

Midterm Review

Date _____ Period _____

Simplify.

1) $\begin{bmatrix} -3 & 2 \\ -4 & 5 \end{bmatrix} \cdot \begin{bmatrix} 3 & -3 & -4 \\ 2 & 5 & -4 \end{bmatrix}$

A) $\begin{bmatrix} -5 & 19 & -2 \\ -5 & 40 & -10 \end{bmatrix}$

B) $\begin{bmatrix} -5 & 19 & 4 \\ -8 & 43 & 4 \end{bmatrix}$

C) $\begin{bmatrix} -5 & 19 & 4 \\ -2 & 37 & -4 \end{bmatrix}$

D) $\begin{bmatrix} -1 & 19 & 4 \\ 8 & 37 & -4 \end{bmatrix}$

2) $2 \left(\begin{bmatrix} -4 & -1 & 2 \\ -4 & -6 & -4 \end{bmatrix} - \begin{bmatrix} -5 & -1 & -4 \\ 0 & -6 & -3 \end{bmatrix} \right)$

A) $\begin{bmatrix} -4 & 0 & 12 \\ -8 & 0 & -2 \end{bmatrix}$

B) $\begin{bmatrix} -28 & -6 & -12 \\ -8 & -36 & -20 \end{bmatrix}$

C) $\begin{bmatrix} 2 & 0 & 12 \\ -8 & 0 & -2 \end{bmatrix}$

D) $\begin{bmatrix} 4 & 0 & 12 \\ -8 & -2 & -2 \end{bmatrix}$

Evaluate each determinant.

3) $\begin{vmatrix} -2 & -1 \\ -2 & 0 \end{vmatrix}$

A) 8 B) 2

C) -2 D) 0

4) $\begin{vmatrix} 1 & -1 & 2 \\ 3 & 5 & 1 \\ -1 & -3 & 2 \end{vmatrix}$

A) 25 B) 12

C) 39 D) -14

Solve each equation.

5) $\begin{bmatrix} -2 & -6 \\ -23 & 1 \end{bmatrix} = \begin{bmatrix} -2 & -2 \\ 2 & -3 \end{bmatrix} C$

A) $\begin{bmatrix} -4 & 1 \\ 5 & 2 \end{bmatrix}$

B) $\begin{bmatrix} -4 & 2 \\ 6 & 1 \end{bmatrix}$

C) $\begin{bmatrix} -4 & 2 \\ 5 & 1 \end{bmatrix}$

D) $\begin{bmatrix} 2 & -2 \\ 7 & 1 \end{bmatrix}$

Find the inverse of each matrix.

6) $\begin{bmatrix} -3 & 0 \\ -6 & -2 \end{bmatrix}$

A) $\begin{bmatrix} -\frac{1}{3} & 0 \\ \frac{1}{9} & -\frac{1}{6} \end{bmatrix}$

B) $\begin{bmatrix} -\frac{1}{3} & 0 \\ 1 & -\frac{1}{2} \end{bmatrix}$

C) $\begin{bmatrix} \frac{1}{9} & -\frac{1}{6} \\ -\frac{1}{3} & 0 \end{bmatrix}$

D) $\begin{bmatrix} -\frac{1}{6} & 0 \\ \frac{1}{4} & -\frac{1}{2} \end{bmatrix}$

7) $\begin{bmatrix} -4 & 4 & 4 \\ -3 & 3 & -1 \\ 5 & -5 & -2 \end{bmatrix}$

A) $\begin{bmatrix} \frac{3}{35} & \frac{2}{5} & -\frac{13}{35} \\ \frac{1}{35} & \frac{4}{5} & -\frac{16}{35} \\ -\frac{1}{7} & 1 & -\frac{5}{7} \end{bmatrix}$

B) No inverse exists

C) $\begin{bmatrix} \frac{3}{5} & \frac{11}{15} & -\frac{4}{15} \\ \frac{2}{5} & \frac{3}{5} & -\frac{2}{5} \\ \frac{9}{10} & \frac{14}{15} & -\frac{17}{30} \end{bmatrix}$

D) $\begin{bmatrix} -\frac{16}{3} & -\frac{13}{3} & -\frac{20}{3} \\ -\frac{17}{3} & -\frac{14}{3} & -\frac{22}{3} \\ \frac{5}{3} & \frac{5}{3} & \frac{7}{3} \end{bmatrix}$

Identify the center and radius of each.

8) $(x + 5)^2 + y^2 = 49$

A) Center: $(-5, 0)$

Radius: 7

B) Center: $(-5, 0)$

Radius: 2

C) Center: $(0, -5)$

Radius: 7

D) Center: $(1, 7)$

Radius: 49

Use the information provided to write the standard form equation of each circle.

9) Center: $(14, -2)$

Point on Circle: $(13, -2)$

A) $(x - 2)^2 + (y + 14)^2 = 9$

B) $(x - 3)^2 + (y + 12)^2 = 1$

C) $(x - 14)^2 + (y + 2)^2 = 1$

D) $(x - 14)^2 + (y + 2)^2 = 9$

Use the information provided to write the standard form equation of each ellipse.

10) $25x^2 + 16y^2 - 100x + 320y + 100 = 0$

A) $\frac{(x - 2)^2}{25} + \frac{(y + 10)^2}{4} = 1$

B) $\frac{(x - 2)^2}{100} + \frac{(y + 10)^2}{64} = 1$

C) $\frac{(x - 2)^2}{64} + \frac{(y + 10)^2}{100} = 1$

D) $\frac{(x - 2)^2}{64} + \frac{(y + 10)^2}{36} = 1$

Use the information provided to write the transformational form equation of each parabola.

11) Vertex: $(-2, -1)$, Focus: $\left(-\frac{5}{2}, -1\right)$

A) $2(x + 2) = (y + 1)^2$

B) $-2(x + 2) = (y + 1)^2$

C) $2(y + 1) = (x + 2)^2$

D) $-2(y - 1) = (x + 2)^2$

Use the information provided to write the standard form equation of each hyperbola.

12) $-4x^2 + y^2 + 56x + 4y - 336 = 0$

A) $\frac{(y + 2)^2}{144} - \frac{(x - 7)^2}{36} = 1$

B) $\frac{(x + 7)^2}{144} - \frac{(y + 2)^2}{36} = 1$

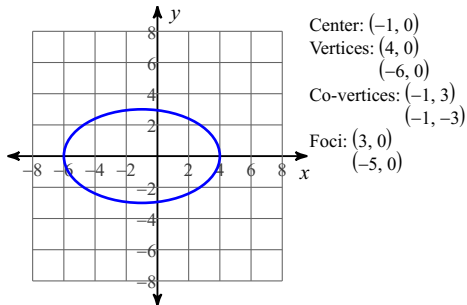
C) $\frac{(x - 7)^2}{36} - \frac{(y + 2)^2}{144} = 1$

D) $\frac{(x + 7)^2}{36} - \frac{(y - 2)^2}{144} = 1$

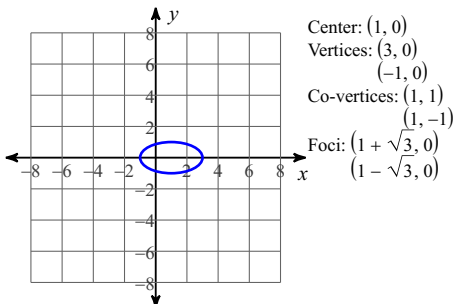
Identify the center, vertices, co-vertices, and foci of each. Then sketch the graph.

13) $\frac{(x-1)^2}{25} + \frac{y^2}{9} = 1$

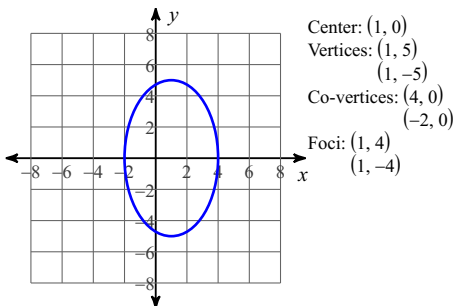
A)



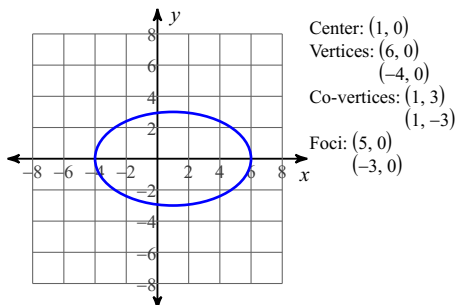
B)



C)



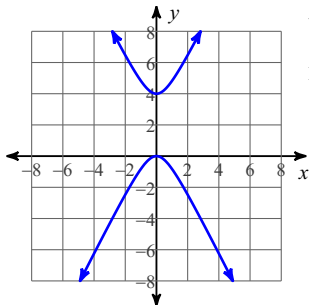
D)



Identify the vertices and foci of each. Then sketch the graph.

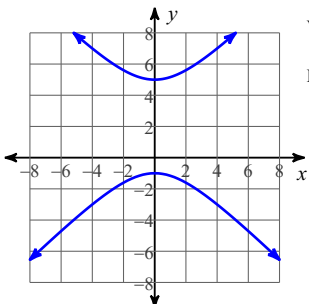
14) $\frac{(y-2)^2}{9} - \frac{x^2}{9} = 1$

A)



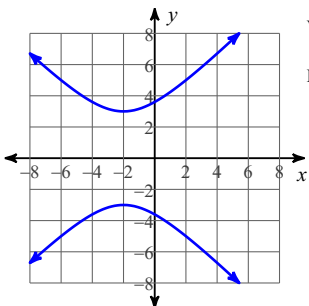
Vertices: $(0, 4)$
 $(0, 0)$
 Foci: $(0, 2 + \sqrt{5})$
 $(0, 2 - \sqrt{5})$

B)



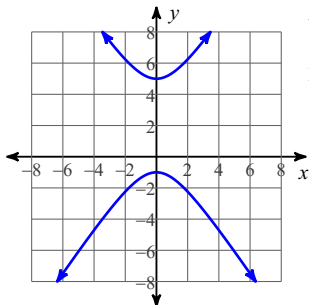
Vertices: $(0, 5)$
 $(0, -1)$
 Foci: $(0, 2 + 3\sqrt{2})$
 $(0, 2 - 3\sqrt{2})$

C)



Vertices: $(-2, 3)$
 $(-2, -3)$
 Foci: $(-2, 3 + \sqrt{2})$
 $(-2, -3 + \sqrt{2})$

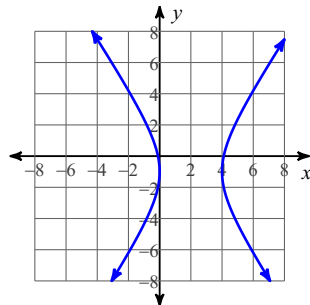
D)



Vertices: $(0, 5)$
 $(0, -1)$
 Foci: $(0, 2 + \sqrt{13})$
 $(0, 2 - \sqrt{13})$

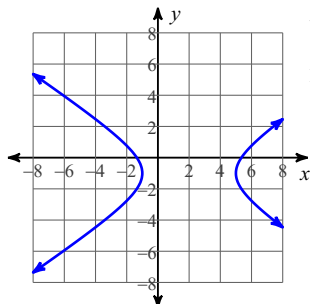
15) $\frac{(x-2)^2}{9} - \frac{(y+1)^2}{4} = 1$

A)



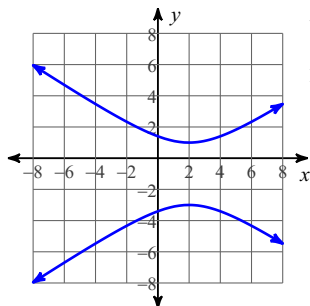
Vertices: $(4, -1)$
 $(0, -1)$
 Foci: $(2 + \sqrt{13}, -1)$
 $(2 - \sqrt{13}, -1)$

B)



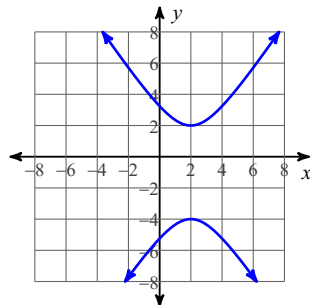
Vertices: $(5, -1)$
 $(-1, -1)$
 Foci: $(2 + \sqrt{13}, -1)$
 $(2 - \sqrt{13}, -1)$

C)



Vertices: $(2, 1)$
 $(2, -3)$
 Foci: $(2, -1 + \sqrt{13})$
 $(2, -1 - \sqrt{13})$

D)

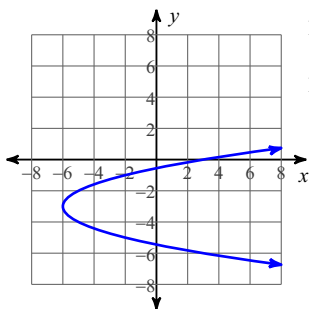


Vertices: $(2, 2)$
 $(2, -4)$
 Foci: $(2, -1 + \sqrt{13})$
 $(2, -1 - \sqrt{13})$

Identify the focus and directrix of each. Then sketch the graph.

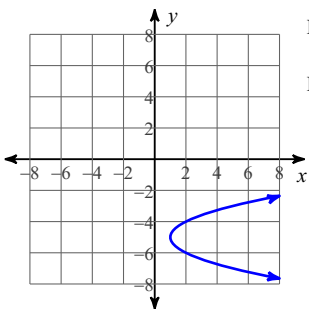
16) $x - 2 = y^2$

A)



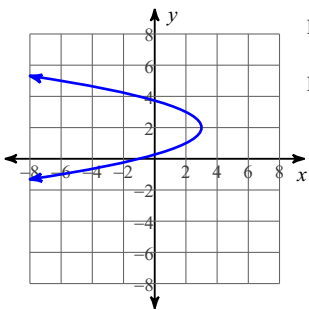
Focus: $(-\frac{23}{4}, -3)$
 Directrix: $x = -\frac{25}{4}$

B)



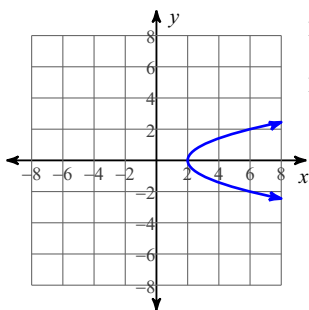
Focus: $(\frac{5}{4}, -5)$
 Directrix: $x = \frac{3}{4}$

C)



Focus: $(\frac{11}{4}, 2)$
 Directrix: $x = \frac{13}{4}$

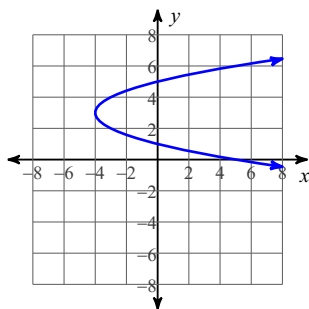
D)



Focus: $(\frac{9}{4}, 0)$
 Directrix: $x = \frac{7}{4}$

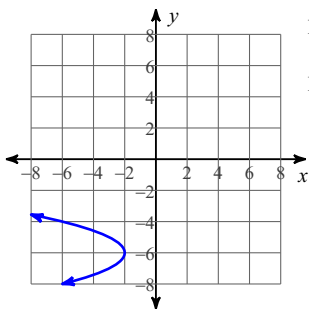
17) $-(x - 6) = (y - 2)^2$

A)



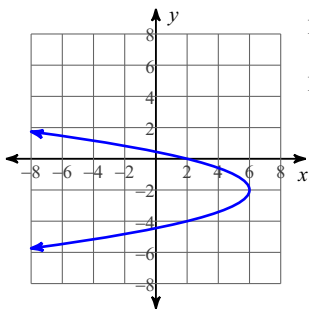
Focus: $(-\frac{15}{4}, 3)$
 Directrix: $x = -\frac{17}{4}$

B)



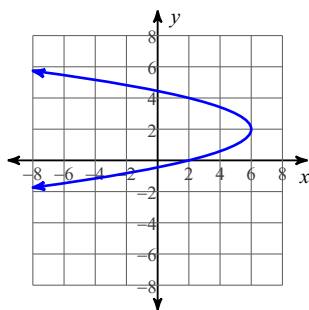
Focus: $(-\frac{9}{4}, -6)$
 Directrix: $x = -\frac{7}{4}$

C)



Focus: $(\frac{23}{4}, -2)$
 Directrix: $x = \frac{25}{4}$

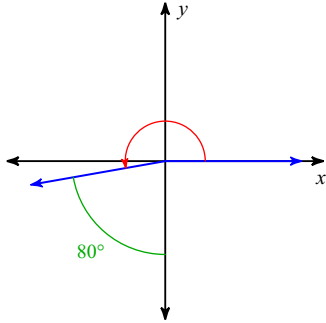
D)



Focus: $(\frac{23}{4}, 2)$
 Directrix: $x = \frac{25}{4}$

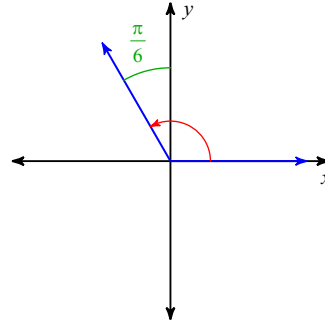
Find the measure of each angle.

18)



- A) 190° B) 170°
 C) 100° D) 200°

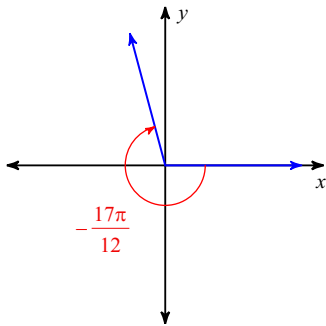
19)



- A) $\frac{4\pi}{3}$ B) $\frac{5\pi}{6}$
 C) $\frac{2\pi}{3}$ D) $\frac{23\pi}{36}$

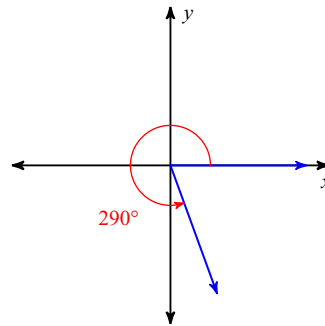
Find the reference angle.

20)



- A) $\frac{5\pi}{12}$ B) $\frac{\pi}{6}$
 C) $\frac{\pi}{4}$ D) $\frac{5\pi}{18}$

21)



- A) 20° B) 70°
 C) 55° D) 25°

Convert each degree measure into radians.

22) -570°

- A) $-\frac{29\pi}{9}$ B) $-\frac{115\pi}{36}$
 C) $-\frac{28\pi}{9}$ D) $-\frac{19\pi}{6}$

23) 15°

- A) $\frac{\pi}{18}$ B) $\frac{\pi}{36}$
 C) $\frac{\pi}{12}$ D) $\frac{2\pi}{9}$

Convert each radian measure into degrees.

24) $-\frac{5\pi}{18}$

- A) -60° B) -40°
 C) -50° D) -100°

25) $-\frac{43\pi}{9}$

- A) -1720° B) -865°
 C) -860° D) -850°

Find the exact value of each trigonometric function.

26) $\tan \frac{11\pi}{2}$

A) Undefined

B) $-\sqrt{3}$

C) 0

D) $-\frac{\sqrt{3}}{3}$

27) $\cot \frac{4\pi}{3}$

A) 1

B) -2

C) $\frac{\sqrt{3}}{3}$

D) $\sqrt{3}$

28) $\csc -360^\circ$

A) 1

B) 0

C) $\sqrt{3}$

D) Undefined

29) $\cot -2\pi$

A) $-\frac{\sqrt{3}}{3}$

B) Undefined

C) 1

D) 0

Use the given point on the terminal side of angle θ to find the value of the trigonometric function indicated.

30) $\cot \theta; (-5, 6)$

A) $-\frac{\sqrt{61}}{5}$

B) $\frac{\sqrt{61}}{6}$

C) $-\frac{6}{5}$

D) $-\frac{5}{6}$

31) $\tan \theta; (\sqrt{11}, 5)$

A) $-\frac{9}{8}$

B) $\frac{\sqrt{11}}{5}$

C) $\frac{6\sqrt{11}}{11}$

D) $\frac{5\sqrt{11}}{11}$

Find the exact values of the five trigonometric ratios not given.

32) $\sec \theta = -\frac{5}{4}$ and $\sin \theta > 0$

A) $\sin \theta = \frac{3}{5}, \cos \theta = -\frac{4}{5}, \tan \theta = -\frac{3}{4}$

$\csc \theta = \frac{5}{3}, \cot \theta = -\frac{4}{3}$

B) $\sin \theta = \frac{6}{17}, \cos \theta = -\frac{4}{17}, \tan \theta = -\frac{3}{2}$

$\csc \theta = \frac{17}{4}, \cot \theta = -\frac{2}{3}$

C) $\sin \theta = \frac{6}{5}, \cos \theta = -\frac{4}{5}, \tan \theta = -\frac{3}{2}$

$\csc \theta = \frac{5}{6}, \cot \theta = -\frac{2}{3}$

D) $\sin \theta = \frac{6}{17}, \cos \theta = -\frac{4}{17}, \tan \theta = -\frac{3}{2}$

$\csc \theta = \frac{17}{6}, \cot \theta = -\frac{2}{3}$

33) $\cos \theta = -\frac{21}{29}$ and $\sin \theta < 0$

A) $\sin \theta = -\frac{1}{9}, \tan \theta = \frac{2}{21}$

$\csc \theta = -9, \sec \theta = -\frac{6}{7}, \cot \theta = \frac{21}{2}$

B) $\sin \theta = -\frac{2\sqrt{2}}{29}, \tan \theta = \frac{2\sqrt{2}}{21}$

$\csc \theta = -\frac{29\sqrt{2}}{4}, \sec \theta = -\frac{29}{21}, \cot \theta = \frac{21\sqrt{2}}{4}$

C) $\sin \theta = -\frac{20}{29}, \tan \theta = \frac{20}{21}$

$\csc \theta = -\frac{29}{20}, \sec \theta = -\frac{29}{21}, \cot \theta = \frac{21}{20}$

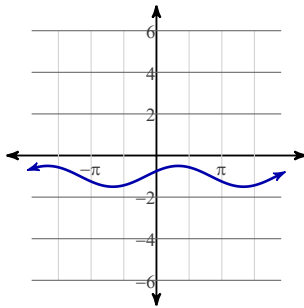
D) $\sin \theta = -\frac{\sqrt{2}}{9}, \tan \theta = \frac{2\sqrt{2}}{21}$

$\csc \theta = -\frac{9\sqrt{2}}{2}, \sec \theta = -\frac{6}{7}, \cot \theta = \frac{21\sqrt{2}}{4}$

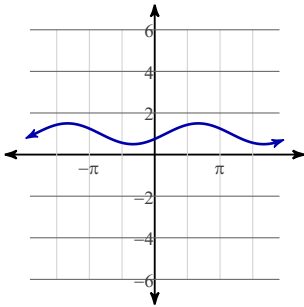
Graph each function using radians.

34) $y = \frac{1}{2} \cdot \sin\left(\theta + \frac{\pi}{6}\right) - 1$

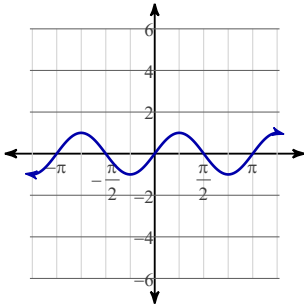
A)



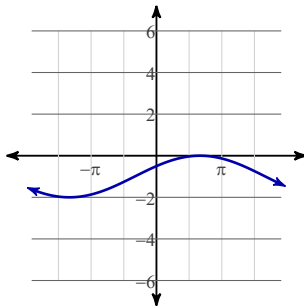
B)



C)

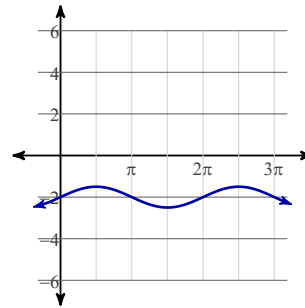


D)

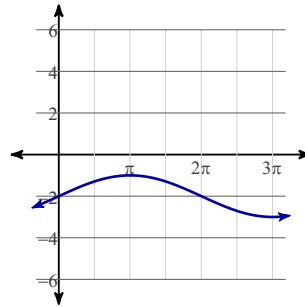


35) $y = \frac{1}{2} \cdot \sin \theta - 2$

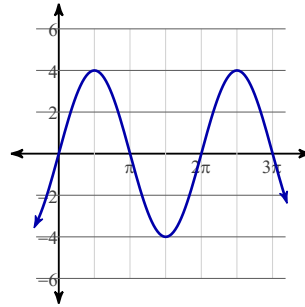
A)



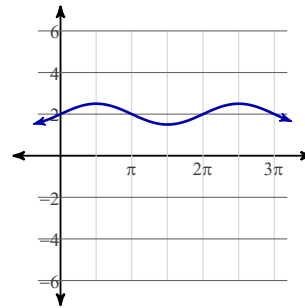
B)



C)



D)



Find the amplitude, the period in radians, the phase shift in radians, and the vertical shift.

36) $y = -4 + 10\sec\left(5\theta - \frac{5\pi}{6}\right)$

- A) Amplitude: None
Period: $\frac{2\pi}{5}$
Phase shift: Right $\frac{\pi}{6}$
Vert. shift: Down 4
- B) Amplitude: None
Period: π
Phase shift: Left $\frac{\pi}{4}$
Vert. shift: Down 3
- C) Amplitude: None
Period: $\frac{2\pi}{5}$
Phase shift: Left $\frac{\pi}{6}$
Vert. shift: Up 4
- D) Amplitude: None
Period: $\frac{2\pi}{5}$
Phase shift: Right $\frac{\pi}{12}$
Vert. shift: Down 4

37) $y = 5 + 10\tan\left(\frac{\theta}{2} + \frac{5\pi}{6}\right)$

- A) Amplitude: None
Period: 2π
Phase shift: Left $\frac{5\pi}{3}$
Vert. shift: Up 5
- B) Amplitude: 8
Period: π
Phase shift: Right $\frac{2\pi}{3}$
Vert. shift: Up 1
- C) Amplitude: None
Period: 2π
Phase shift: Right $\frac{5\pi}{3}$
Vert. shift: Down 5
- D) Amplitude: None
Period: 2π
Phase shift: Left $\frac{\pi}{12}$
Vert. shift: Up 5

Find the exact value of each expression.

38) $\tan^{-1} \sqrt{3}$

- A) $\frac{\pi}{4}$ B) $\frac{\pi}{3}$
C) 0 D) $-\frac{\pi}{3}$

39) $\cos^{-1} 0$

- A) $\frac{5\pi}{6}$ B) π
C) $\frac{\pi}{6}$ D) $\frac{\pi}{2}$

Find the arc length. (arc=radius*radians)

40) $r = 8$ km, $\theta = 60^\circ$

- A) $\frac{22\pi}{3}$ km B) 6π km
C) $\frac{8\pi}{3}$ km D) $\frac{9\pi}{2}$ km

Answers to Midterm Review (ID: 2)

- | | | | |
|-------|-------|-------|-------|
| 1) C | 2) C | 3) C | 4) B |
| 5) C | 6) B | 7) B | 8) A |
| 9) C | 10) C | 11) B | 12) A |
| 13) D | 14) B | 15) B | 16) D |
| 17) D | 18) A | 19) C | 20) A |
| 21) B | 22) D | 23) C | 24) C |
| 25) C | 26) A | 27) C | 28) D |
| 29) B | 30) D | 31) D | 32) A |
| 33) C | 34) A | 35) A | 36) A |
| 37) A | 38) B | 39) D | 40) C |