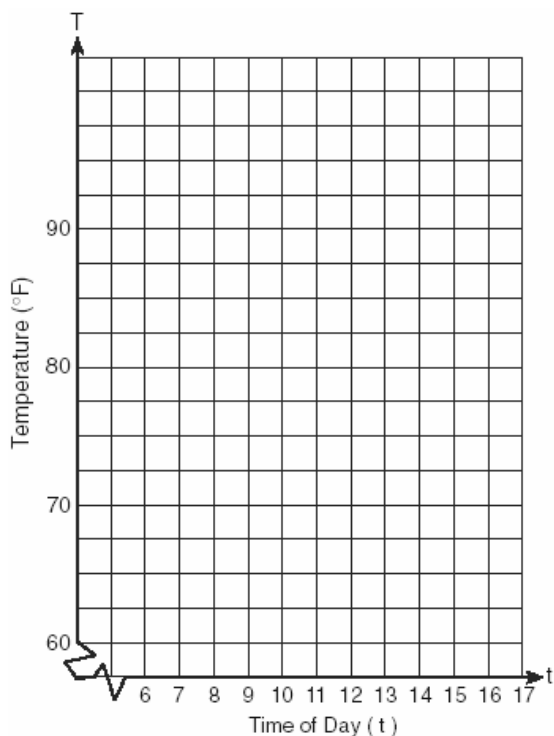


NAME: \_\_\_\_\_

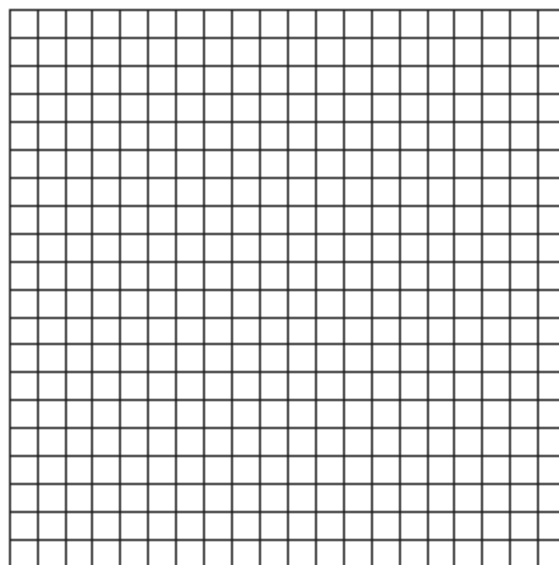
1. 010329b

A building's temperature,  $T$ , varies with time of day,  $t$ , during the course of 1 day, as follows:  $T = 8\cos t + 78$ . The air-conditioning operates when  $T \geq 80^\circ F$ . Graph this function for  $6 \leq t < 17$  and determine, to the nearest tenth of an hour, the amount of time in 1 day that the air-conditioning is on in the building.



2. 080433b

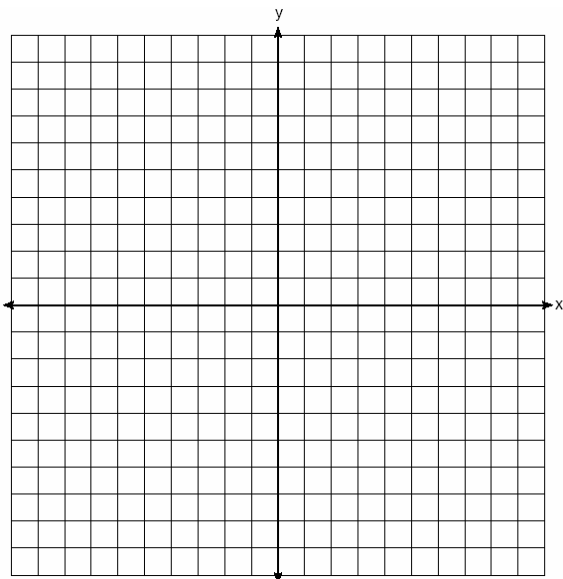
The tide at a boat dock can be modeled by the equation  $y = -2\cos\left(\frac{\pi}{6}t\right) + 8$ , where  $t$  is the number of hours past noon and  $y$  is the height of the tide, in feet. For how many hours between  $t = 0$  and  $t = 12$  is the tide at least 7 feet? [The use of the grid is optional.]



NAME: \_\_\_\_\_

3. 080532b, P.I. A2.A.70

On the accompanying set of axes, graph the equations  $y = 4\cos x$  and  $y = 2$  in the domain  $-\pi \leq x \leq \pi$ . Express, in terms of  $\pi$ , the interval for which  $4\cos x \geq 2$ .



[4] 4.1 and the equation  $T = 8 \cos t + 78$  is graphed correctly and appropriate work is shown to determine the amount of time, such as using the table function of the graphing calculator or estimating (3.9-4.3 hours) based on the graph.

[3] The equation  $T = 8 \cos t + 78$  is graphed correctly and the correct intervals are stated, but the number of hours is not found or is incorrect.

[2] The equation  $T = 8 \cos t + 78$  is graphed correctly, but no further correct work is shown.

or [2] The equation  $T = 8 \cos t + 78$  is graphed incorrectly, but an appropriate number of hours is found, based on the incorrect graph.

[1] 4.1, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[1] incorrect procedure.

[6] 8, and appropriate work is shown, such as a correctly labeled graph, a table of values, or an algebraic solution.

[5] Appropriate work is shown, but one computational or graphing error is made.

[4] Appropriate work is shown, but two or more computational or graphing errors are made.

or [4] Appropriate work is shown, and the correct values of  $t$  where the height of the tide is 7 are identified (2 and 10), but the correct number of hours is not stated.

[3] Appropriate work is shown, but one conceptual error is made.

or [3] A correct table or graph is constructed, but no further correct work is shown.

[2] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.

or [2] The correct values of  $t$  (2 and 10) and 8 are written, but no work is shown.

[1] 8, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[2] incorrect procedure.

[4] Both equations are graphed correctly over the specified domain and the interval

$-\frac{\pi}{3} \leq x \leq \frac{\pi}{3}$  is identified.

[3] Appropriate work is shown, but one computational or graphing error is made.

or [3] Both equations are graphed correctly over the specified domain, but the interval is not identified or is written as  $-1.0472 \leq x \leq$

$1.0472$  or  $-60^\circ \leq x \leq 60^\circ$  or  $-\frac{\pi}{3} < x < \frac{\pi}{3}$ .

[2] Appropriate work is shown, but two or more computational or graphing errors are made.

or [2] Appropriate work is shown, but one conceptual error is made, such as graphing  $y = 4 \sin x$ .

or [2] The equation  $y = 4 \cos x$  is graphed correctly over the specified domain, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.

or [1]  $-\frac{\pi}{3} \leq x \leq \frac{\pi}{3}$ , but no work is shown and

no graphs are drawn.

[0] The equation  $y = 2$  is graphed correctly, but no further correct work is shown.

or [0]  $-1.0472 < x < 1.0472$  or  $-60^\circ < x < 60^\circ$

or  $-\frac{\pi}{3} < x < \frac{\pi}{3}$ , and no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[3] obviously incorrect procedure.

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