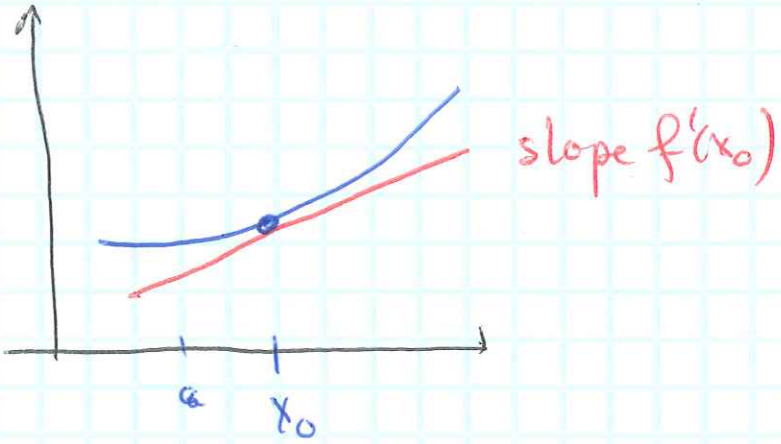
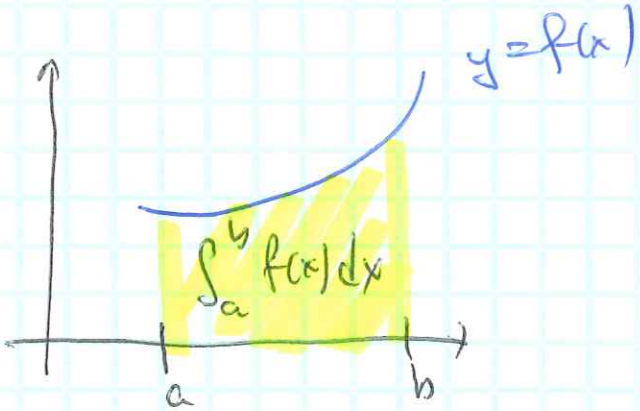
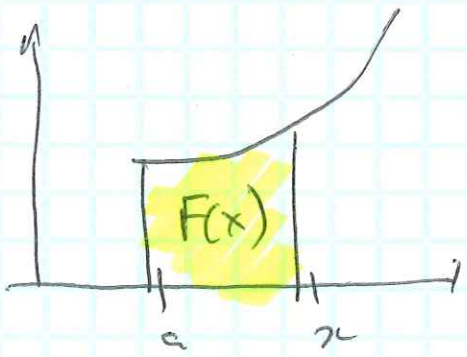
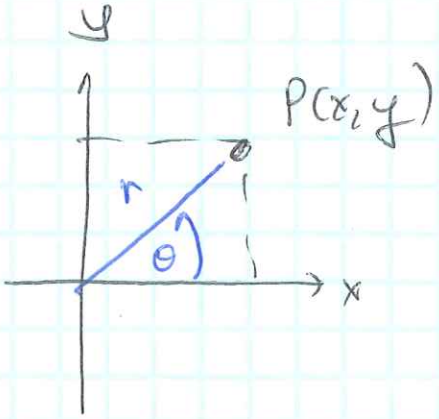
Math 213 - Sec 12.1.







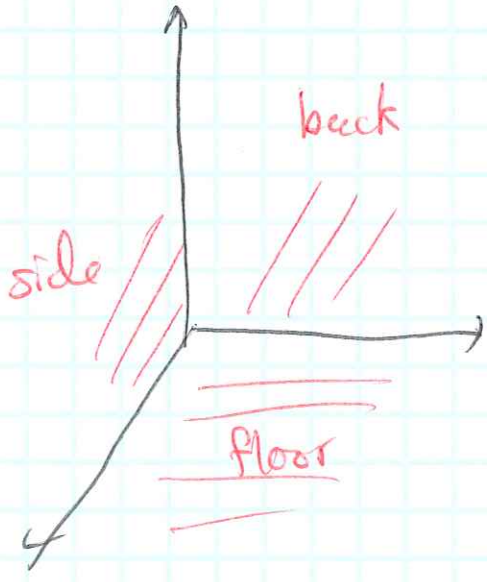
$$F(x) = \int_a^x f(t)\,dt$$



$$x = r\cos\theta$$

$$y = r\sin\theta$$

$$(r, \theta) \rightarrow (x, y)$$



Ex: Find the center and radius of the circle

$$x^2 - 2x + y^2 + 4y = 0$$

$$x^2 - 2x + 1 + y^2 + 4y + 4 = 0 + 1 + 4$$

$$(x-1)^2 + (y+2)^2 = 5$$

Radius: $\sqrt{5}$

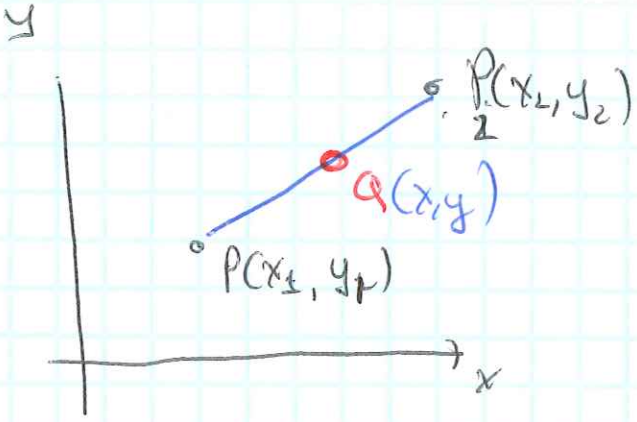
Center: $(1, -2)$

Circle: $(x-h)^2 + (y-k)^2 = r^2$

Center (h, k)

Radius r

$$(x-h)^2 + (y-k)^2 + (z-\ell)^2 = r^2$$



Midpoint

$Q(x, y)$: $x = \frac{x_1 + x_2}{2}$ 2-D

$y = \frac{y_1 + y_2}{2}$

$Q(x, y, z)$ $x = \frac{x_1 + x_2}{2}$ 3-D

$y = \frac{y_1 + y_2}{2}$

$z = \frac{z_1 + z_2}{2}$