5.5 Review Warmup

For the following, state
a) amplitude
b) phase shift
c) period
d) vertical displacement
f) maximum value and where it occurs
g) sketch the graph for 3 cycles
f) minimum value and where it occurs

1. $y=4 \sin 2 x-1$
amplitude $=4$
period $=\frac{2 \pi}{2}=\pi$
phase shift: none

$$
v \cdot \text { displ }=-1
$$

2. $y=-3 \cos 2\left(x-\frac{\pi}{4}\right)+1$
amplitude $=3$
phase shift $=\frac{\pi}{4}$

$$
\begin{aligned}
& \text { period }=\frac{2 \pi}{2}=\pi \\
& \text { V.displ }=+1
\end{aligned}
$$

3. $y=2 \cos 2 \pi\left(\frac{x-4}{7}\right)+6$
amplitude $=2$
phase shift $=4$

$$
\text { period }=\frac{2 \pi}{\left(\frac{2 \pi}{7}\right)}=7
$$

$$
v \cdot \operatorname{displ}=6
$$




4. Write the equation of
a) a sinusoidal function with maximum value of 12 occurring at 5 and the closest minimum value of 3 occurring at $11(5,12)$

amplitude $=\frac{12-3}{2}=4.5$

$$
y=4.5 \cos \frac{2 \pi}{2}(x-5)+7.5
$$

$$
\text { v.d'spl }=\frac{12+3}{2}=7.5
$$

period $=1 \quad 2$
b) the functions graphed below.




$$
y=-3 \cos \frac{2 \pi}{5}(x+2)-1
$$

5. A high tide of 5 m occurs at 5:00 AM. The next low tide of 1 m occurs 5.7 hours later. During what times in the afternoon will the tide be greater than 4 m ?


$$
\begin{gathered}
\text { amplitude }=2 \\
V \cdot \text { displ }=3
\end{gathered}
$$

$$
y=2 \cos \frac{2 \pi}{11.4}(x-5)+3
$$

$$
\text { period= } 11.4
$$


6. What are the zeros and the equations of the asymptotes to
a) $y=3 \tan x$

Zeroes: $x=0+n \pi$
asymptote $x=\frac{\pi}{2}+n \pi$
b) $y=5 \tan \frac{\pi}{2} x$

$$
\text { period }=2
$$

zeroes: $\quad x=0+2 n$
asymptote: $x=1+2 n$
7. A rotating light at the top of an ambulance sends out rays of light in opposite directions. As the light rotates, the ray at angle $\theta$ makes a spot of light that travels along the sidewalk. The ambulance is located 10 m from the sidewalk, and the light makes one complete rotation every 10 sec . Determine an equation that relates the distance $d$, in metres, as a function of time $t$, in seconds.

8. Solve over the reals: $5 \sin ^{2} x+3 \sin x-1=0$

$$
y_{1}=5\left(\sin (x)^{2}\right)+3 \sin (x)-1
$$

$$
x=2.9+n 2 \pi
$$

period $=2 \pi$

$$
\begin{array}{ll}
x: & 0<x<2 \pi \\
y: & -10<y<10
\end{array}
$$



$$
\begin{aligned}
& x=.24+n 2 \pi \\
& x=4.14+n 2 \pi \\
& x=5.29+n 2 \pi
\end{aligned}
$$

9. If the graph of the function shown below has the equation $y=a \sin b(x-c)+d$, determine the value of $a, b, c$ and $d$.

