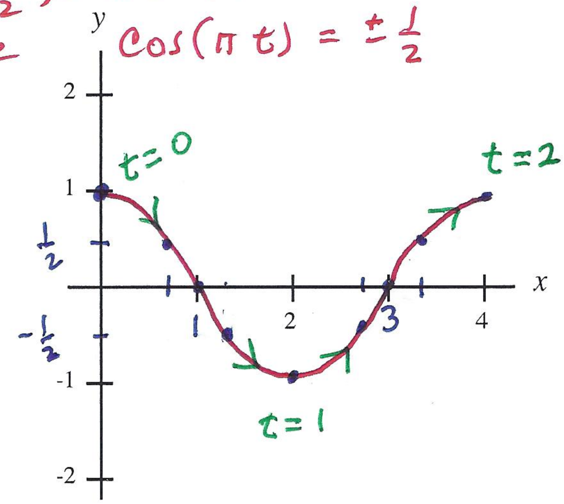
6. $x = 2t, \quad y = \cos(\pi t), \quad 0 \le t \le 2$

For t I chose axial values to create $t = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$, and 2π. I also chose values of t where $\cos(\pi t) = \pm \frac{1}{2}$

t	$x = 2t$	$y = \cos(\pi t)$
0	0	1
1/3	2/3	1/2
1/2	1	0
2/3	4/3	-1/2
1	2	-1
4/3	8/3	-1/2
3/2	3	0
5/3	10/3	1/2
2	4	1



Section 10.2

7. Consider the parametric equations $x = \frac{3}{t}$ and $y = t^2 - 6t$, for $t \ge 1$.

$\frac{dx}{dt} = \frac{-3}{t^2}$ $\quad \frac{dy}{dt} = 2t - 6$

a) Find the first derivative, $\frac{dy}{dx}$, and simplify

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{2t-6}{\frac{-3}{t^2}}$$

$$= -\frac{t^2}{3}(2t-6)$$

$$= \boxed{-\frac{2}{3}t^3 + 2t^2}$$

b) Write the equation of the tangent line for $t = 2$.

First find x and y:

$x = \frac{3}{2}$; $y = (2)^2 - 6(2)$

$= 4 - 12$

$= -8$

$\left(\frac{3}{2}, -8\right)$

Next find the slope of the tangent line at $t=2$:

$$m_T(t=2) = -\frac{2}{3}(2)^3 + 2(2)^2$$

$$= -\frac{16}{3} + 8$$

$$= \frac{8}{3}$$

Now write the equation of the line:

$$y - (-8) = \frac{8}{3}\left(x - \frac{3}{2}\right)$$

$$y + 8 = \frac{8}{3}x - 4$$

$$\boxed{y = \frac{8}{3}x - 12}$$

c) Determine where the tangent line is horizontal and where it is vertical.

vertical: No where

horizontal: $-\frac{2}{3}t^3 + 2t^2 = 0$

$$-2t^3 + 6t^2 = 0$$

$$-2t^2(t-3) = 0$$

$t = 0$, $t = 3$ $\quad \boxed{t=3}$ (only)

not in domain of t.