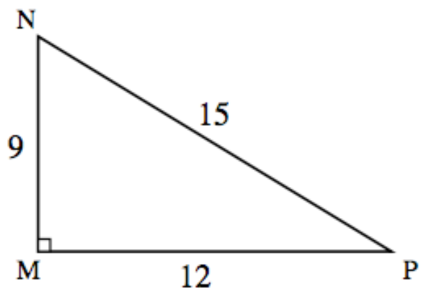
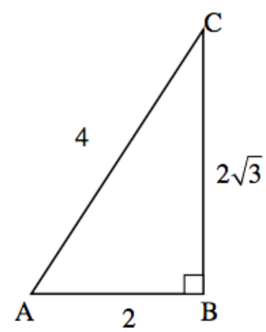
Problem Set 6.1 | Unit 6 – Trigonometry

BIG PICTURE of this Unit

- How can we extend our geometry skills with triangles to go beyond right triangles to (i) obtuse triangles and (ii) circles and Cartesian Planes?
- What do triangles have to do with sinusoidal functions in the first place?
- How can we connect previously learned function concepts and skills to sinusoidal functions?
- How can use the equation of a sinusoidal function be used to analyze for key features of a graph of a sinusoidal curve?
- When and how can triangles and sinusoidal functions be used to model real world scenarios?

1. (CI) Use the triangles to find the given trigonometric ratios (express final answers as non-reduced fractions): {1}

(i) cos(N) (ii) sin(N) (iii) tan(N) (iv) cos(P) (v) sin(P) (vi) tan(P)		(i) sin(C) (ii) cos(C) (iii) tan(C) (iv) sin(A) (v) cos(A) (vi) tan(A)	

2. (CA) Use your calculator to evalaute the following (make sure your calculator is set in "degree" mode) {1}

(i) sin(40°)	(ii) cos(35°)	(iii) tan(70°)	(iv) sin(85°)	(v) cos(53°)	(vi) tan(11°)
(vii) $\sin^{-1}(0.75)$	(viii) $\sin^{-1}(0.20)$	(ix) $\cos^{-1}(0.6)$	(x) $\cos^{-1}(1.2)$	(xi) $\tan^{-1}(0.30)$	(xii) $\tan^{-1}(1.75)$

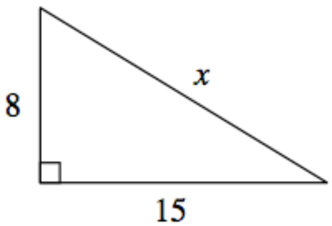
3. (CI) Understanding Meanings

   a. You know that sin(20) = 0.342. If sine can be understood as a "function", explain what the input of 20 means and explain what the output of 0.342 means.
   b. You know that $\cos^{-1}(0.6) = 53.13$. If $\cos^{-1}$ can be understood as a "function", explain what the input of 0.6 means and explain what the output of 53.13 means.
   c. Since you know that $\cos^{-1}(0.6) = 53.13$, use your calculator to evaluate cos(53.13). Now explain why $\cos^{-1}$ is referred to as "inverse cosine."

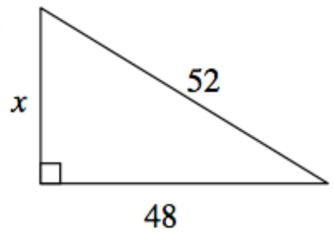
4. (CI) It is known that $\tan^{-1}\left(\frac{6}{9}\right) = 33.7$. Draw a diagram of a right triangle, wherein you label the sides and angles of the triangle, so that you demonstrate the **meaning** of the statement $\tan^{-1}\left(\frac{6}{9}\right) = 33.7$. {1}

5. (CA) Find the value of x in the following diagrams. Round to the nearest *tenth* if necessary. Then, determine the measure of all three angles in each triangle. {1,2}

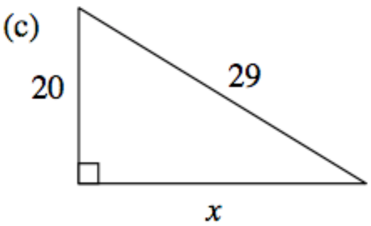
(a)



(b)

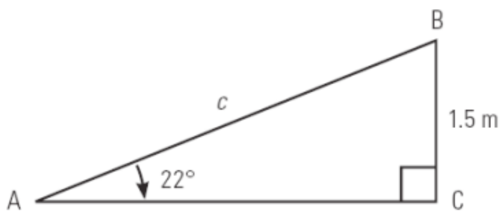


(c)

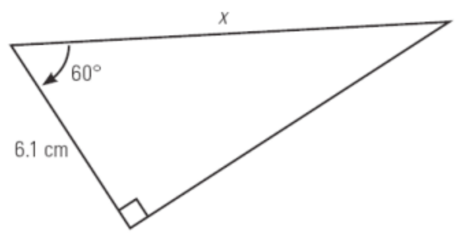


6. (CA) Calculate the length of the indicated side: {1,2}

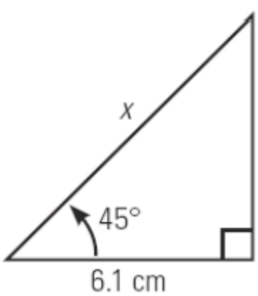
(a)



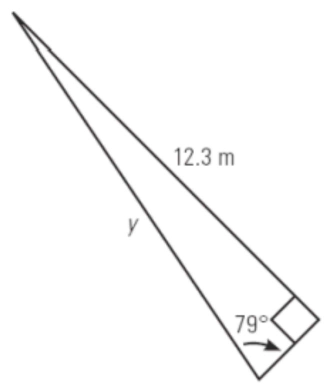
(b)



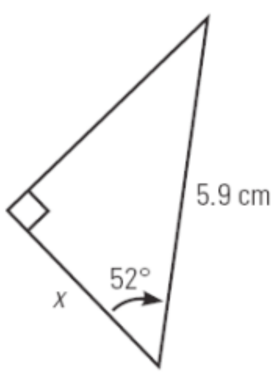
c)



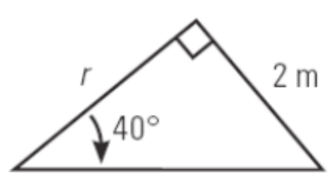
(d)



(e)

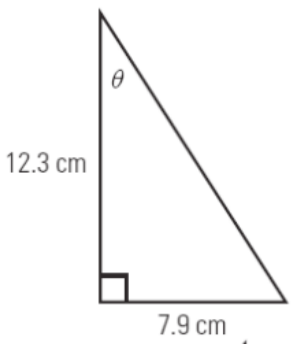


(f)

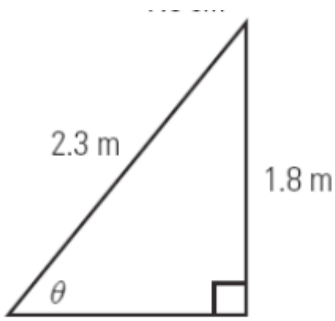


7. (CA) Calculate the measure of the indicated angle: {1,2}

(a)



(b)



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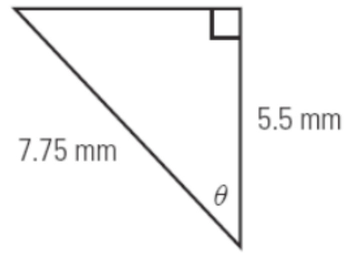
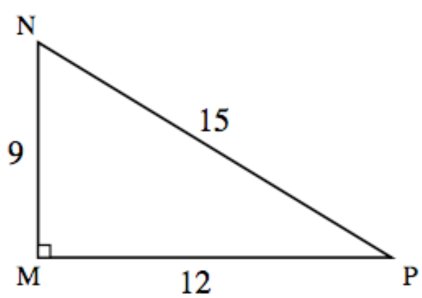
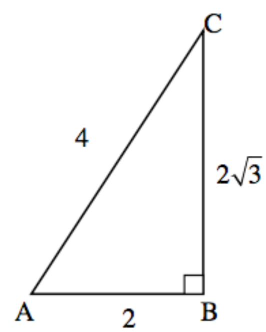


Higher Level Questions for More Complex Concepts OR an EXTENSION of basic concepts involved with triangle trigonometry and sinusoidal functions.

1. (CI) Use the triangle given to find the given **secondary trigonometric ratios** (express final answers as non-reduced fractions):

(i) sec(N) (ii) csc(N) (iii) cot(N) (iv) sec(P) (v) csc(P) (vi) cot(P)		(i) csc(C) (ii) sec(C) (iii) cot(C) (iv) csc(A) (v) sec(A) (vi) cot(A)	

2. (CI) It is known that $\sec(66.4) = \frac{r}{x}$. Draw a diagram of a right triangle, wherein you label the sides and angles of the triangle, so that you demonstrate the **meaning** of the statement $\sec(66.4) = \frac{r}{x}$. Hence, evaluate the following (in terms of r and x):

   a. $\cos(66.4)$ b. $\csc(66.4)$ c. $\cot(66.4)$ d. $(\cos(66.4))^2 + (\sin(66.4))^2$