8. For each of the following functions, determine

1. the period, 2. the amplitude, 3. the range of the function.

a) $f(x) = -2\sin\frac{\pi}{8}(x-5)+3$

1. *p = 16*
2. *A = 2*
3. *ran f = [1, 5]*

b) $f(x) = 3\sin 12\left(x+\frac{\pi}{2}\right)+5$

1. *p = $\frac{\pi}{6}$*
2. *A = 3*
3. *ran f = [2, 8]*

c) $f(x) = 5\sin\frac{4\pi}{3}(x+1)-4$

1. *p = $\frac{3}{2}$*
2. *A = 5*
3. *ran f = [-9, 1]*

d) $f(x) = 10\sin\frac{6}{5}\left(x-\frac{\pi}{4}\right)+4$

1. *p = $\frac{5\pi}{3}$*
2. *A = 10*
3. *ran f = [-6, 14]*

9. Determine the initial value of the following functions.

a) $f(x) = 4\sin\frac{\pi}{6}(x+1)-3$ *-1*

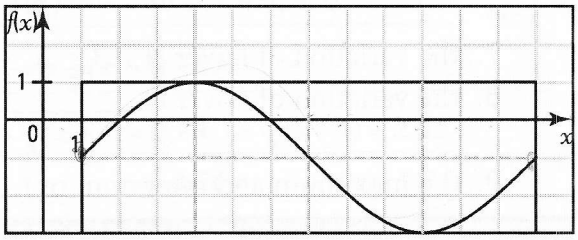
b) $f(x) = -2\sin\frac{\pi}{3}(x-2)+2$ *$\sqrt{3}$ + 2*

c) $f(x) = 2\sin 2\left(x-\frac{\pi}{4}\right)+4$ *2*

d) $f(x) = 3\sin\pi(x+5)-1$ *-1*

10. For each of the following functions, determine, over $\mathbb{R}$, the interval over which the function is positive.

a) $f(x) = 2\sin\frac{\pi}{6}(x-1)-1$



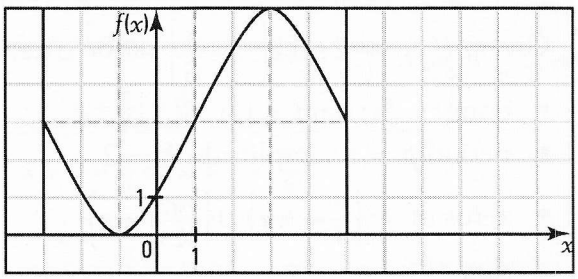
Zeros: sin $\frac{\pi}{6}(x-1) = \frac{1}{2}$

$\frac{\pi}{6}(x-1) = \frac{\pi}{6}$ or $\frac{\pi}{6}(x-1) = \frac{5\pi}{6}$

$x = 2$ $x = 6$

$f(x) \geq 0$ over $[2 + 12n, 6 + 12n]$

b) $f(x) = -3\sin\frac{\pi}{4}(x+3)+3$



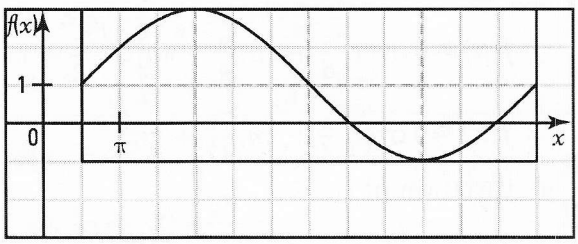
Zeros: sin $\frac{\pi}{4}(x+3) = 1$

$\frac{\pi}{4}(x+3) = \frac{\pi}{2}$

$x = -1$

$f(x) \geq 0$ over $\mathbb{R}$

c) $f(x) = 2\sin\frac{1}{3}\left(x-\frac{\pi}{2}\right)+1$



Zeros: sin $\frac{1}{3}\left(x-\frac{\pi}{2}\right) = -\frac{1}{2}$

$\frac{1}{3}\left(x-\frac{\pi}{2}\right) = \frac{7\pi}{6}$ or $\frac{1}{3}\left(x-\frac{\pi}{2}\right) = \frac{11\pi}{6}$

$x = 4\pi$ $x = 6\pi$

$f(x) \geq 0$ over $\left[\frac{\pi}{2} + 6\pi n, 4\pi + 6\pi n\right] \cup \left[6\pi + 6\pi n, \frac{13\pi}{2} + 6\pi n\right]$