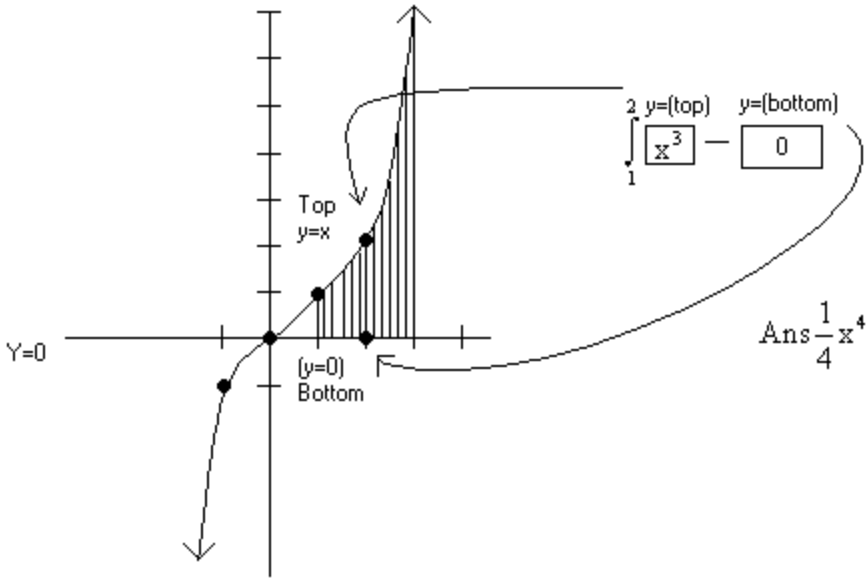
AREA UNDER THE CURVE NOTES

EASY

Find the area bounded by the x-axis, $y = x^3$, $x = 1$ & $x = 2$



$$\int_1^2 \boxed{x^3} - \boxed{0}$$

(y=(top) y=(bottom))

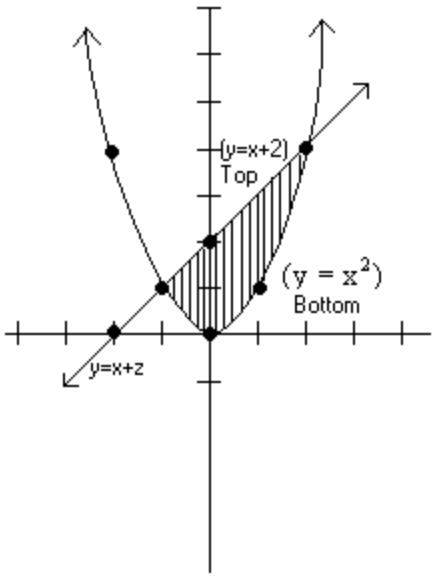
$$\text{Ans} \frac{1}{4}x^4 \Big]_1^2 = \frac{1}{4}(16) - \frac{1}{4}(1)$$

$$= 4 - \frac{1}{4}$$

$$= \boxed{3\frac{3}{4}}$$

MEDIUM

Find the area bounded by $y = x^2$ & $y = x + 2$



$$\int_{-1}^{2} \boxed{x+2} - \boxed{x^2}\, dx$$

(y=(top) y=(bottom))

$$\frac{1}{2}x^2 + 2x - \frac{x^3}{3}\Big]_{-1}^{2}$$

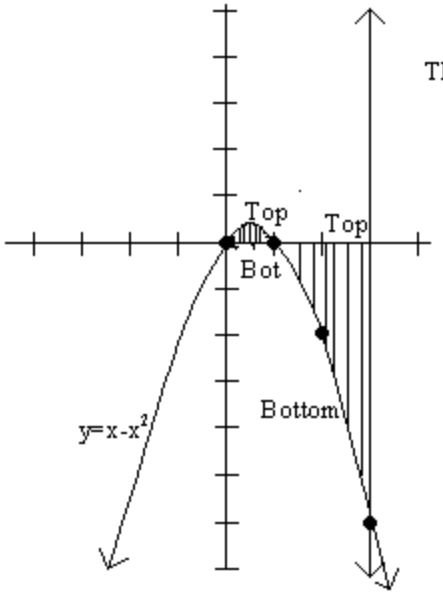
$$\boxed{2 + 4 - \frac{8}{3}} - \boxed{\frac{1}{2} - 2 + \frac{1}{3}}$$

$$\boxed{\frac{10}{3}} - \boxed{-\frac{7}{6}}$$

$$\boxed{4\frac{1}{2}}$$

MEDIUM- HARD

Bounded by the $x-$axis, $y-$axis, $y = x - x^2$, $x = 3$



THERE ARE TWO AREAS TO BE ADDED TOGETHER!

$$\int_0^1 \boxed{x - x^2} - \boxed{0}\,dx + \int_1^3 \boxed{0} - \boxed{x - x^2}\,dx$$

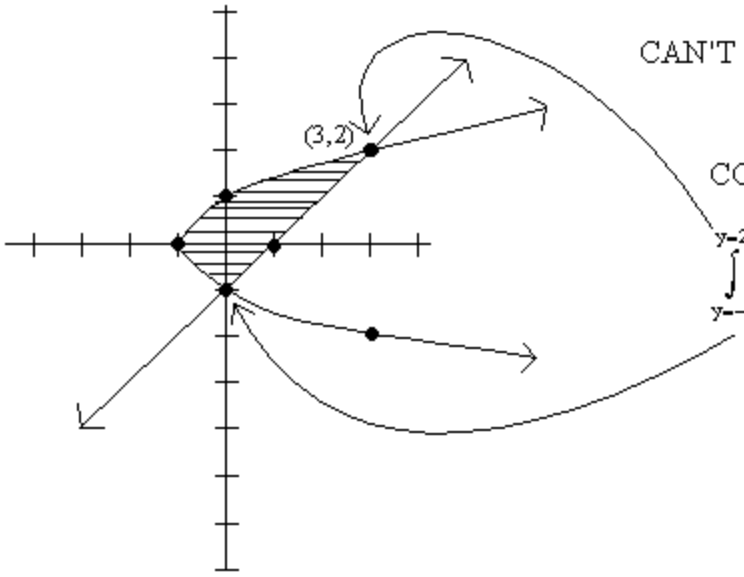
(y=(top) y=(bottom) y=(top) y=(bottom))

answer $= 4\frac{5}{6}$

HARD

Bounded by $y^2 = x + 1$ & $x - y = 1$

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



CAN'T USE $\int_{x=?}^{x=?} \boxed{\text{y=(top)}} - \boxed{\text{y=(bottom)}}$

CONVERT TO:

$$\int_{y=-1}^{y=2} \boxed{y + 1} - \boxed{y^2 - 1}\,dy$$

(x=(right) x=(left))

ANS: $4\frac{1}{2}$