

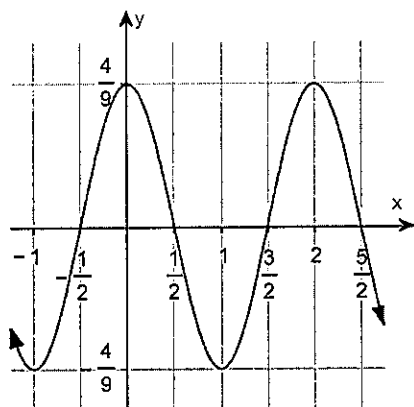
Student: _____
Date: _____

Instructor: Joe Better's

Course: Pre-Calculus Pre AP (Master Course)

Assignment: 6.4 Classwork Day 2

1. Find an equation for the graph.



Which is an equation for the graph?

- A. $y = \pi \sin\left(\frac{4}{9}x\right)$
- B. $y = \sin\left(\frac{4\pi}{9}x\right)$
- C. $y = \frac{4}{9} \sin(\pi x)$
- D. $y = \cos\left(\frac{4\pi}{9}x\right)$
- E. $y = \pi \cos\left(\frac{4}{9}x\right)$
- F. $y = \frac{4}{9} \cos(\pi x)$

2. The current I , in amperes, flowing through an ac (alternating current) circuit at time t , in seconds, is shown below.

$$I(t) = 270 \sin(60\pi t) \quad t \geq 0$$

What is the period? What is the amplitude? Graph this function over two periods.

What is the period?

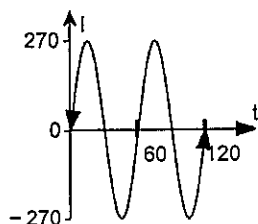
$$T = \underline{\hspace{2cm}} \quad (\text{Simplify your answer.})$$

What is the amplitude?

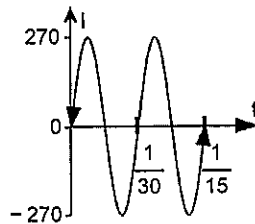
$$|A| = \underline{\hspace{2cm}} \quad (\text{Simplify your answer.})$$

Choose the correct graph of the function below.

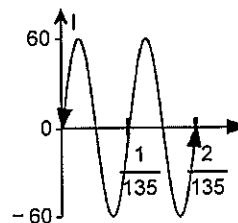
A.



B.



C.



3. In the theory of biorhythms, a sine function of the form $P(t) = 50 \sin(\omega t) + 50$ is used to measure the percent P of a person's potential at time t , where t is measured in days and $t = 0$ is the person's birthday. Three characteristics are commonly measured: physical potential with a period of 23 days, emotional potential with a period of 28 days, and intellectual potential with a period of 33 days.

(a) Find ω for each characteristic.

For physical potential, $\omega =$ _____.

(Simplify your answer. Type an exact answer in terms of π . Use integers or fractions for any numbers in the expression.)

For emotional potential, $\omega =$ _____.

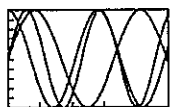
(Simplify your answer. Type an exact answer in terms of π . Use integers or fractions for any numbers in the expression.)

For intellectual potential, $\omega =$ _____.

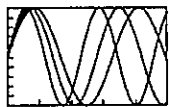
(Simplify your answer. Type an exact answer in terms of π . Use integers or fractions for any numbers in the expression.)

(b) Using a graphing utility, graph all three functions on the same screen. Choose the correct answer below. All graphs are shown in $[0, 50, 10]$ by $[0, 100, 10]$ viewing windows.

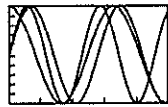
A.



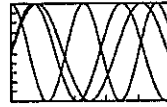
B.



C.



D.



(c) Is there a time t when all three characteristics have 100% potential? When is it?

A. Yes; $t =$ _____

B. No

(d) Suppose that a person is 28 years old today ($t = 10,227$ days). Describe this person's physical, emotional, and intellectual potential for the next 30 days.

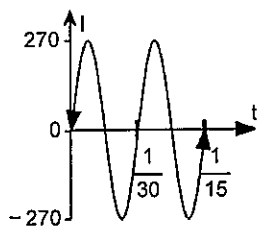
The next time this person's physical potential peaks is _____ days after the person's birthday.
(Round up to the nearest day.)

The next time this person's emotional potential peaks is _____ days after the person's birthday.
(Round up to the nearest day.)

The next time this person's intellectual potential peaks is _____ days after the person's birthday.
(Round up to the nearest day.)

1. F. $y = \frac{4}{9} \cos(\pi x)$

2. $\frac{1}{30}$
270

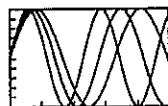


B.

3. $\frac{2\pi}{23}$

$\frac{\pi}{14}$

$\frac{2\pi}{33}$



B.

B. No

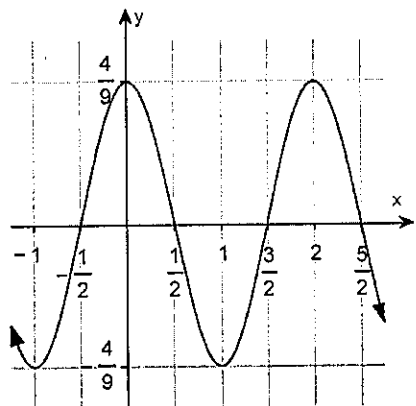
14

28

12

6.4 classwork day 2

①



* cosine

$$\text{Amplitude} = \left| \frac{4}{9} \right| = \frac{4}{9}$$

$$\omega = \frac{2\pi}{\text{period}} = \frac{2\pi}{2} = \pi$$

$$y = \frac{4}{9} \cos(\pi x)$$

② $I(t) = 270 \sin(60\pi t) \quad t \geq 0$

$$\text{period} = \frac{2\pi}{\omega} = \frac{2\pi}{60\pi} = \boxed{\frac{1}{30}}$$

$$\text{Amplitude} = |270| = \boxed{270}$$

Graph B

6.4 classwork day 2 continued

③ $P(t) = 50 \sin(\omega t) + 50$

a) physical period 23 $\omega = \frac{2\pi}{\text{period}} = \boxed{\frac{2\pi}{23}}$

emotional period 28 $\omega = \frac{2\pi}{\text{period}} = \frac{2\pi}{28} = \boxed{\frac{\pi}{14}}$

intellectual period 33 $\omega = \frac{2\pi}{\text{period}} = \boxed{\frac{2\pi}{33}}$

b) use calculator

Graph B

c) **NO** none of the 3 graphs intersect at the peak at the same time

d) $t = 10,227$ days * use calculator

physical peaks at 10,240.7 \rightarrow **14 days**
rounded

emotional peaks at 10,255 \rightarrow **28 days**

intellectual peaks at 10,238.25 **12 days**
rounded