

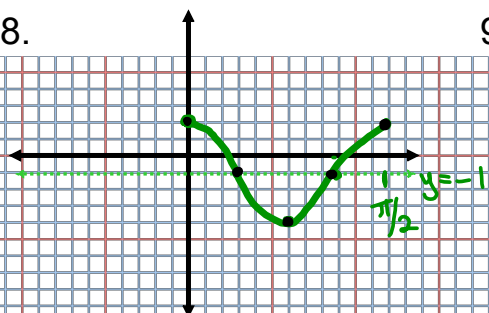
Answers:

1. 4 2. 2 3. 2 4. 2 5. 4

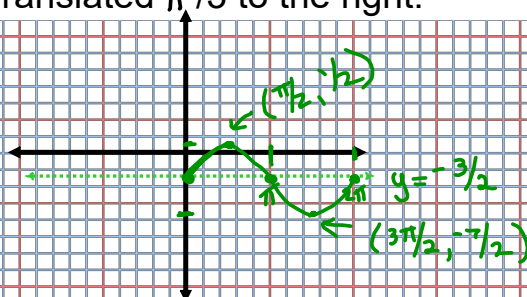
6. Amplitude because it measures the volume. Period measures how quickly they breath, and midline measures the average air volume.

7. Period is $2/3$ seconds, which represents the amount of time it takes the wheel to complete one revolution.

8.



9. b) Translated $\pi/3$ to the right.

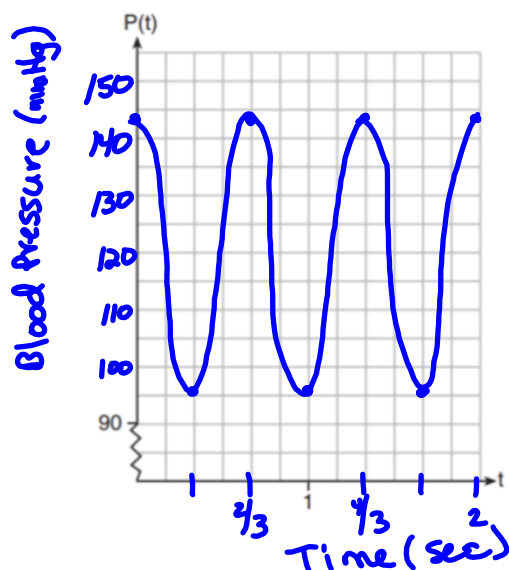


#10 →

10. The resting blood pressure of an adult patient can be modeled by the function P below, where $P(t)$ is the pressure in millimeters of mercury after time t in seconds.

$$P(t) = 24\cos(3\pi t) + 120$$

On the set of axes below, graph $y = P(t)$ over the domain $0 \leq t \leq 2$.



$$\text{Per} = \frac{2\pi}{3\pi} = \frac{2}{3}$$

$$\text{Max} = 120 + 24 = 144$$

$$\text{min} = 120 - 24 = 96$$

Determine the period of P . Explain what this value represents in the given context.

Period = $\frac{2}{3}$ seconds = time between beats.

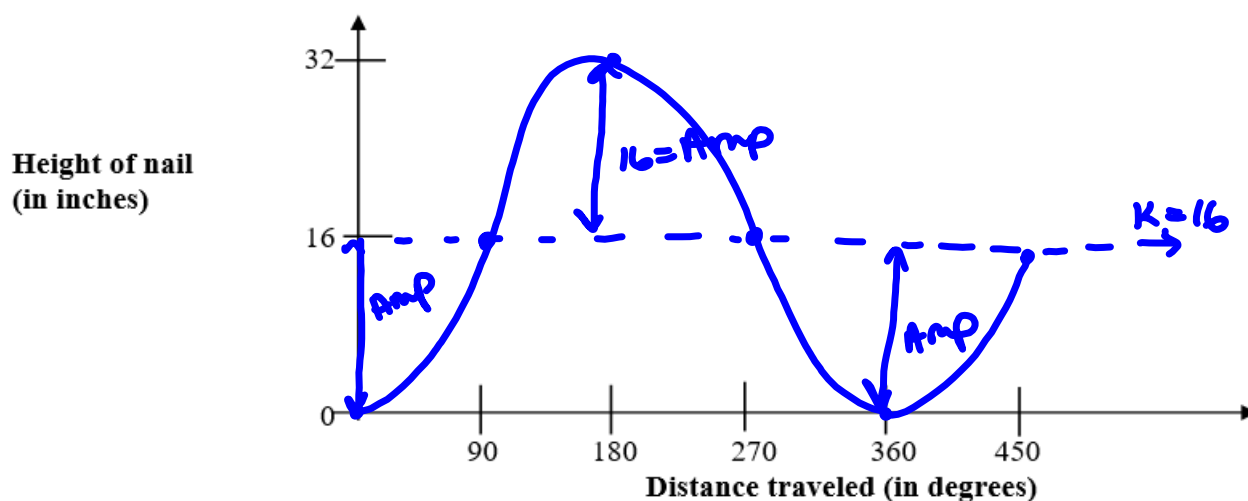
Normal resting blood pressure for an adult is 120 over 80. This means that the blood pressure oscillates between a maximum of 120 and a minimum of 80. Adults with high blood pressure (above 140 over 90) and adults with low blood pressure (below 90 over 60) may be at risk for health disorders. Classify the given patient's blood pressure as low, normal, or high and explain your reasoning.

This person's BP is 144 over 96 which is considered High BP because it is higher than 140 over 90.

Day 8: Application #1

A car's tire has a diameter of 32 inches. It runs over a nail, but it is able to continue moving. Write a **cosine** function that describes the height of the nail above the ground as a function of the wheel's angular distance.

A. Sketch the curve



- B. Identify the vertical shift (midline) $f(x) = A \cos(\omega(x-h)) + k$

$$k \rightarrow \text{up } 16 \quad k = 16$$

$$k = \frac{\text{max} + \text{min}}{2} = \frac{32 + 0}{2} = 16$$

$$k = 16$$

- C. Identify the amplitude

$$\text{Amp} = 16 = |A|$$

reflected cos curve so... $A = -16$

- D. Find the horizontal shift (phase shift)

none

$$h = 0$$

- E. Find the cycle (distance of each rotation) and period
Since the function will consist of angular distance, we'll use 360 degrees for each cycle.

$$1 \text{ cycle} = 360^\circ = \text{Per.}$$

$$\omega = \frac{\text{# of cycles in } 2\pi}{360^\circ}$$

$$\omega = 1$$

- F. Write the equation to model this situation.

$$f(x) = -16 \cos(x) + 16$$

- G. If the car wheel frame covers the top half of the wheel, when will the nail be visible?

$$[0, 90^\circ], [270^\circ, 360^\circ]$$