Area of a Plane Region
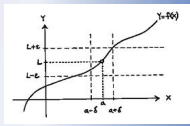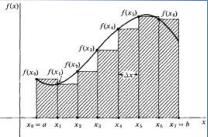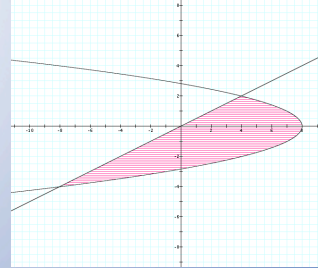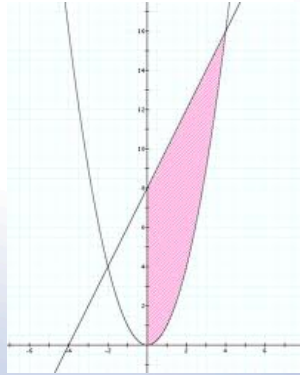
$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$\frac{d}{dx} \int_a^x f(t)\,dt = f(x)$$

$$\lim_{max \, \Delta x_i \to 0} \sum_1^n f(x_i)\Delta x_i = \int_a^b f(x)\,dx$$

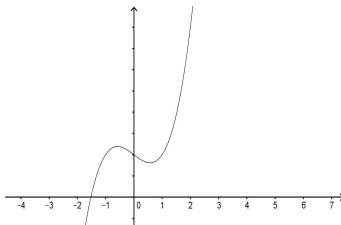$$\int_a^b f(x)\,dx = F(b) - F(a)$$

A = The area between a curve, *f(x),* and the *x-axis* from *x=a* to *x=b* is found by

$$\int_a^b f(x)\,dx \,.$$
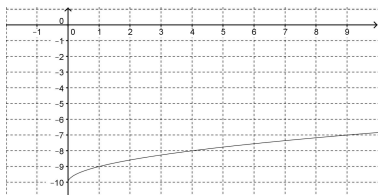
EX 1 Find the area of the region between the function and the *x-axis*
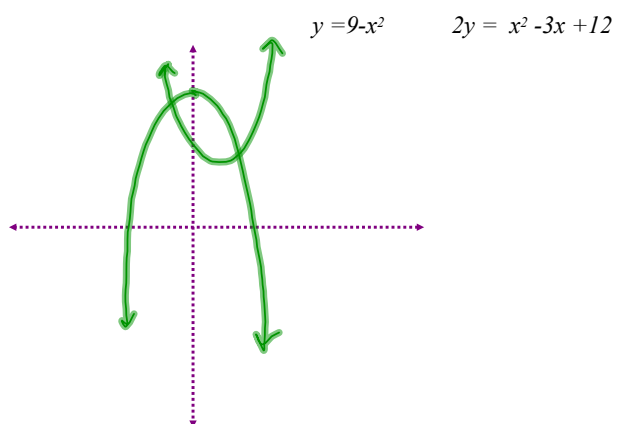on the *x*-interval *[-1,2]*. $f(x) = x^3 - x + 2$

EX 2 Find the area between $y = \sqrt{x} - 10$ and $y = 0$ between $x = 0$ and $x = 9$.

EX 3 Find the area between these two curves.

$$y = 9 - x^2 \qquad 2y = x^2 - 3x + 12$$

EX 4   Find the area of the region bounded by these two curves.

$$x = y^2 - 2y \qquad\qquad x - y - 4 = 0$$