7.1 day 2 - Area of a Region Between Two Curves 5/10/19

Homework: 7.1 B

Quiz 7.1 Wednesday 5/15

Objective: Find the area of a region between two curves using integration. Use symmetry and *dy* perspective.

If she loves you more each and every day,
by linear regression she hated you before you met.

Do Now: Draw a sketch of and set up an integral that will evaluate the area between the 2 functions, then find the area.

$f(x) = x^2$ $g(x) = -x + 2$

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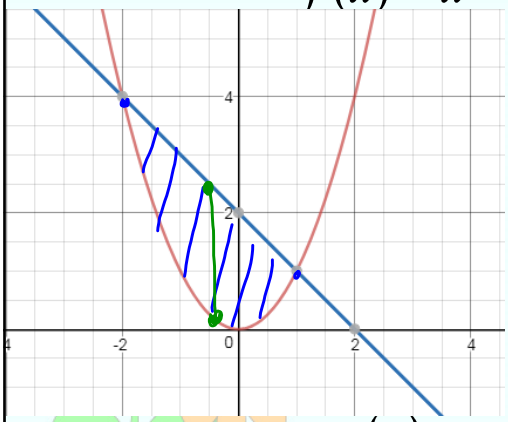
$f(x) = x^2$



$g(x) = -x + 2$

$x^2 = -x + 2$

$x^2 + x - 2 = 0$

$(x-1)(x+2) = 0$

$x = 1, -2$

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

$= \left[-\frac{x^2}{2} + 2x - \frac{x^3}{3}\right]_{-2}^{1}$

$-\frac{1}{2} + 2 - \frac{1}{3} + \left(+2 + 4 + \frac{8}{3}\right)$

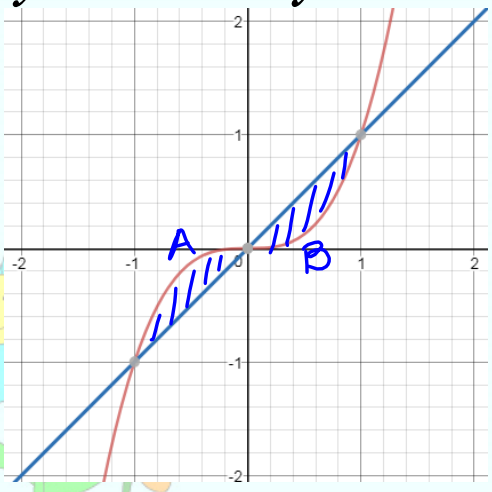
$-\frac{1}{2} - 3 + 8 = 4.5$

HW Questions

Do you remember using symmetry when finding area of absolute value functions?

Find the area of the region bounded by the following functions.

$y = x^3 \qquad y = x$



$x^3 = x$

$x^3 - x = 0$

$x(x^2 - 1) = 0 \qquad x = 0, \pm 1$

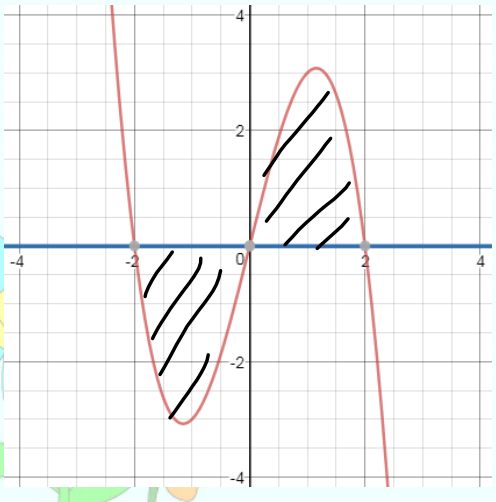
$\int_{-1}^{0} (x^3 - x)\,dx + \int_{0}^{1} (x - x^3)\,dx$

$2\int_{0}^{1} (x - x^3)\,dx = \frac{1}{2}$

Try this in your groups

Find the area of the region bounded by the following functions.

$f(x) = 4x - x^3 \qquad g(x) = 0$

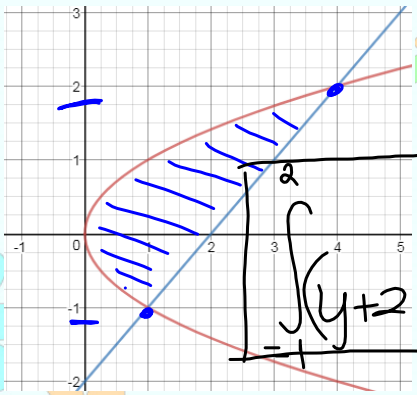


$2\int_{-2}^{0} (-4x + x^3)\,dx =$

$2\int_{0}^{2} (4x - x^3)\,dx = 8$

Let's look at things from a different perspective.

Find the area of the region bounded by the following relations.



$\sqrt{x} = \sqrt{y^2}$

$y = \pm\sqrt{x}$

$y_1 = \sqrt{x}$

$y_2 = -\sqrt{x}$

$\int_{-1}^{2} (y+2-y^2)\,dy$

$= 4.5$

$f(y) = y^2$

$y = x - 2$

$x = y + 2$

$g(y) = y + 2$

$y^2 = y + 2$

$y^2 - y - 2 = 0$

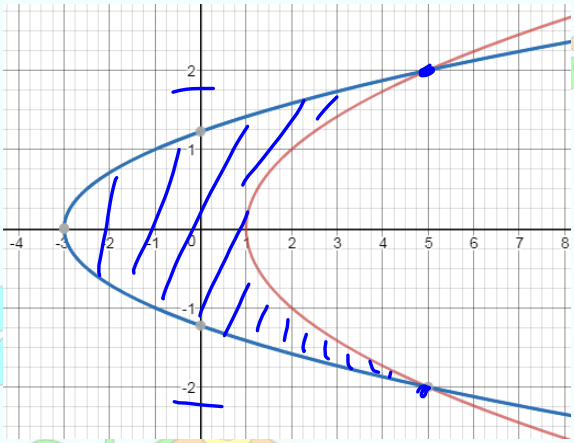
$(y-2)(y+1) = 0$

$y = -1, 2$

Try this one in your groups

Find the area of the region bounded by the following relations.

$x = y^2 + 1 \rightarrow y = \pm\sqrt{x-1}$ $\quad x = 2y^2 - 3$



$y^2 + 1 = 2y^2 - 3$

$0 = y^2 - 4$

$y = \pm 2$

$\int_{-2}^{2} y^2 + 1 - (2y^2 - 3)\,dy$

Just set up the integral that will give us the area of the region bounded by the following curves.