PART 2 – Calculator Inactive

Provide clear and concise supporting evidence for your solutions. Your evidence should be either algebraic or graphic, as is necessary and appropriate OR as is required. Incorrect answers without supporting evidence/working will NOT earn partial marks!!!

1. In this question, you will work with the angle of $\theta = -\frac{15\pi}{13}$. **(5 marks)**

   a. Show a diagram of this angle, drawn in standard position.

   (2 M)

   b. State the measure of the related acute angle (or the reference angle).

   (1 M)

   c. State the measure of the principle angle.

   (1 M)

   d. State the measure of an angle which is a positive coterminal angle to your principle angle.

   (1 M)

2. In this question, you will determine the exact values for the following expressions. Include relevant & appropriate diagrams that show your thinking as you determine the values of these expressions: **(8 marks)**

   a. $\sin\left(\frac{2\pi}{3}\right)$

   b. $\sec\left(-\frac{3\pi}{4}\right)$

   c. $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

   d. $arc\csc\left(\sqrt{2}\right)$

3. The terminal arm of the angle θ, which is in standard position, goes through the point $A(-3,-2)$. Determine the values of: **(6 marks)**

   a. $\sin(\theta)$

   b. $1+\tan^2(\theta)$

   c. $\cos\left(\frac{\pi}{2}-\theta\right)$

4. Evaluate the following expressions: **(8 marks)**

   a. $\sin\left(\tan^{-1}\left(\frac{1}{3}\right)\right)$

   b. $\cos^{-1}\left(\sin\left(-\frac{\pi}{4}\right)\right)$

   c. $\sin^{-1}\left(\sin\left(\frac{7\pi}{6}\right)\right)$

   d. $\sec\left(\frac{\pi}{2}-\tan^{-1}\left(\frac{3}{4}\right)\right)$

5. Draw diagrams of these following angles in standard position and state the measure of θ_{ref}. **(6 marks)**

   a. $\theta = \frac{11\pi}{4}$ **(3 M)**

   b. $\theta = -7$ radians **(3 M)**

6. State all transformations, the period, the amplitude, the equation of the axis of the curve and the range for the sinusoidal function whose equation is $f(\theta) = 4 - 3\cos 2\theta$ and sketch the graph over the domain of $-\pi \le \theta \le \pi$. Make sure that the x-axis and y-axis show correct & relevant scaling!!!! **(10 marks)**

Transformations:

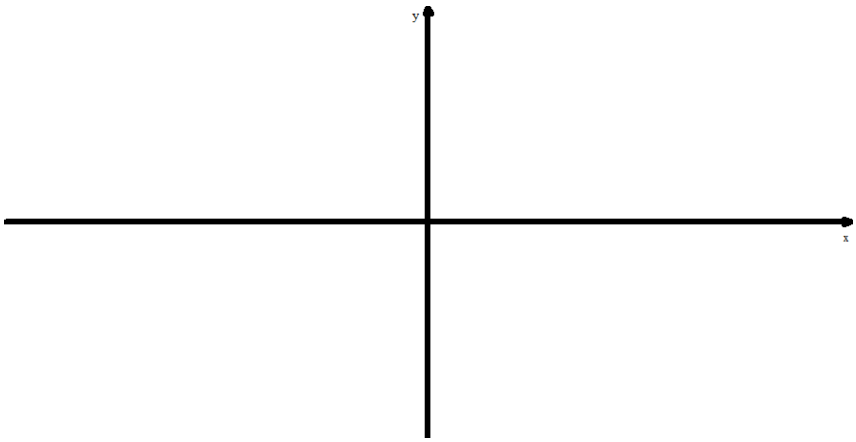
Period:

Amplitude:

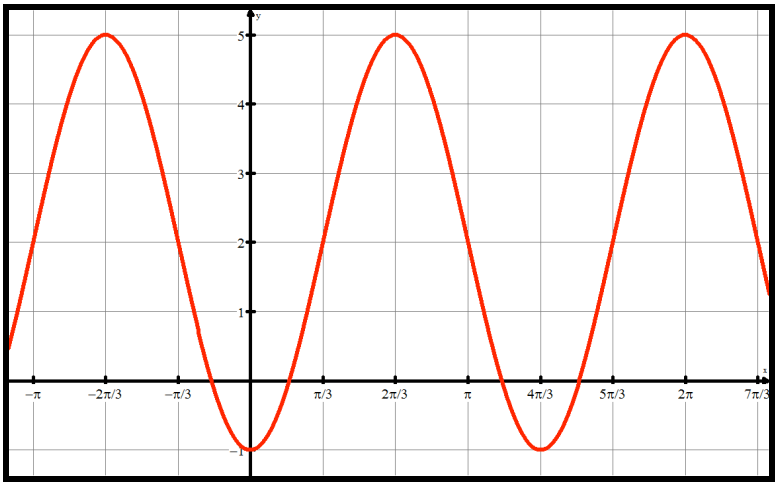
Axis of curve:

Range:

Sketch:



7. Use the graph of the function $f(x) = a\cos(kx) + d$ to find the values of *a*,*k*,*d* **[4 marks]**



8. The following questions give you an opportunity to demonstrate your understanding of foundational trigonometry concepts. Select any three (3) and provide clear, concise answers. **(3 marks)**

   a. Explain why $\csc^{-1}(0.5)$ gives an error if you were to try it on the calculator.

   b. Explain why the graph of the tangent function has vertical asymptotes at $x = \pm\frac{\pi}{2}$.

   c. Explain why only the cosine and secant ratios are positive in Quadrant IV.

   d. Explain why the solutions to the following two equations are different (i) Solve $\cos(x) = 0.75$ and (ii) solve $\cos^{-1}(0.75) = x$.

   e. Explain if (or how) the graphs of $y = \sin(2x)$ and $y = \sin(2\pi x)$ are/aren't different.

NAME: UNIT 5 TEST: Trigonometric Functions

BONUS: Mr. S has been presented with a multiple choice question which involves a foundational understanding of the sin ratio and how the Cartesian plane as well as graphs of sine functions can be used to understand angles and various angle relationships. He has been given the fact that $\sin(\theta)=\frac{a}{b}$ and θ is a first quadrant angle. Below are four equations which may or may not be true. Through the use of the Cartesian plane as well as your knowledge of graphs of sine curves, determine which statements are true and which are false.

a. $\sin(\theta)=\sin(\pi+\theta)$

b. $\sin(\theta)=\sin(\pi-\theta)$

c. $\sin(\theta)=-\sin(\pi+\theta)$

d. $\sin(\theta)=-\sin(\pi-\theta)$

NAME: UNIT 5 TEST: Trigonometric Functions

PART 1 – Calculator Active

Provide clear and concise supporting evidence for your solutions. Your evidence should be either algebraic or graphic, as is necessary and appropriate OR as is required. Incorrect answers without supporting evidence/working will NOT earn partial marks!!!

1. The temperature (C°) over a 24 hour day in Centraville is modeled by $C(t) = 17 - 6\cos\left(\frac{\pi t}{12} + 5\right)$, $0 \le t \le 24$, where t is the time in hours after midnight.

(10 marks)

a. What is the temperature at 1:00 pm?

(2M)

b. At what times of day is the temperature warmer than 20°C?

(3 M)

c. What are the maximum and minimum temperatures reached and when do these occur over a 48 hour period?

(5 M)

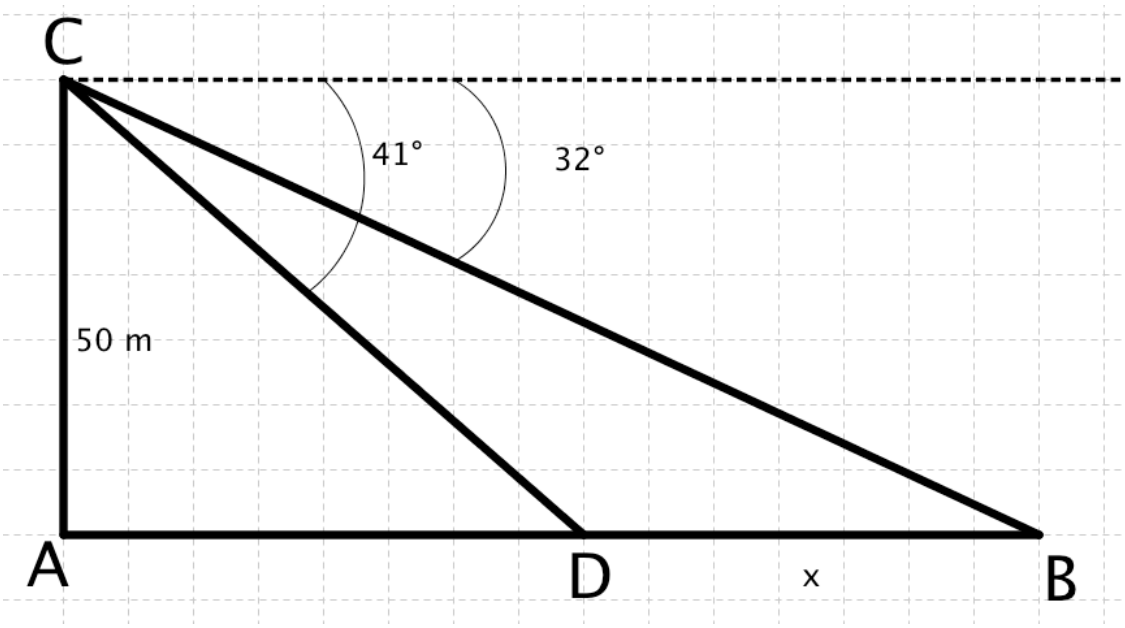
2. Solve the equation $\sin(x) = -0.75$ on the domain $-2\pi \le x \le 2\pi$. In order to get FULL credit for your solution, you must show an algebraic development of your solution. Round all final answer(s) to two decimal places & make sure your final answer is given in the correct UNITS!!! You may verify graphically.

(4 marks)

(max 3 marks on graphic solns)

3. Solve for the unknown side, x (from D to B), given the diagram below. Record your FINAL ANSWER rounded to one decimal place and include units.

(7 marks)



4. A small windmill has its center 6 m above the ground and the blades are 2 m in length. In a steady wind, one blade makes a rotation in 12 sec. Use the point *P* as a reference point on a blade that started at the highest point above the ground. Make sure ALL FINAL ANSWERS include UNITS!

(9 marks)

a. Determine an equation of the function that relates the height of a tip of a blade, *h* in meters, above the ground at a time *t*.

(3M)

b. What is the height of the point *P* at the tip of a blade at 5s?

(3M)

c. At what time is the point *P* exactly 7 m above the ground?

(3M)

NAME: UNIT 5 TEST: Trigonometric Functions

1. Triangle Trig Question ➔ two triangles & solve for an angle in second triangle (from Lesson 26)
2. Trig curves questions ➔ given an equation ➔ State all transformations, the period and amplitude and graph each of the following for $-\pi \le x \le 2\pi$ and state the domain and range. (from Lesson 29, 30 & 32 and Trig Assign & trig Review)
3. Trig curves question ➔ given a curve, determine an equation (Lesson 30 & Trig review)
4. Convert angles from degrees to radians and vice versa (Lesson 26 & Trig Assign & trig Review)
5. Draw a given principal angle & determine/label/draw (i) the angle, (ii) the principle angle, (iii) the ref angle, (iv) positive & negative coterminal angles (Lesson 27 & Trig Assign)
6. Given an ordered pair (or info involving ordered pairs & triangles), state trig ratios of a given angle (Lesson 27 & trig assign Q6,8,9 & trig review)
7. Evaluating angles/ratios for standard angles (30,45,60 & multiples as well as quadrantal angles) (Lesson 28 & trig assign & trig review)
8. Evaluating trig inverse (lesson 31 & trig assign & trig review)
9. Evaluating composed trig inverses (Lesson 31 & trig assign & trig review)
10. Working with periodic phenomenon & sinusoidals & word problems (lesson 32) ➔ one question wherein data is provided (i.e dimensions on a Ferris wheel) and one question wherein the equation is already provided)

The following questions give you an opportunity to demonstrate your understanding of foundational trig concepts. Select any four (4) and provide clear, concise answers.

11. Explain why csc-1(0.5) gives an error on the gdc (Lesson 31 & trig assign)
12. Explain why the graph of the tangent function has vertical asymptotes at x= $\pm$pi/2 (lesson 29 & trig review)
13. Explain why only the cosine and secant ratios are positive in Quadrant IV. (lesson 27 & trig review)
14. Explain why the range of $y = \arccos x$ is $[0,\pi]$. (lesson 31)
15. Explain why the solutions to the following two equations are different (i) Solve cos(x) = 0.75 and (ii) solve $\cos^{-1}(0.75) = x$ (lesson 31)
16. Explain, with specifics, if (or how) the graphs of y = sin(2x) and sin(2pix) are/aren't different (lesson 30,32 & trig review)