Entry #: ______

Lesson 8.2: Area Between Curves

$\int_a^b f(x)\,dx$ produces a value "signed area" which may be positive, negative, or zero.

However, if you are asked to find an actual area , that area can't be __________________ .

Area of a Region Between Two Curves:

For functions of x, $A = \int_a^b (top\ curve - bottom\ curve)\,dx$.

For functions of y, $A = \int_a^b (right\ curve - left\ curve)\,dy$.

<u>Example</u>:

Find the area of the region bounded by $y = x^2 + 2$, $y = x$, $x = 0$, and $x = 1$.

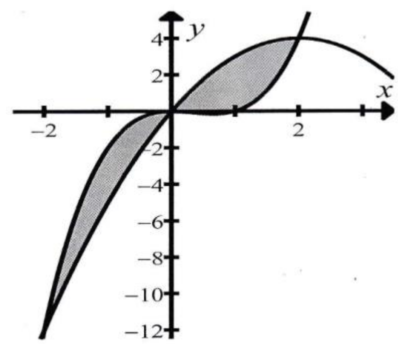
Sometimes, you have to find where two curves intersect to determine "boundaries" for your region(s). These intersections will provide you with _________________________ for your integral(s). You must show an equation set up, even when using a calculator to find intersections.

Examples:

1. Find the area of the region bounded by $x = y^2 - 3$ and $y = x + 1$.

2. Find the total area of the regions located between the two curves as shown. You may use a calculator.

   $f(x) = x^3 - x^2$ and $g(x) = -x^2 + 4.1x$



3. Without using a calculator set up an integral for the area of one region bounded between the graphs of $y = \sin(\theta)$ and $y = \cos(\theta)$.