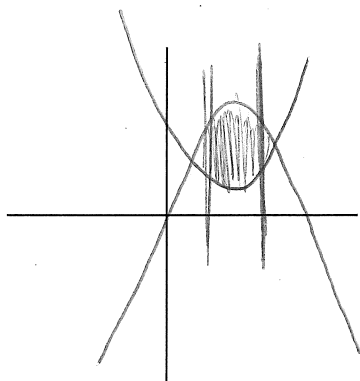


AP Calculus AB
Area Between Curves Worksheet #1

Name Key

Sketch the graphs of the given curves, shade the bounded region, and find the area bounded by the given curves.

1. $y = -x^2 + 6x - 3$; $y = x^2 - 6x + 10$; $x = 2$; and $x = 4$



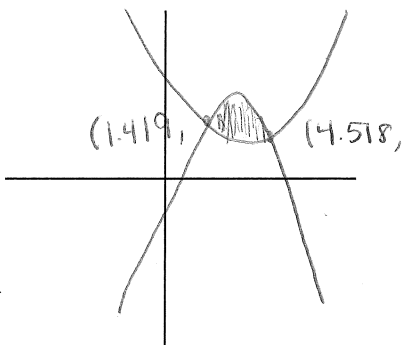
$$\int_2^4 (-x^2 + 6x - 3 - (x^2 - 6x + 10)) dx$$

$$\int_2^4 -x^2 + 6x - 3 - x^2 + 6x - 10 dx$$

$$\int_2^4 -2x^2 + 12x - 13 dx$$

$$\left. -\frac{2}{3}x^3 + 6x^2 - 13x \right|_2^4$$

2. $y = -x^2 + 6x - 3$ and $y = x^2 - 6x + 10$



$$\int_{1.419}^{4.518} -2x^2 + 12x - 13 dx$$

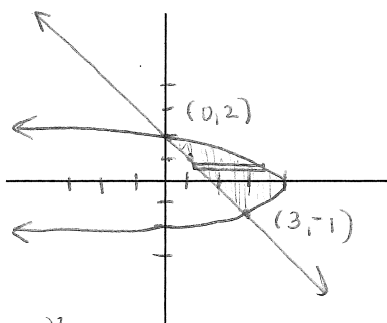
3. $x = 4 - y^2$ and $x + y - 2 = 0$

$$y^2 = 4 - x$$

$$y = \pm \sqrt{4 - x}$$

$$y = -x + 2$$

$$x = 2 - y$$



$$\int_{-1}^2 (4 - y^2 - (2 - y)) dy$$

$$\int_{-1}^2 (4 - y^2 - 2 + y) dy$$

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

$$-\frac{1}{3}y^3 + \frac{1}{2}y^2 + 2y \Big|_{-1}^2$$

$$(\pm\sqrt{4-x})^2 = (-x+2)^2$$

$$4-x = x^2 - 4x + 4$$

$$0 = x^2 - 3x$$

$$0 = x(x-3)$$

4. $y^2 = 4x$ and $4x - 3y = 4$

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

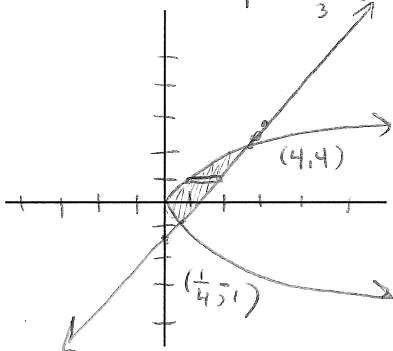
$$x = \frac{y^2}{4}$$

$$3y = 4x - 4$$

$$y = \frac{4x-4}{3}$$

$$4x = 4 + 3y$$

$$x = \frac{4+3y}{4}$$



$$\int_{-1}^2 \left(\frac{4+3y}{4} - \frac{y^2}{4} \right) dy$$

$$\frac{1}{4} \int_{-1}^2 (4 + 3y - y^2) dy$$

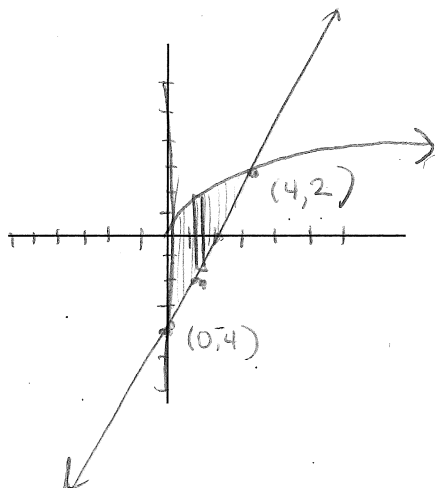
$$\frac{1}{4} \left[4y + \frac{3}{2}y^2 - \frac{1}{3}y^3 \right]_{-1}^2$$

$$\frac{y^2}{4} = \frac{4+3y}{4}$$

$$y^2 - 3y - 4 = 0$$

$$(y-4)(y+1) = 0$$

5. $y = 2\sqrt{x}$; $y = 2x - 4$; and $x = 0$



$$\int_0^4 (2\sqrt{x} + (2x - 4)) dx$$

$$\frac{4}{3}x^{3/2} - x^2 + 4x \Big|_0^4$$

$$(2\sqrt{x})^2 = (2x-4)^2$$

$$4x = 4x^2 - 16x + 16$$

$$0 = 4x^2 - 20x + 16$$

$$0 = 4(x^2 - 5x + 4)$$

$$0 = (x-4)(x-1)$$