Name $\qquad$
Mid-term Review

## Date

1. Identify the co terminal angle on the interval $[-2 \pi, 2 \pi]$ for the angle $-5 \pi / 6$.
2. Find the value of the $\cos -3 \pi / 4$.
3. Find the exact value of $\tan 2 \pi / 3$.
4. Identify the quadrant if the $\sec \Theta<0$ and the $\cot \Theta<0$.
5. The value of $\cos 9 \pi / 10$ will be positive/negative?
6. Find the other 5 trig values if $\tan \theta=12 / 5$ and $\theta$ is in quad III.
7. Find the value of $\csc \theta$ if $\cos \theta=-1 / 3$ and $\pi / 2<\boldsymbol{\theta}<\boldsymbol{\pi}$.
8. Write an equation of the sine function with amplitude $1 / 2$, period 2 , and vertical shift down 4 .
9. State the period of the function $\mathrm{y}=\sin (\pi / 4 \mathrm{x})$.
10. Where does the maximum value occur $[0,2 \pi)$ for the function $y=-3 \cos (x+\pi / 4)$
11. Where do the asymptotes occur for one period of $\mathrm{y}=\csc (\mathrm{x})+1$ ?
12. Graph one period of $y=\cos (x-\pi / 2)-2$. Label both axes. Label the key points, clearly.
13. Simplify $\frac{\tan \alpha}{\cot \alpha}-\frac{\cos \alpha}{\sec \alpha}$
14. Simplify: $\frac{\cot x}{\cos x}+\frac{1}{\sin x}$
15. Verify the identity. $2 \csc ^{2} \mathrm{x}=\frac{1}{1-\cos x}+\frac{1}{1+\cos x}$
16. Solve: $2 \sin \theta=-\sqrt{2}$
17. Give the solutions for $4 \cos ^{2} \theta=4$
18. Solve secx $-\sqrt{2}=0$ for $[0,2 \pi]$
19. Solve: $2 \sin ^{2} \mathrm{x}-\sin \mathrm{x}-1=0$
20. Give the solutions for $\sin 2 \theta=-\cos \theta$
21. Use either a sum or difference identity to find the exact value of $\cos 5 \pi / 12$.
22. Triangle $X Y Z$ has the following properties. What is the approximate length of the side opposite vertex Z ?

- The angle at vertex X is $24^{0}$ and the angle at vertex Y is obtuse.
- The side opposite vertex X has a length of 6 units.
- The side opposite vertex $Y$ has a length of 8 units.

23. A triangular parcel of land has sides of lengths $41^{\prime}, 29^{\prime}$ and $59^{\prime}$. Find the measure of the largest angle.
24. Donald and Barack are standing 100 feet apart and notice a drone hovering above them in the sky. If Donald is standing west of the drone and spots it at a $41^{\circ}$ angle of elevation and Barack is standing east of the drone and spots it at a $21^{\circ}$ of elevation, what is the distance from each man to the drone?
25. Two airplanes leave an airport and the angle between their flight paths is $40^{\circ}$. An hour later, one plane has traveled 300 miles while the other has traveled 200 miles. How far apart are the planes at this time?
26. Graph the piecewise function by hand and find the indicated values.

$$
f(x)=\left\{\begin{array}{c}
x^{2}+1 \quad \text { if } x \leq 1 \\
x-2 \quad \text { if } 1<x \leq 4
\end{array}\right.
$$

a. $f(-1)$
b. $f(2)$
c. $f(1)$
d. $f(4)$
27. Describe how the graph of $g(\mathrm{x})$ can be obtained from the graph of $f(\mathrm{x})=\sqrt{x}$.
a. $g(x)=\frac{1}{2} \sqrt{x}-1$
b. $g(x)=-\sqrt{x-2}$
c. $g(\mathrm{x})=2 \sqrt{3 x+12}$
28. Find the equation of the function whose graph can be obtained by performing the translation, 3 units left, 1 unit up, and is horizontally compressed by a factor of $1 / 4$ on the function $f(x)=x^{3}$. Sketch the graphs.
29. State the domain of the following functions:
a. $\quad f(x)=x^{2}+1$
b. $f(x)=\sqrt{x+2}$
c. $\quad f(\mathrm{x})=\frac{x}{2 x-1}$
d. $f(x)=\frac{\sqrt{x}}{x-4}$
30. Let $f(x)=x-2, g(x)=x^{2}+3$, and $h(x)=\sqrt{x}$. Simplify. Find the domain of each.
a. $\quad(f+g)(x)$
b. $(f-g)(x)$
c. $(f g)(x)$
d. $\left(\frac{f}{g}\right)(x)$
e. $(f \circ g)(x)$
f. $(g \circ f)(x)$
g. $\quad(h \circ f)(x)$
h. $(f \circ g)(9)$
31. Decide if the following functions are even, odd or neither:
a. $f(x)=3 x^{6}-5 x^{4}$
b. $f(x)=x^{2}+2$
c. $\quad f(x)=x^{101}+11 x$
32. Find the inverse of the functions algebraically, if they exist.
a. $f(x)=2 \mathrm{x}^{2}-1$
b. $f(x)=\sqrt{3 x+4}$
c. $f(x)=\mathrm{x}-1$
33. Determine if $f$ and $g$ are inverses of each other. Show all work.
a. $f(x)=x^{5}$ and $g(x)=\sqrt[5]{x}$
b. $f(x)=\mathrm{x}^{3}-1$ and $g(x)=\sqrt[3]{x}-1$
34. Express the function $h(x)=\frac{1}{(x-2)^{2}}$ as a composition of two functions.
35. Use the graph below to answer each question.

a. Find $f(0)$ and $f(-6)$
b. Is $f(2)$ positive or negative?
c. What are the x -intercepts of $f(\mathrm{x})$ ?
d. How often does $\mathrm{y}=-1$ intersect $f(\mathrm{x})$ ?
e. What is $f(f(5))$ ?
f. What is the domain of the function?
g . What is the range of the function?
$h$. For what values is $f(x)>0$
i. What interval is $f(\mathrm{x})$ increasing?
j. What interval is $f(x)$ decreasing?

