

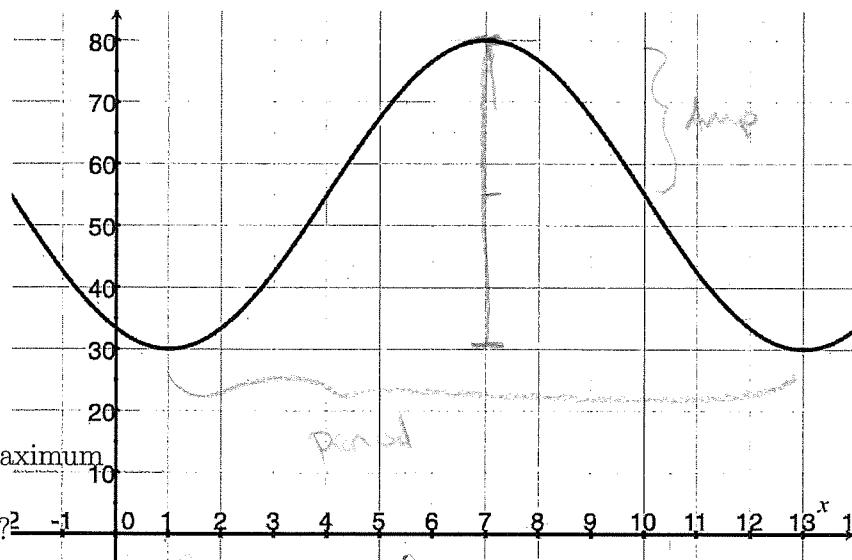
Quiz 4

Key

This is a two-stage quiz. During the first stage, use your knowledge & calculator to take this quiz and a one-sided 8.5 by 5 inch sheet of notes. You have 15 min. In the second stage. You are now welcome to use your books, notes, and students in the class to retake the same quiz. You have 15 min. to complete the quiz and to build one solution to be turned in.

Show *all* your work. Reasonable supporting work must be shown for any partial credit.

1. The maximum afternoon temperature for a city is well modeled by the curve. Here T is the maximum afternoon temperature in month x , where $x = 0$ corresponds to January.



- (a) [1] Approximate the maximum afternoon temperature of the city in February?

- (b) [1] What month does the afternoon temperature reach its highest value?

- (c) [3] Describe either:

- the graph transformations needed to transform the basic cosine graph into the graph of $T(x)$, or
- the amplitude, period, and phase shift of the graph of $T(x)$

- (d) [2] Find an algebraic rule for the function d . (There are *many* correct answers!!)

$A = 25$
 $\text{period} = \frac{2\pi}{B} = 12$

$\Rightarrow 25 = B \cdot 12 \Rightarrow B = \frac{\pi}{6}$

$-25 \cos\left(\frac{\pi}{6}(x-1)\right) + 55$

2. [3] Let $\cos(\theta) = \frac{4}{5}$ and $\frac{3\pi}{2} \leq \theta \leq 2\pi$. Find $\sin(\theta)$.

Solution:
 $4^2 + y^2 = 5^2$
 $16 + y^2 = 25$
 $y^2 = 9$
 $y = \pm 3$
 $\sin \theta = \frac{y}{5} = \frac{-3}{5}$

OR Pyth. Thm.
 $\cos^2 \theta + \sin^2 \theta = 1$
 $\left(\frac{4}{5}\right)^2 + \sin^2 \theta = 1$
 $\sin^2 \theta = 1 - \frac{16}{25}$
 $\sin^2 \theta = \frac{9}{25}$
 $\sin \theta = \pm \frac{3}{5}$

OR
 $\cos(\theta) = \frac{4}{5}$
 $\Rightarrow \theta = \arccos\left(\frac{4}{5}\right)$
 ≈ 0.64 rad
 $\sin(0.64 \text{ rad}) \approx 0.6$
 $\sin \theta = -0.6$