Math 1330
Homework 20 (5.4, models)

Problem 5.4.46 refers to problem 46 in Chapter 5, Section 4 of the online text. Record your answers to all the problems in the EMCF titled "**Homework 20**."

1. Problem 5.4.46

   A. –5; 2/3

   B. 5; –2/3

   C. doesn't exist; 2/3

   D. -5; doesn't exist

   E. doesn't exist; doesn't exist

2. Problem 5.4.48

   A. –0.3; 0.5

   B. 0.3; doesn't exist

   C. doesn't exist; 0.5

   D. –0.3; $\frac{\pi}{6}$

   E. doesn't exist; doesn't exist

3. Problem 5.4.50

   A. $\frac{5}{13}$; $\frac{7}{24}$

   B. $\frac{12}{5}$; $\frac{\sqrt{674}}{7}$

   C. $\frac{5}{13}$; $\frac{24}{7}$

   D. $\frac{5\sqrt{119}}{119}$; $\frac{7}{25}$

   E. None of the above

4. Problem 5.4.52

A. $\sqrt{17}$; $\frac{4\sqrt{33}}{33}$

B. $\sqrt{17}$; $\frac{\sqrt{33}}{4}$

C. $\sqrt{15}$; $\frac{7}{4}$

D. $\frac{\sqrt{17}}{4}$; $\frac{\sqrt{33}}{7}$

E. None of the above

5. Problem 5.4.54

A. $-\frac{5\sqrt{2}}{7}$; $-\frac{3\sqrt{10}}{20}$

B. $\frac{\sqrt{2}}{10}$; $-\frac{2\sqrt{10}}{3}$

C. $\frac{7\sqrt{2}}{10}$; $-\frac{2\sqrt{10}}{3}$

D. $-\frac{7\sqrt{2}}{10}$; $-\frac{3\sqrt{10}}{20}$

E. None of the above

6. Problem 5.4.64: Which of the following points lies on the graph of the function that is given?

A. $\left(\frac{\pi}{4},0\right)$ B. $\left(0,\frac{\pi}{4}\right)$ C. $\left(-2,\frac{\pi}{4}\right)$ D. $\left(\frac{\pi}{4},-2\right)$ E. $\left(-2,\frac{3\pi}{4}\right)$

7. Determine the equation of the sine function which has amplitude 2 and period 4.

A. $y = 4\sin\left(\frac{\pi}{4}x\right)$

B. $y = 2\sin(4x)$

C. $y = 4\sin(2x)$

D. $y = 2\sin\left(\frac{\pi}{2}x\right)$

8. Determine the period of the given graph.

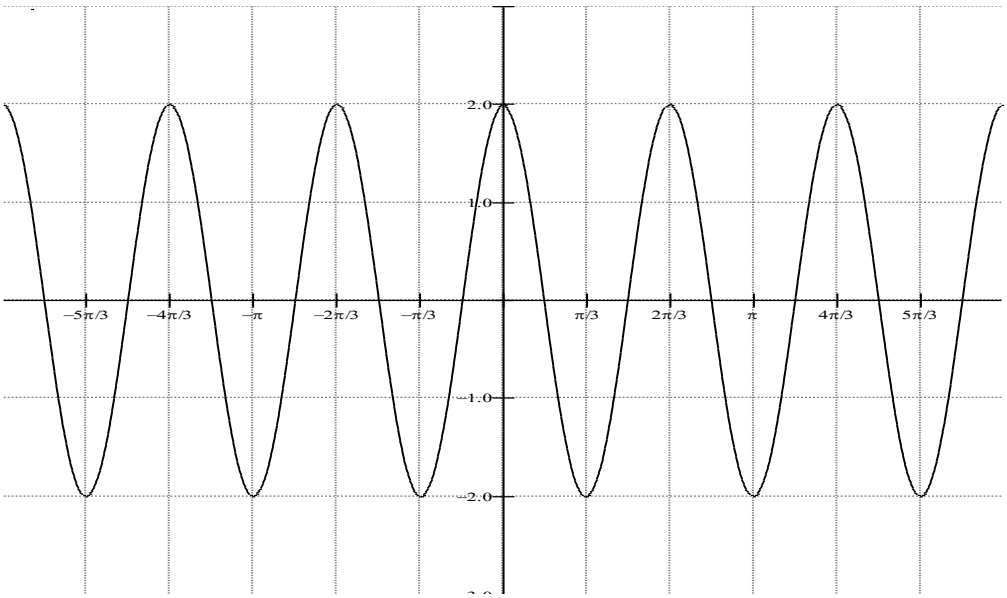
A. $\frac{\pi}{3}$

B. 6

C. 3

D. π

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



9. Given the following, determine the maximum, minimum, and x-intercepts in the interval $[-2\pi, 2\pi]$.

$$y = 3\cos\frac{x}{2}$$

A. Maximum: 3 Minimum: –3 x-intercepts: $(\pm\pi, 0)$

B. Maximum: 3/2 Minimum: –3/2 x-intercepts: $\left(\pm\frac{\pi}{2}, 0\right)$, $\left(\pm\frac{3\pi}{2}, 0\right)$

C. Maximum: 3 Minimum: –3 x-intercepts: $\left(0, \pm\frac{\pi}{2}\right)$, $\left(0, \pm\frac{3\pi}{2}\right)$

D. Maximum: 3 Minimum: –3 x-intercepts: $\left(\pm\frac{\pi}{2}, 0\right)$, $\left(\pm\frac{3\pi}{2}, 0\right)$

10. The voltage V produced by an alternating current generator is $V(t) = 229\sin(120\pi t)$. What are the amplitude and period of V(t)?

A. amplitude: 114.5 period: 1/60

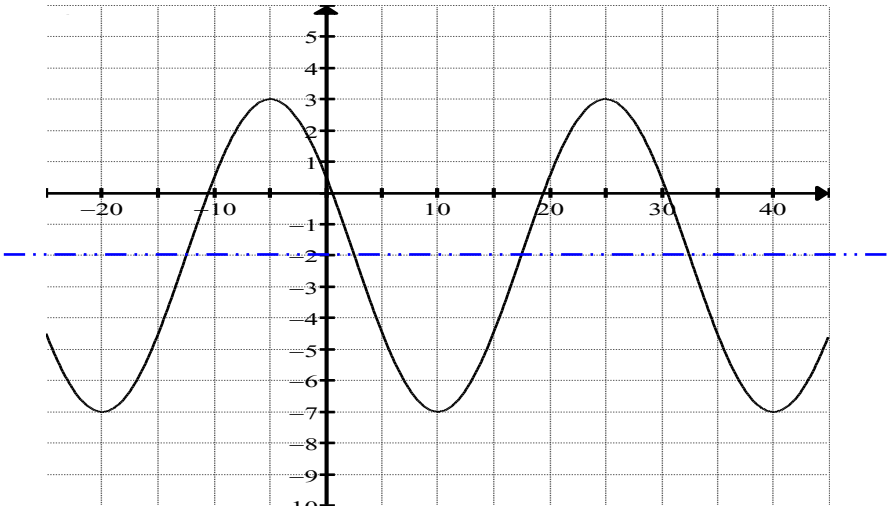
B. amplitude: 229 period: 1/60

C. amplitude: 229 period: 120π

D. amplitude: 229 period: 60

E. amplitude: 458 period: 1/60

11. Determine an equation of the form y = A *cos* B(x – C) +D for the following graph:



A. $y = -5\cos\frac{\pi}{15}(x+10)-2$

B. $y = -5\cos\frac{\pi}{30}(x-10)-2$

C. $y = -5\cos\frac{\pi}{15}(x-10)-2$

D. $y = 5\cos\frac{\pi}{15}(x-10)-2$

E. $y = -5\cos 15\pi(x-10)-2$

12. Assume that you are aboard a research submarine doing submerged training exercises in the Pacific Ocean. At time t = 0 you start porpoising (alternately deeper and then shallower). At time t = 4 min you are at your deepest, y = – 800 m. At time t = 9 min you next reach your shallowest, y = –200 m. Assume that y varies sinusoidally with time. Find an equation expressing y as a function of t.

A. $y(t) = -500\cos\frac{\pi}{5}(t-4)-300$

B. $y(t) = -300\cos\frac{\pi}{15}(t-9)-500$

C. $y(t) = -300\cos\frac{\pi}{5}(t-4)-500$

D. $y(t) = -500\cos\frac{\pi}{15}(t-9)-300$

E. None of the above (not the right answer)

13 The Pressure, P (in lbs/ft^2), in a pipe varies over time. Five times an hour, the pressure oscillates from a low of 90 to a high of 230 and then back to a low of 90. The pressure at t = 0 is 90. What is the period of this function in minutes?

A. 60 minutes
B. 15 minutes
C. 12 minutes
D. 10 minutes
E. 5 minutes

14. Write a sine function with a positive vertical dilation, given the amplitude is 6, the phase shift is 5 to the left, the vertical shift is 4 down, and the period is 3.

A. $y(t) = 6\sin\frac{2\pi}{3}(x+5) - 4$

B. $y(t) = 5\sin\frac{2\pi}{3}(x+6) - 4$

C. $y(t) = 6\sin\frac{2\pi}{3}(x-5) - 4$

D. $y(t) = 6\sin 3(x+5) - 4$

E. $y(t) = 6\sin 3(x-5) - 4$

15. A signal buoy in the Gulf of Mexico bobs up and down with the height *h* of its transmitter (in feet) above sea level modeled by $h(t) = a\sin(bt) + 5$, where *t* represents seconds. During a small squall its height varies from 1 ft to 9 ft and there are 3 seconds from one 9-ft height to the next. What are the values of the constants a and b?

A. $a = 4;\ b = 3$

B. $a = 4;\ b = \frac{\pi}{3}$

C. $a = 9;\ b = \frac{2\pi}{3}$

D. $a = 4;\ b = \frac{2\pi}{3}$

E. $a = 1;\ b = \frac{2\pi}{3}$