

## Math 2 Honors – Unit 5 Trigonometry REVIEW

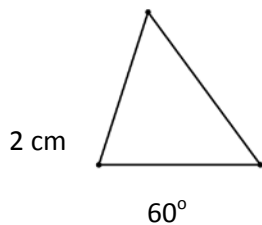
**PART A** – The following questions are **CALCULATOR INACTIVE**. Provide clear, concise solutions that show the key algebraic steps in your solutions:

- Evaluate  $\cot\left(\cos^{-1}\left(\frac{5}{13}\right)\right)$ .
- Write a trigonometric equation that produces the solutions  $\theta = \frac{5\pi}{6}, \frac{11\pi}{6}$  on the domain  $\theta \in [0, 2\pi]$ .
- The solution to  $\cot(x) = -1$  on an infinitely defined domain is:

4. In which quadrant does  $\theta$  lie if  $(\sin \theta)(\cos \theta) < 0$  and  $\csc \theta < 0$ ? Justify your answer.

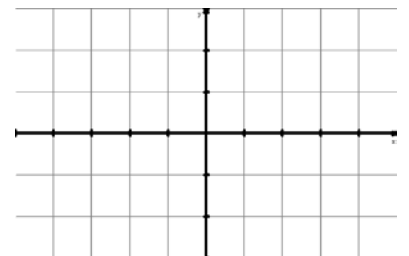
5. Solve for the unknown side in the diagram below:

**(2M)**



6. In this question, you will work with the function  $f(\theta) = 2\sec\frac{1}{4}\left(\theta - \frac{3\pi}{2}\right)$  and your knowledge of transformations. A grid has been provided for your use (if you wish).

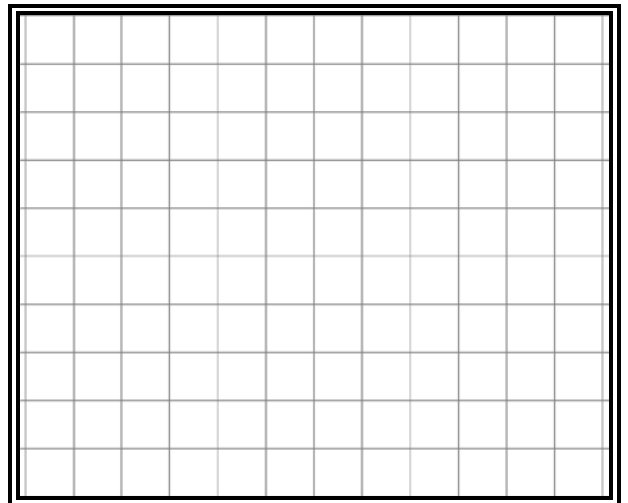
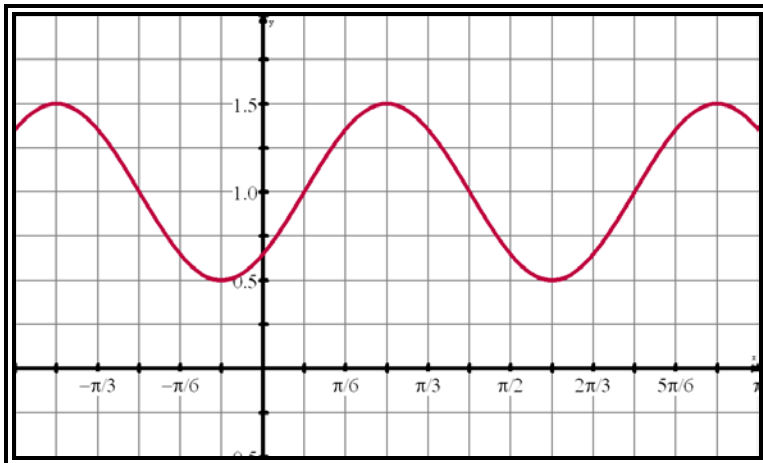
- Write the equation of a vertical asymptote of  $f(\theta) = \sec(\theta)$ . \_\_\_\_\_.
- The equations of any two (2) vertical asymptotes of  $f(\theta) = 2\sec\frac{1}{4}\left(\theta - \frac{3\pi}{2}\right)$  \_\_\_\_\_.
- The co-ordinates of one maximum point of  $f(\theta) = \sec(\theta)$ . \_\_\_\_\_.
- The co-ordinates of one maximum point of  $f(\theta) = 2\sec\frac{1}{4}\left(\theta - \frac{3\pi}{2}\right)$ . \_\_\_\_\_.
- The range of  $f(\theta) = 2\sec\frac{1}{4}\left(\theta - \frac{3\pi}{2}\right)$ . \_\_\_\_\_.



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7. Prove the identity  $\frac{\sin(2x)}{1 + \cos(2x)} = \tan(x)$  and then state and EXPLAIN the domain of validity for this identity.
8. Determine the exact ratio for  $\sec\left(\frac{5\pi}{12}\right)$ .
9. You are given a graph of a sinusoidal function  $y = f(\theta)$ .
- Determine an appropriate sinusoidal equation for the function.
  - Graph the inverse **function**,  $y = f^{-1}(\theta)$  on the second graph. Clearly label/indicate the key points and place an appropriate scale on the axis (axis NOT included in second graph).



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PART B – The following questions are CALCULATOR ACTIVE. Provide clear, concise solutions that show the key algebraic steps.

10. Solve the equation  $4\sin(\theta) + 3 = 0$  for  $\theta \in [-180^\circ, 360^\circ]$ . Round answer(s) to the nearest degree.

11. The angle  $\theta = -\frac{47\pi}{13}$  is given.

- Convert the angle to degrees, correct to the nearest degree.
- Sketch  $\theta$  in standard position on grid (show the rotation(s)).
- State the measure (in radians) of an angle that is coterminal with  $\theta$ .

12. How many cycles of the sinusoid  $y = \cos(kx)$ ,  $k \in R$  are there from  $x \in [-2\pi, 2\pi]$ ?

13. Prove the identity  $\tan(x)\sin(x) = \sec(x) - \cos(x)$ .

14. In this question, you will determine the co-ordinates of the intersection points of the graphs of  $f(\theta) = \sin(2\theta)$  and  $g(\theta) = \cot(\theta)$  on the interval  $[0, 2\pi]$ .

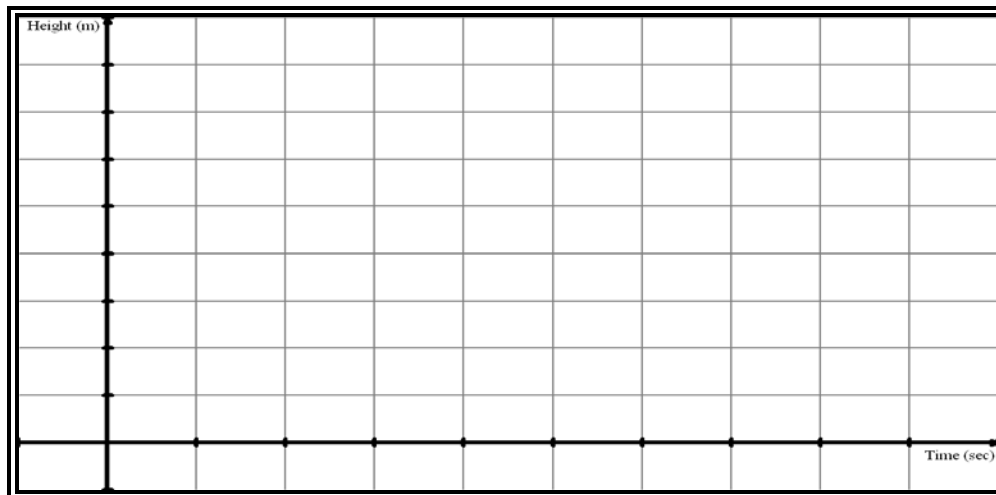
- Illustrate the graphical solution from your calculator (**diagram worth 1 mark only**).
- Provide an ALGEBRAIC solution to the question.

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15. A Ferris wheel with a radius of 7 meters makes one complete revolution every 16 seconds. The bottom of the Ferris wheel is 2 meters above the ground, where the riders get on and off the ride.

- a. On the grid provided, draw a graph showing how a rider's height varies with time for 2 revolutions of the Ferris wheel, given that the rider enters the Ferris wheel at the bottom of the wheel.



- b. Determine an equation for the graph.
- c. At what height above the ground is a rider after 27 seconds? Round final answer to the nearest  $10^{\text{th}}$  of a meter. Explain/show algebraically HOW you determined your answer.
- d. At what time(s) in the 2 revolutions is the rider 12m above the ground? Round final answer to the nearest  $10^{\text{th}}$  of a second. Explain/show algebraically HOW you determined your answer.

16. My wife wants a triangular flower garden planted in our yard on this Spring break. I will refer to the triangular garden as  $\triangle ABC$  and she has given me the following guidelines for the garden:  $\angle A = 32^\circ$ , side  $a = 11$  meters, and side  $b = 14$  meters. Include a diagram of the garden and determine the area and perimeter of the garden that I am to build this Spring break.