52} = \frac{27 \cdot \sin 111}{\sin 52}$

$\boxed{x = 32.0 \text{ in}}$

18. Find $m\angle B$.



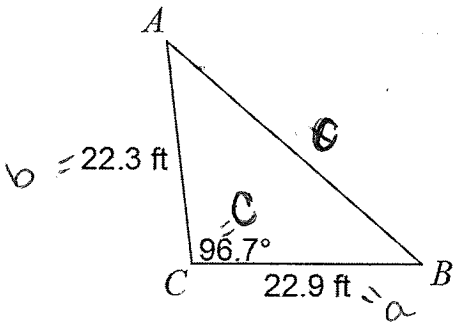
$\frac{30 \cdot \sin 103}{51} = \frac{\sin B}{30} \cdot 30$

$\sin B = 0.5732$

$B = \sin^{-1}(0.5732)$

$\boxed{B = 35^\circ}$

19. Find *AB*.



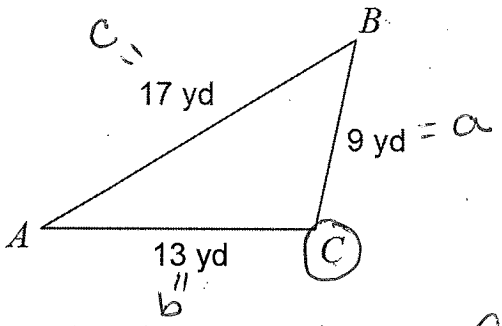
$c^2 = a^2 + b^2 - 2ab \cdot \cos C$

$c^2 = 22.9^2 + 22.3^2 - 2(22.9)(22.3) \cdot \cos(96.7)$

$\sqrt{c^2} = \sqrt{1140.86}$

$c = 33.8 \text{ ft}$

20. Find $m\angle C$.



$c^2 = a^2 + b^2 - 2ab \cdot \cos C$

$17^2 = 9^2 + 13^2 - 2(9)(13) \cdot \cos C$

$289 = 81 + 169 - 234 \cos C$

$289 = 250 - 234 \cos C$

$-250 \quad -250$

$\frac{39}{-234} = \frac{-234 \cdot \cos C}{-234}$

$\cos C = -0.16$

$C = \cos^{-1}(-0.16)$

$C = 99.6°$

Law of Sines: $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

Law of Cosines: $a^2 = b^2 + c^2 - 2bc \cos A$

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

$c^2 = a^2 + b^2 - 2ab \cos C$