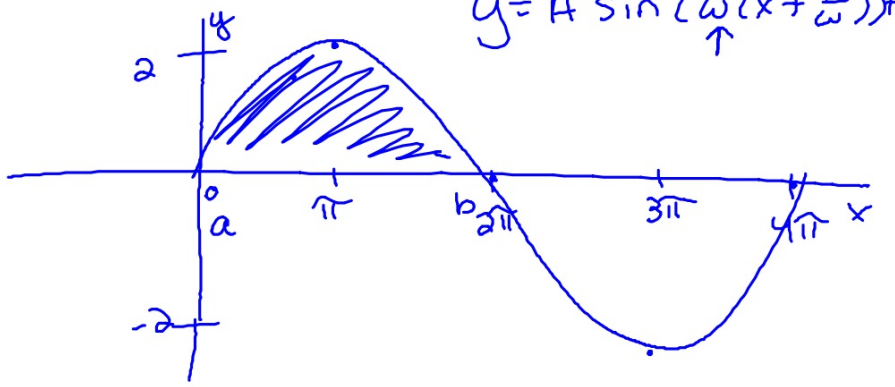
#5

$y = A\sin(\omega(x + \frac{\phi}{\omega})) + c$



a) find a + b

limits $\begin{cases} a = 0 \\ b = 2\pi \end{cases}$

b)

A. $2 = a$

$P = 4\pi$

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

$\omega = \frac{2\pi}{4\pi} = \frac{1}{2} = b$

$P = \frac{2\pi}{\omega} = \frac{2\pi}{\frac{1}{2}} = 4\pi$

$$\int_0^{2\pi} 2\sin\left(\frac{1}{2}x\right)dx$$

$$= 2\int_0^{2\pi} \sin\left(\frac{1}{2}x\right)dx$$

$$\equiv 2\cos\left(\frac{1}{2}x\right)dx = 8$$

14.4 Revisiting Linear Motion

Recall

Displacement = $s(t)$

velocity = $v(t) = \frac{ds}{dt} = s'(t)$

Acceleration = $a(t) = v'(t) = s''(t)$

total distance from t_1 to t_2 = $\int_{t_1}^{t_2} |v(t)|\,dt$

Ex: A particle moves along a horizontal line. The particle's displacement, in metres, from origin O is $s(t)=5-2\cos(3t)$. in t seconds.

a) Find the particle's velocity + accel. at time t.

$v(t) = s'(t) = -2(-\sin(3t))(3)$

$= 6\sin(3t)$

$a(t) = v'(t) = 6\cos(3t)(3) = 18\cos(3t)$

b) Find the intial disp., veloc., accel.
$t=0$

$s(0) = 5 - 2\cos(3\cdot 0) = 5 - 2\cos(0) = 3$ m

$v(0) = 6\sin(3\cdot 0) = 6(\sin(0)) = 0$ ms^{-1}

$a(0) = 18\cos(0) = 18 \cdot 1 = 18\ m\,s^{-2}$

c) when the paricle is moving → ←
stopped over $0 \le t \le \pi$

Stopped when $v(t) = 0$

$6\sin(3t) = 0$

$\sin(3t) = 0$

$3t = 0$ $\quad 3t = \pi$

$t = 0$ $\quad t = \frac{\pi}{3}$

$3t = 2\pi$ $\quad 3t = 3\pi$

$t = \frac{2\pi}{3}$ $\quad t = \pi$

Hw p. 512
1, 2, 16
14ff