MHF4U j1+ B – Trigonometric Functions and Graphs Mid-Unit Assignment

Answer all questions with full solutions. Make sure your work is legible, even after you have scanned it, and submit it as a single file.

1. Create a table of values to graph the following function. Show all of your work.

$$f(x) = -2\cos\left(\theta - \frac{\pi}{2}\right) \text{ for } -4\pi \le \theta \le 4\pi$$

2. Complete the following:
   a. Find the slope of the secant to the function $f(x) = 3\cos(x) - 1$
      i. between x = 45° and x = 50°
      ii. between x = 45° and x = 46°
      iii. between x = 45° and x = 45.5°
      iv. between x = 45° and x = 45.1°

   b. Use the information from part a) to determine the slope of the tangent to the given function at x = 45°, accurate to 2 decimal places.

3. The temperature in a building can be controlled by a programmable thermostat. For a particular office the temperatures vary according to the unction:

$$f(x) = 19 + 6\sin\left(\frac{\pi}{12}(x - 11)\right)$$

   Where $f(x)$ is the temperature, and x is the time in hours (after midnight).
   a. Sketch a graph of the above function showing two cycles.
   b. What is the temperature in the office at 8 am when employees come to work.
   c. What are the maximum and minimum temperatures in the office?

4. Given the function $f(x) = \cot(x)$.
   a. Graph $f(x) = \cot(x)$ in the interval: $-4\pi \le x \le 4\pi$
   b. State the domain, range and period for this function.
   c. What is the amplitude of this function? Explain.

5. How is the period of each primary trigonometric function related to the period of its reciprocal function? Include a graph of each to justify your answer.

6. How is the amplitude of each primary trigonometric function related to the amplitude of its reciprocal function? Include a graph of each to justify your answer.

GO TO: THE DROPBOX AND UPLOAD YOUR WORK.

7. Your classmate missed the lesson that explained vertical asymptotes and reciprocal trigonometric functions. Explain the following to your classmate:
    a. The meaning of a vertical asymptote.
    b. Which reciprocal trigonometric functions have vertical asymptotes. Include examples in your explanation

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