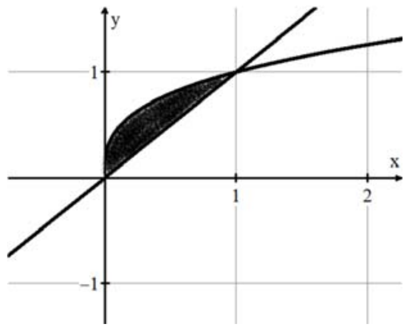
11.1 Area Between Two Curves

Calculus   Name: ______________________________

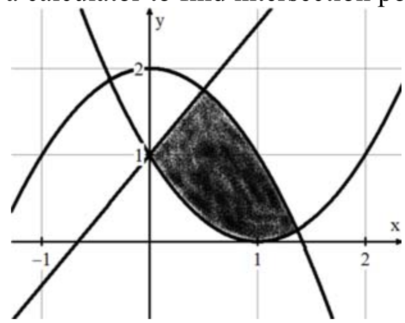
CA #2

For 1-2, set up the integral to find the area of the shaded region, but DO NOT EVALUATE.

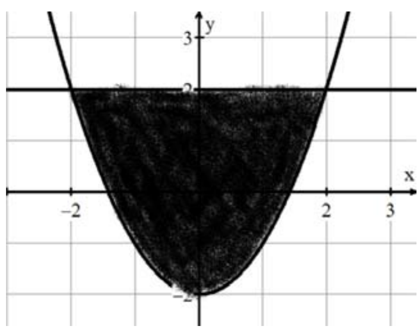
1. <u>With respect to $\boldsymbol{x}$</u>.
   $f(x) = \sqrt[3]{x},\ g(x) = x$



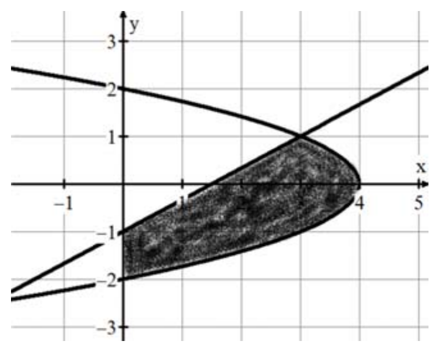
2. <u>With respect to $\boldsymbol{x}$</u>.
   $y = 2 - x^2,\ y = (x-1)^2,\ y = \frac{3}{2}x + 1$
   Use a calculator to find intersection points!



3. <u>With respect to $\boldsymbol{y}$</u>. $y = x^2 - 2$ and $y = 2$



4. <u>With respect to $\boldsymbol{y}$</u>. $x = 4 - y^2,\ y = \frac{2}{3}x - 1, x = 0$



Find the area of the region bounded by the curves.

5. $y = x^2$ and $y = 4x - x^2$

6. $x = y^3 - y^2$ and $x = 2y$

Find the area of the region bounded by the given equations. Evaluate an integral with respect to *x* (perpendicular to the *x*-axis) by using a calculator. Find the same area by evaluating an integral with respect to *y* (perpendicular to the *y*-axis) by showing your work.

7. $y = \sqrt[3]{x}, x = 0,$ and $y = 2$

Sketch your graph here in the middle!

with respect to *x* (SHOW WORK)

with respect to *y* (show the integral set up, then use a calculator)

8. $y = x^3, y = x$

Sketch your graph here in the middle!

with respect to *x* (SHOW WORK)

with respect to *y* (show the integral set up, then use a calculator)

Answers to 11.1 CA #2

1. $\int_0^1 (\sqrt[3]{x} - x)\, dx$	2. $\int_0^{\frac{1}{2}} \left(-x^2 + \frac{7}{2}x\right) dx + \int_{\frac{1}{2}}^{1.366} (-2x^2 + 2x + 1)\, dx$	3. $\int_{-2}^{2} (2\sqrt{y+2})\, dy$
4. $\int_{-2}^{-1} (4 - y^2)\, dy + \int_{-1}^{1} \left(-y^2 - \frac{3}{2}y + \frac{11}{2}\right) dy$	5. $\int_0^2 (4x - 2x^2)\, dx = \frac{8}{3}$	6. $\int_{-1}^{0} (y^3 - y^2 - 2y)\, dy +$ $\int_0^2 (2y - y^3 + y^2)\, dy = \frac{37}{12}$
7a. $\int_0^8 (2 - \sqrt[3]{x})\, dx = 4$ 7b. $\int_0^2 (y^3)\, dy = 4$	8a. $\int_{-1}^{0} (x^3 - x)\, dx + \int_0^1 (x - x^3)\, dx = \frac{1}{2}$ 8b. $\int_{-1}^{0} (y - \sqrt[3]{y})\, dy + \int_0^1 (\sqrt[3]{y} - y)\, dy = \frac{1}{2}$	