| Student: _____
 Date: _____ | **Instructor:** Joe Betters
 Course: Pre-Calculus Pre AP (Master Course) | **Assignment:** Chapter 6 Review |

1. Convert the angle to D°M'S" form.

   $79.622°$

   $79.622° =$ _____ ° _____ ' _____ " (Round to the nearest second.)

   ID: 6.1.31

2. Convert the angle in radians to degrees.

   $$-\frac{7\pi}{6}$$

   $-\dfrac{7\pi}{6} =$ _____ ° (Simplify your answer.)

   ID: 6.1.55

3. Find the central angle θ which subtends an arc of length 9 miles of a circle of radius 27 miles.

   $\theta \approx$ _____ radians
   (Type an integer or decimal rounded to three decimal places as needed.)

   ID: 6.1.75

4. A denotes the area of the sector of a circle of radius r formed by the central angle θ. Find the missing quantity.

   $r = 4$ inches, $\theta = 150°$, $A = ?$

   $A =$ _____ square inches
   (Type an integer or decimal rounded to three decimal places as needed.)

   ID: 6.1.85

5. The diameter of each wheel of a bicycle is 28 inches. If you are traveling at a speed of 35 miles per hour on this bicycle, through how many revolutions per minute are the wheels turning?

   _____ $\dfrac{\text{revolutions}}{\text{minute}}$
   (Type an integer or decimal rounded to one decimal place as needed.)

   ID: 6.1.99

6. At a museum you can see the four cable lines that are used to pull cable cars up and down a hill. Each cable travels at a speed of 9.75 miles per hour, caused by a rotating wheel whose diameter is 5.5 feet. How fast is the wheel rotating? Express your answer in revolutions per minute.

   The angular speed of the wheel is _____ rev/min.
   (Round to two decimal places as needed.)

   ID: 6.1.111

7. Find the exact value. Do not use a calculator.

$$\cos\left(-\frac{3\pi}{2}\right)$$

$\cos\left(-\dfrac{3\pi}{2}\right) =$ _____   (Type an exact answer, using radicals as needed.)

ID: 6.2.27

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8. Find the exact values of the six trigonometric functions of the given angle. Do not use a calculator.

$$-\frac{2\pi}{3}$$

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\sin\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\cos\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\tan\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\csc\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\sec\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

Select the correct choice below and fill in any answer boxes within your choice.

◯ **A.** $\cot\left(-\dfrac{2\pi}{3}\right) =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

◯ **B.** The function value is undefined.

ID: 6.2.57

9. Use a calculator to find the approximate value of the expression. Round the answer to two decimal places.

    sec 16°

    ---

    sec 16° = _____   (Round to two decimal places as needed.)

    ID: 6.2.67

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10. Use a calculator to find the approximate value of the expression. Round the answer to two decimal places.

     sec 1°

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     sec 1° = _____   (Round to two decimal places as needed.)

     ID: 6.2.75

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11. The point P = (− 6,6) on the circle $x^2 + y^2 = r^2$ is also on the terminal side of an angle θ in standard position. Find **sin** θ, **cos** θ, **tan** θ, **csc** θ, **sec** θ, and **cot** θ.

sin θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cos θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

tan θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

csc θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

sec θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

cot θ = _____
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

ID: 6.2.81

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12. Use the fact that the trigonometric functions are periodic to find the exact value of the given expression. Do not use a calculator.

     tan (390°)

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     tan (390°) = _____
     (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

     ID: 6.3.17

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13. Name the quadrant in which the angle θ lies.

   $\cos \theta < 0, \quad \cot \theta < 0$

   Choose the correct answer below.

   - ○ **A.** The angle θ does not exist.
   - ○ **B.** The angle θ lies in quadrant III.
   - ○ **C.** The angle θ lies in quadrant II.
   - ○ **D.** The angle θ lies in quadrant II or III.

   ID: 6.3.31

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14. Find the exact value of each of the remaining trigonometric functions of θ.

   $\sec \theta = 7, \quad \tan \theta > 0$

   $\sin \theta =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

   $\cos \theta =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

   $\tan \theta =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

   $\cot \theta =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

   $\csc \theta =$ _____
   (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

   ID: 6.3.53

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15. Use the even-odd properties to find the exact value of the given expression. Do not use a calculator.

   $\cos(-180°)$

   $\cos(-180°) =$ _____
   (Type an exact answer, using radicals as needed. Simplify your answer, including any radicals.)

   ID: 6.3.65

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16. Use properties of the trigonometric functions to find the exact value of the expression. Do not use a calculator.

   $\sin 55° \cdot \csc 55°$

   $\sin 55° \cdot \csc 55° =$ _____

   ID: 6.3.79

17. What is the range of the tangent function?

Choose the correct answer below.

- ○ **A.** All real numbers greater than or equal to 0
- ○ **B.** All real numbers from -1 to 1, inclusive
- ○ **C.** All real numbers
- ○ **D.** All real numbers greater than or equal to 1 or less than or equal to -1

ID: 6.3.103

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18. Determine the amplitude and period of the following function without graphing.

$$y = 4 \cos (\pi x)$$

For the function given, the amplitude is _____ .
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

For the function given, $\omega =$ _____ , so that the period $= T =$ _____ .
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

ID: 6.4.15

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19. Match the given function to one of the graphs.

$$y = -4 \cos \left(\frac{1}{4}x \right)$$

Select the correct graph.
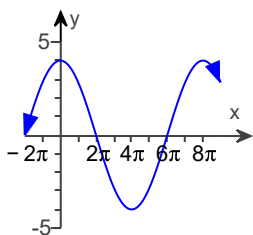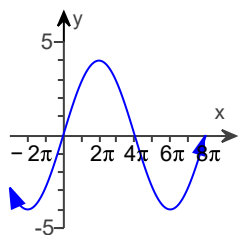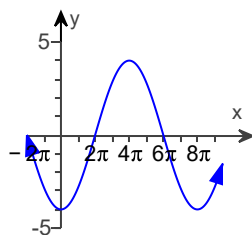
- ○ **A.**
- ○ **B.**
- ○ **C.**
- ○ **D.**
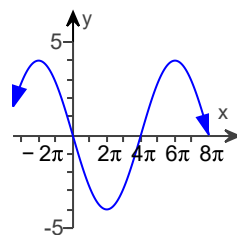
ID: 6.4.27

20. Match the function $y = -6\,\mathbf{sin}\,(8x)$ to the correct graph.

Choose the correct graph of the given function below.

A.
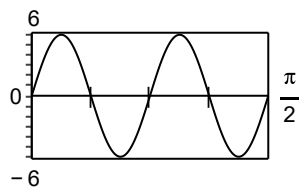
B.
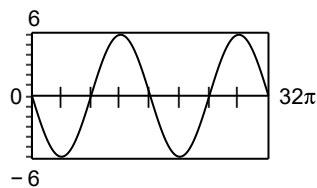
C.
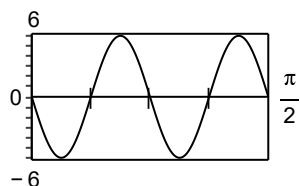
D.
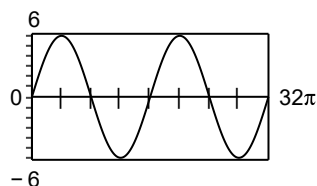
ID: 6.4.33

21. Find an equation for the graph.
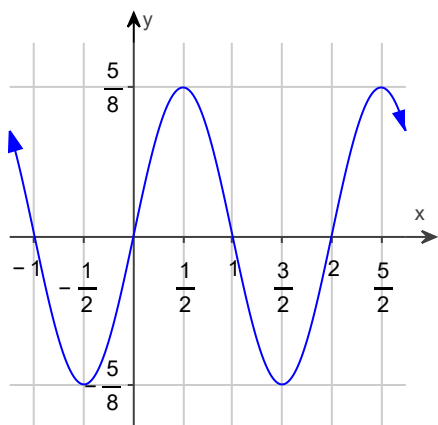
Which is an equation for the graph?

A. $y = \dfrac{5}{8}\,\mathbf{sin}\,(\pi x)$

B. $y = \mathbf{sin}\left(\dfrac{5\pi}{8}x\right)$

C. $y = \pi\,\mathbf{cos}\left(\dfrac{5}{8}x\right)$

D. $y = \dfrac{5}{8}\,\mathbf{cos}\,(\pi x)$

E. $y = \pi\,\mathbf{sin}\left(\dfrac{5}{8}x\right)$

F. $y = \mathbf{cos}\left(\dfrac{5\pi}{8}x\right)$

ID: 6.4.67

22. Graph the following function.

$$f(x) = \begin{cases} \cos x & 0 \le x < \dfrac{5\pi}{4} \\[3mm] \sin x & \dfrac{5\pi}{4} \le x \le 2\pi \end{cases}$$

Choose the correct graph below.
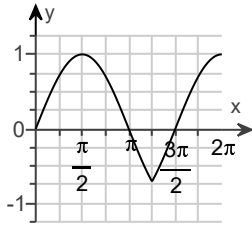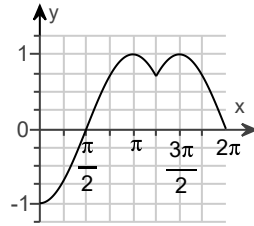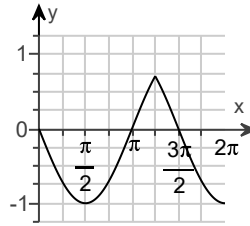
A.   **B.**   **C.**   **D.**
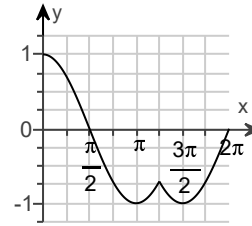
ID: 6.4.85

23. The voltage V produced by an ac generator is V = 260 **sin** (140πt). Use this information to answer the questions below.

(a) What is the amplitude of the voltage V?

The amplitude of the voltage is _____ .

What is the period of the voltage V?

T = _____   (Type an integer or a simplified fraction.)

(b) Which of the following shows a graph of the voltage V over two periods, beginning at t = 0?
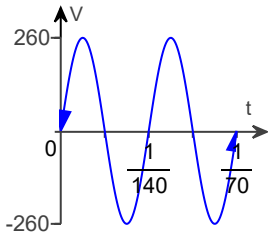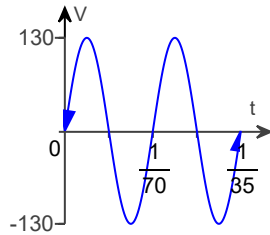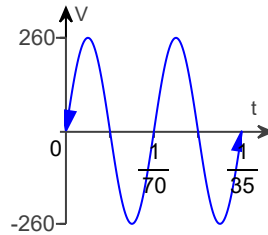
○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
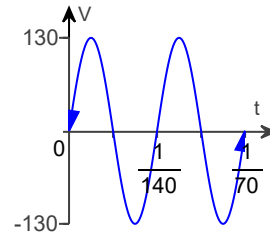
(c) If a resistance R = 80 ohms is present, what is the current I? [Hint: Use Ohm's Law, V = IR.]

I = _____ **sin** (140πt)
(Round to the nearest tenth as needed.)

(d) What is the amplitude of the current I?

The amplitude of the current is _____ .
(Round to the nearest tenth as needed.)

What is the period of the current I?

T = _____   (Type an integer or a simplified fraction.)

(e) Which of the following shows a graph of the current I over two periods, beginning at t = 0?
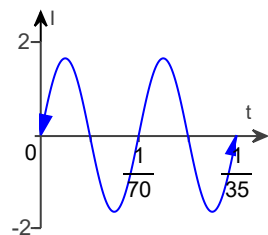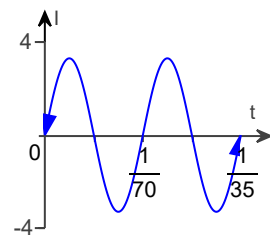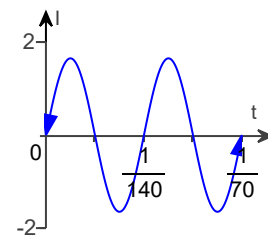
○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
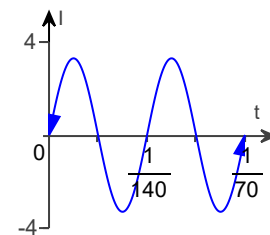
ID: 6.4.89

24. For what numbers x, $-2\pi \le x \le 2\pi$, does the graph of y = **tan** x have vertical asymptotes?

Refer to the graph, which shows y = **tan** x in blue and
y = **cos** x in red.

In the interval $-2\pi \le x \le 2\pi$, what is the smallest
value of x for which the graph of y = **tan** x has a
vertical asymptote?
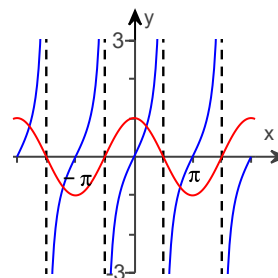
_____

(Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression. Simplify your
answer.)

Within the given interval, what is the next x-value for which y = **tan** x has a vertical asymptote?

_____

(Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression. Simplify your
answer.)

At what other x-values in the interval $-2\pi \le x \le 2\pi$ does the graph of y = **tan** x have a vertical asymptote?

○ $\dfrac{\pi}{2}$, and $\dfrac{3\pi}{2}$ ○ $\dfrac{\pi}{2}, \dfrac{3\pi}{2}$, and $\dfrac{5\pi}{2}$

○ There are no others.   ○ $\dfrac{3\pi}{2}$ and $\dfrac{5\pi}{2}$

ID: 6.5.15

25. Graph the following function. Show at least two cycles. Use the graph to determine the domain and range of the function.

$$y = \cot\left(\frac{1}{4}x\right) - 5$$
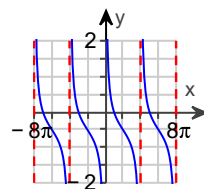

Choose the correct graph below.

A.   B.   C.   D.
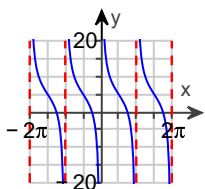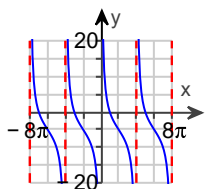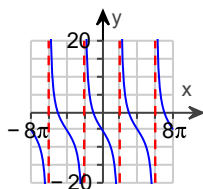
Use the graph to determine the domain of $y = \cot\left(\frac{1}{4}x\right) - 5$.

- A. All real numbers
- B. $\{x \mid x \neq 4k\pi,\ k \text{ is an integer}\}$
- C. $\{x \mid x \neq k\pi,\ k \text{ is an integer}\}$
- D. $\{x \mid x \neq \dfrac{k}{4},\ k \text{ is an odd integer}\}$

Use the graph to determine the range of $y = \cot\left(\frac{1}{4}x\right) - 5$.

- A. $\{y \mid y \leq 20\}$
- B. All real numbers
- C. $\{y \mid y \geq 20\}$
- D. $\{y \mid y \geq -20 \text{ and } y \leq 20\}$

ID: 6.5.33

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26. Graph the following function. Show at least two cycles. Use the graph to determine the domain and range of the function.

$$y = \csc\left(\frac{2\pi}{7}x\right) - 1$$

Choose the correct graph below.

○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**
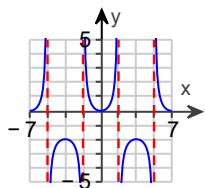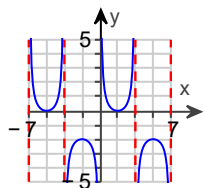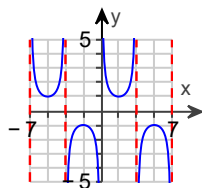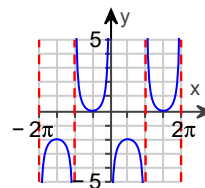
Use the graph to determine the domain of $y = \csc\left(\frac{2\pi}{7}x\right) - 1$.

○ **A.** $\left\{x \middle| x \neq \dfrac{k}{4},\ k \text{ is an odd integer}\right\}$

○ **B.** $\left\{x \middle| x \neq \dfrac{7}{2}k,\ k \text{ is an integer}\right\}$

○ **C.** All real numbers

○ **D.** $\{x | x \neq k\pi,\ k \text{ is an integer}\}$

Use the graph to determine the range of $y = \csc\left(\frac{2\pi}{7}x\right) - 1$.

○ **A.** $\{y | y \leq -2 \text{ or } y \geq 0\}$

○ **B.** $\{y | y \geq 0\}$

○ **C.** All real numbers

○ **D.** $\{y | y \leq -2\}$

ID: 6.5.35

27. Find the amplitude, period, and phase shift of the function. Graph the function. Be sure to label key points. Show at least two periods.

$$y = -3\sin\left(6x + \frac{\pi}{2}\right)$$

What is the amplitude?

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)
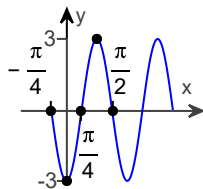
What is the period?

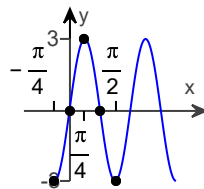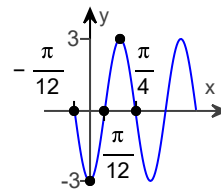(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

What is the phase shift?

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

Choose the correct graph below.
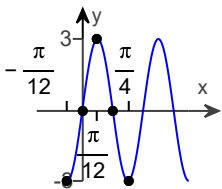
 ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

ID: 6.6.7

28. Write the equation of a sine function that has the following characteristics.

  Amplitude: 2 Period: 2π Phase shift: $-\dfrac{1}{6}$

Type the appropriate values to complete the sine function.

$$y = \underline{\hspace{2cm}} \ \mathbf{sin} \left(\underline{\hspace{2cm}} x + \underline{\hspace{2cm}} \right)$$

(Use integers or fractions for any numbers in the expression. Simplify your answers.)

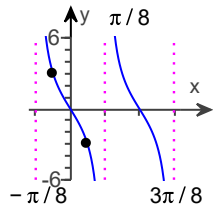ID: 6.6.17

29. Graph the function.

$$y = -3\,\textbf{cot}\left(4x + \frac{\pi}{2}\right)$$

Choose the correct graph of $y = -3\,\textbf{cot}\left(4x + \frac{\pi}{2}\right)$.

○ **A.**
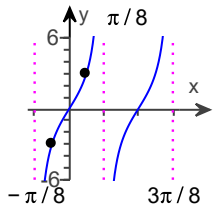
○ **B.**

○ **C.**

○ **D.**
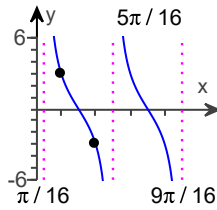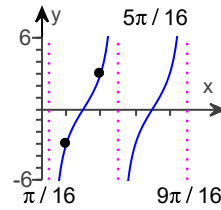

ID: 6.6.23

30. The following data represent the average monthly temperatures (in °F) for a city in Alaska.

   January, 1   25.0   April, 4   40.5   July, 7   56.4   October, 10   43.0
   February, 2 28.8   May, 5   47.4   August, 8   55.4   November, 11   32.4
   March, 3   33.1   June, 6 53.8   September, 9 50.2   December, 12   27.9
   Answer the following questions.

(a) Use a graphing utility to draw a scatter diagram for the data of one period.

Which screen is correct? (All screens are [0,13] by [0,60].)
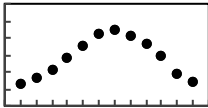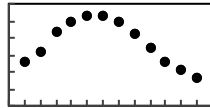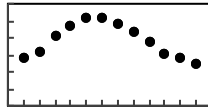
○ A.   ○ B.   ○ C.   ○ D.
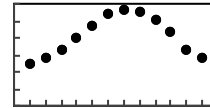
(b) By hand, find a sinusoidal function of the form y = A **sin** (ωx − φ) + B that fits the data.

A = _____

ω = _____

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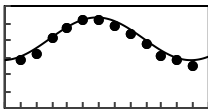
φ = _____

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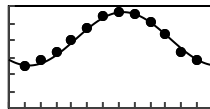
B = _____

(c) Draw the sinusoidal function found in part (b) on the scatter diagram.

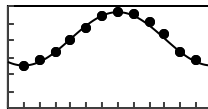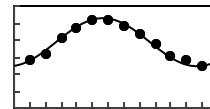Which screen is correct? (All screens are [0,13] by [0,60].)

○ A.   ○ B.   ○ C.   ○ D.

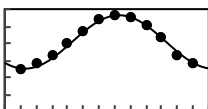(d) Use a graphing utility to find the sinusoidal function of best fit.

   y = 15.57 **sin** (_____ x − _____) + 41.03
   (Round to two decimal places as needed.)

(e) Draw the sinusoidal function of best fit on the scatter diagram.

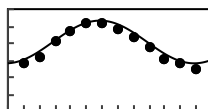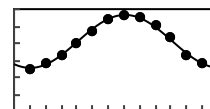Which screen is correct? (All screens are [0,13] by [0,60].)

○ A.   ○ B.   ○ C.   ○ D.

ID: 6.6.31

1. 79

37

19

2. -210

3. 0.333

4. 20.944

5. 420.2

6. 49.66

7. 0

8. A. $\sin\left(-\dfrac{2\pi}{3}\right) = \underline{\quad -\dfrac{\sqrt{3}}{2} \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

A. $\cos\left(-\dfrac{2\pi}{3}\right) = \underline{\quad -\dfrac{1}{2} \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

A. $\tan\left(-\dfrac{2\pi}{3}\right) = \underline{\quad \sqrt{3} \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

A. $\csc\left(-\dfrac{2\pi}{3}\right) = \underline{\quad -\dfrac{2\sqrt{3}}{3} \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

A. $\sec\left(-\dfrac{2\pi}{3}\right) = \underline{\quad -2 \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

A. $\cot\left(-\dfrac{2\pi}{3}\right) = \underline{\quad \dfrac{\sqrt{3}}{3} \quad}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

9. 1.04

10. 1.00

11. $\dfrac{\sqrt{2}}{2}$

$-\dfrac{\sqrt{2}}{2}$

-1

$\sqrt{2}$

$-\sqrt{2}$

-1

12. $\dfrac{\sqrt{3}}{3}$

13. C. The angle θ lies in quadrant II.

14. $\dfrac{4\sqrt{3}}{7}$

$\dfrac{1}{7}$

$4\sqrt{3}$
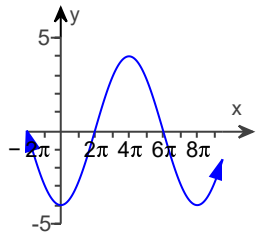
$\dfrac{\sqrt{3}}{12}$

$\dfrac{7\sqrt{3}}{12}$

15. -1

16. 1
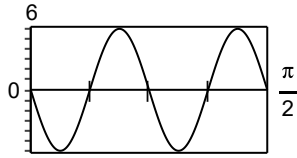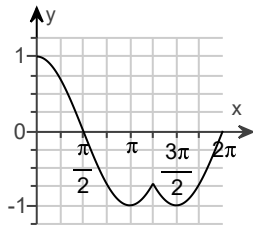
17. C. All real numbers

18. 4

π

2

19.

C.

20.
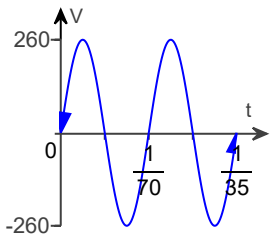

C.

21.
A. $y = \dfrac{5}{8} \sin(\pi x)$

22.

D.

---

23. 260

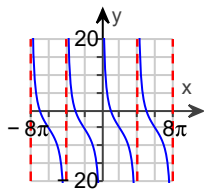$\dfrac{1}{70}$

C.

3.3

3.3

$\dfrac{1}{70}$
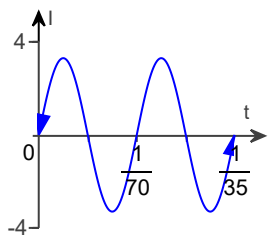
B.

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24. $-\dfrac{3\pi}{2}$

$-\dfrac{\pi}{2}$

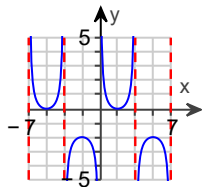$\dfrac{\pi}{2}$, and $\dfrac{3\pi}{2}$

25.

B.

B. $\{x|x \neq 4k\pi,\ k \text{ is an integer}\}$

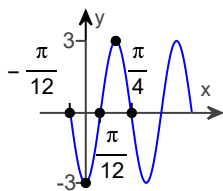B. All real numbers

---

26.

B.

B. $\{x \mid x \neq \dfrac{7}{2}k, k \text{ is an integer}\}$

A. $\{y \mid y \leq -2 \text{ or } y \geq 0\}$

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27. 3
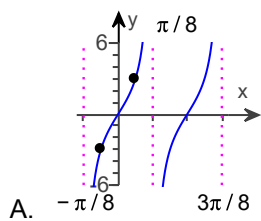
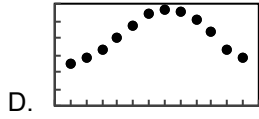$\dfrac{\pi}{3}$

$-\dfrac{\pi}{12}$
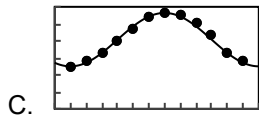

D.

---

28. 2

1

$\dfrac{1}{6}$

29.

A.

30.

D.

15.7

$\dfrac{\pi}{6}$

$\dfrac{2\pi}{3}$

40.7

C.

0.52

2.11

D.