Graphs of Sine & Cosine

1. domain: $[-82°, 998°]$

(a) phase shift = $\boxed{-82°}$ (b) period = $998° - (-82°) = \boxed{1080°}$

2. range: $[-24, -7]$

(a) amplitude = $\frac{-7-(-24)}{2} = \frac{17}{2} = \boxed{8.5}$

(b) vertical shift = $\frac{-7+(-24)}{2} = \frac{-31}{2} = \boxed{-15.5}$

3. $y = 3\sin\left(\frac{x}{4} + \frac{\pi}{12}\right) - 1$

amp = $\boxed{3}$

period = $\frac{2\pi}{1/4} = 2\pi \cdot \frac{4}{1} = \boxed{8\pi}$

vert. shift = $\boxed{-1}$

phase shift: $\frac{x}{4} + \frac{\pi}{12} = 0 \rightarrow \frac{x}{4} = \frac{-\pi}{12} \cdot 4$

$x = \boxed{\frac{-\pi}{3}}$

4. $y = -2\cos(3\theta - 120°) + 2$

amp = $\boxed{2}$

period = $\frac{360°}{3} = \boxed{120°}$

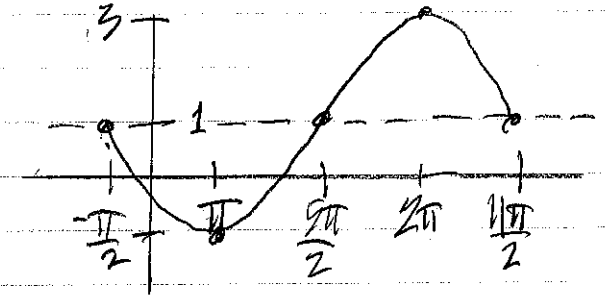
vert. shift = $\boxed{2}$

phase shift: $3\theta - 120° = 0$

5. $\frac{1}{3}x + \frac{\pi}{6} = 0$ $\quad \frac{1}{3}x + \frac{\pi}{6} = \frac{12\pi}{6}$

$\frac{1}{3}x = \frac{-\pi}{6}$ $\quad \frac{1}{3}x = \frac{11\pi}{6}$

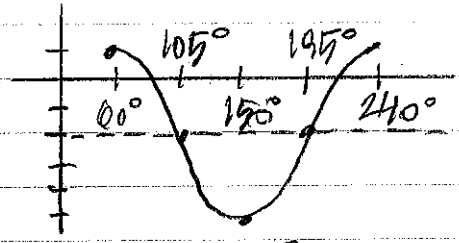
$x = \frac{-\pi}{2}$ $\quad x = \frac{11\pi}{2}$



6. $2(\theta - 60°) = 0$ $\quad 2(\theta - 60°) = 360°$

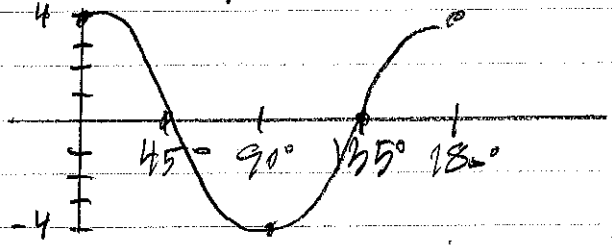
$\theta - 60° = 0$ $\quad \theta - 60° = 180°$

$\theta = 60°$ $\quad \theta = 240°$



7. $2\theta = 0°$ $\quad 2\theta = 360°$

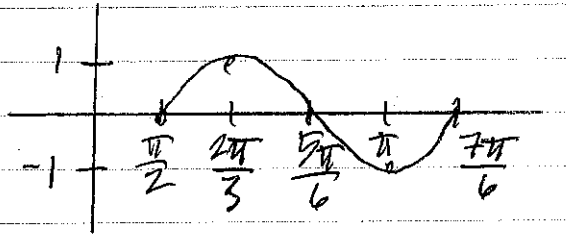
$\theta = 0°$ $\quad \theta = 180°$



8. $3x - \frac{3\pi}{2} = 0$ $\quad 3x - \frac{3\pi}{2} = \frac{4\pi}{2}$

$3x = \frac{3\pi}{2}$ $\quad 3x = \frac{7\pi}{2}$

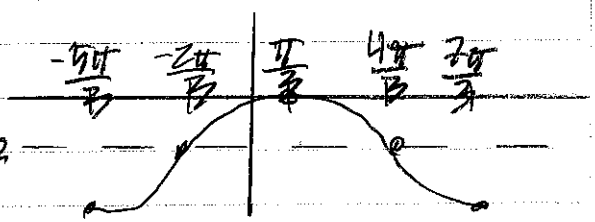
$x = \frac{3\pi}{6} = \frac{\pi}{2}$ $\quad x = \frac{7\pi}{6}$



9. $\frac{1}{2}x + \frac{5\pi}{6} = 0$ $\quad \frac{1}{2}x + \frac{5\pi}{6} = \frac{12\pi}{6}$

$\frac{1}{2}x = \frac{-5\pi}{6}$ $\quad \frac{1}{2}x = \frac{7\pi}{6}$

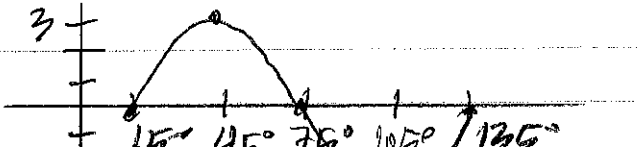
$x = \frac{-5\pi}{3}$ $\quad x = \frac{7\pi}{3}$



10. $3\theta - 45° = 0$ $\quad 3\theta - 45° = 360°$

$3\theta = 45°$ $\quad 3\theta = 405°$

$\theta = 15°$ $\quad \theta = 135°$



11. $y = 5\cos\left(\frac{4}{3}(\theta - 60°)\right) + 3$

$\frac{360°}{270°} = \frac{4}{3}$

12. $y = 2\sin\left(2\left(x + \frac{\pi}{4}\right)\right) - 4$

$\frac{2\pi}{\pi} = 2$

13. period $= 68° - 8° = 60°$

$b = \frac{360°}{60°} = 6$

phase shift $= 8°$

vertical shift $= \frac{4+7}{2} = \frac{11}{2}$

amp $= \frac{7-4}{2} = \frac{3}{2}$

$y = \frac{3}{2}\sin\left(6(\theta - 8°)\right) + \frac{11}{2}$