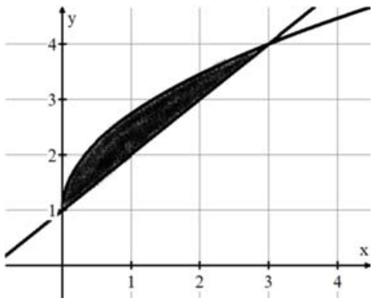
11.1 Area Between Two Curves

CA #1

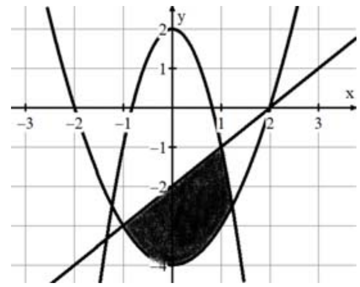
Calculus Name: ________________________________

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

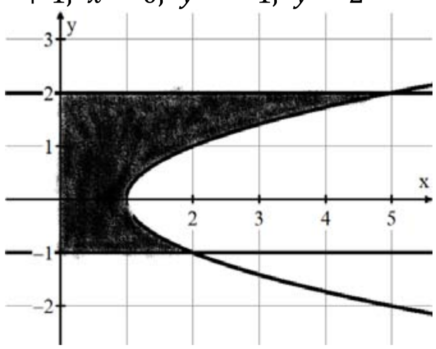
1. With respect to $\boldsymbol{x}$.
$f(x) = \sqrt{3x} + 1,\ g(x) = x + 1$



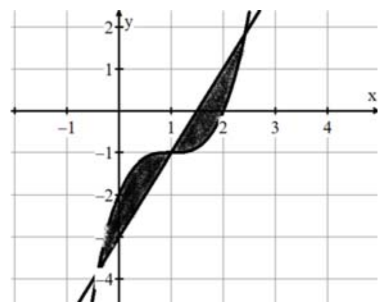
2. With respect to $\boldsymbol{x}$.
$f(x) = x^2 - 4,\ g(x) = x - 2,\ h(x) = 2 - 3x^2$



3. With respect to $\boldsymbol{y}$.
$x = y^2 + 1,\ x = 0,\ y = -1,\ y = 2$



4. With respect to $\boldsymbol{y}$.
$y = (x-1)^3 - 1$ and $y = 2x - 3$
Intersection points:
$(-0.414, -3.828), (1, -1), (2.414, 1.828)$



Find the area of the region bounded by the curves.

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

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

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. $y = x^3$ and $x = y^2 - 1$

Sketch your graph here in the middle!

with respect to *x* (this problem will require a calculator to find the boundaries AND integrate, but you can still show the setup)

with respect to *y* (and a calculator)

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8. $y = 3x^2, y = 0,$
$x = 1, x = 3$

Sketch your graph here in the middle!

with respect to *x* (SHOW WORK)

with respect to *y* (and a calculator)

Answers to 11.1 CA #1

1. $\int_0^3 (\sqrt{3x} - x)\, dx$	2. $\int_{-1}^{1} (-x^2 + x + 2)\, dx + \int_1^{\sqrt{\frac{3}{2}}} (-4x^2 + 6)\, dx$	3. $\int_{-1}^{2} (y^2 + 1)\, dy$
4. $\int_{-3.828}^{-1} \left(\frac{y}{2} + \frac{1}{2} - \sqrt[3]{y+1}\right) dy + \int_{-1}^{1.828} \left(\sqrt[3]{y+1} - \frac{1}{2} - \frac{y}{2}\right) dy$	5. $\int_0^6 (6x - x^2)\, dx = 36$	6. $\int_{-1}^{1} (3 - 3y^2)\, dy = 4$
7a. $\int_{-1}^{-0.7781} (2\sqrt{x+1})\, dx + \int_{-0.7781}^{1.1347} (\sqrt{x+1} - x^3)\, dx = 1.826$ 7b. $\int_{-0.4711}^{1.4611} (\sqrt[3]{y} - y^2 + 1)\, dy = 1.826$	8a. $\int_1^3 (3x^2)\, dx = 26$ 8b. $\int_0^3 (3 - 1)\, dy + \int_3^{27} \left(3 - \sqrt{\frac{y}{3}}\right) dy = 26$	