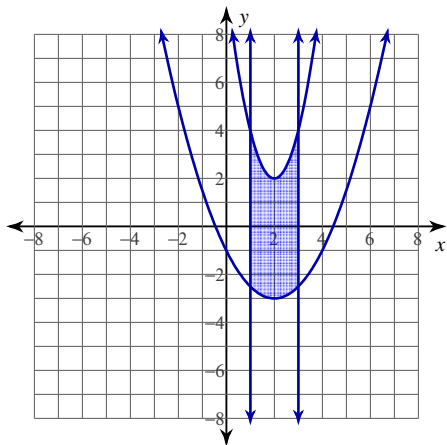Name_____

Area Between Curves

Date_____ Period____

For each problem, find the area of the region enclosed by the curves.

1) $y = 2x^2 - 8x + 10$
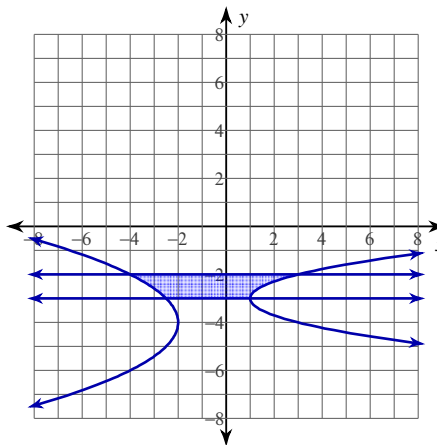
$\quad y = \dfrac{x^2}{2} - 2x - 1$

$\quad x = 1$

$\quad x = 3$

2) $x = 2y^2 + 12y + 19$

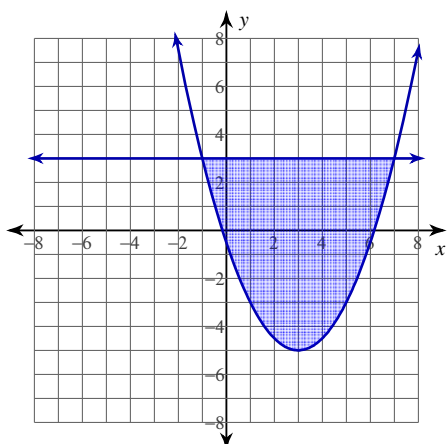$\quad x = -\dfrac{y^2}{2} - 4y - 10$

$\quad y = -3$
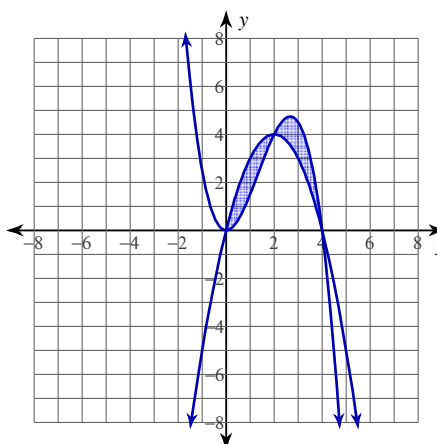
$\quad y = -2$

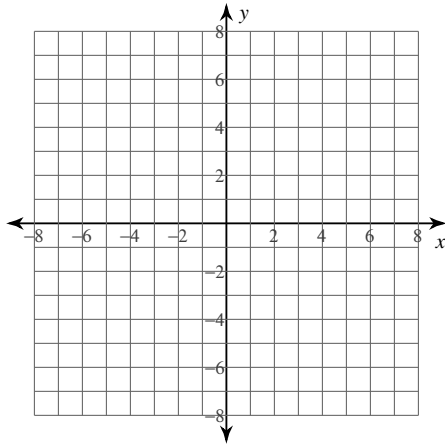3) $y = \dfrac{x^2}{2} - 3x - \dfrac{1}{2}$

$\quad y = 3$

4) $y = -\dfrac{x^3}{2} + 2x^2$
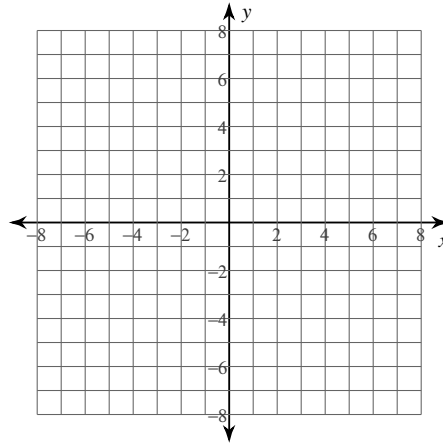
$\quad y = -x^2 + 4x$

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.
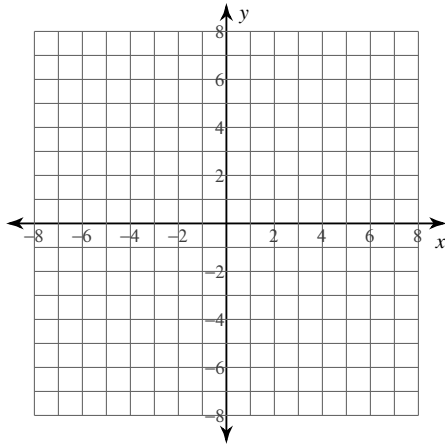
5) $y = -2x^2 - 1$
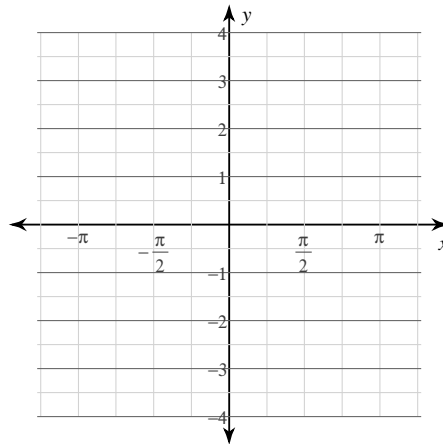 $y = -x + 3$
   $x = 0$
   $x = 1$

6) $y = 2\sqrt[3]{x^2}$
   $y = x$

7) $y = -x^3 + 6x$
   $y = -x^2$

8) $y = -2 \cdot \sec^2 x$
   $y = 2\cos x$
   $x = 0$
   $x = \dfrac{\pi}{4}$

Name_____
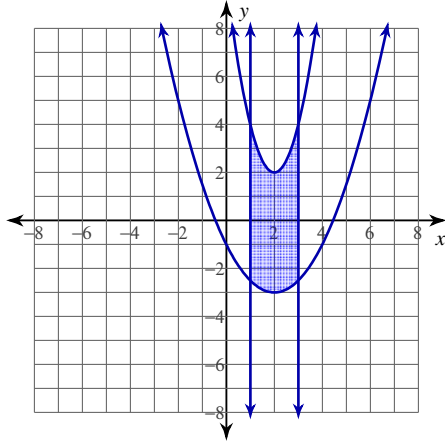
Area Between Curves

Date_____ Period_____

For each problem, find the area of the region enclosed by the curves.

1) $y = 2x^2 - 8x + 10$

$y = \dfrac{x^2}{2} - 2x - 1$

$x = 1$

$x = 3$

$$\int_{1}^{3} \left(2x^2 - 8x + 10 - \left(\dfrac{x^2}{2} - 2x - 1 \right) \right) dx$$
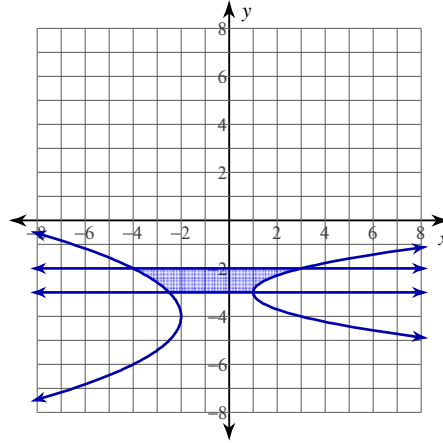
$$= 11$$

2) $x = 2y^2 + 12y + 19$

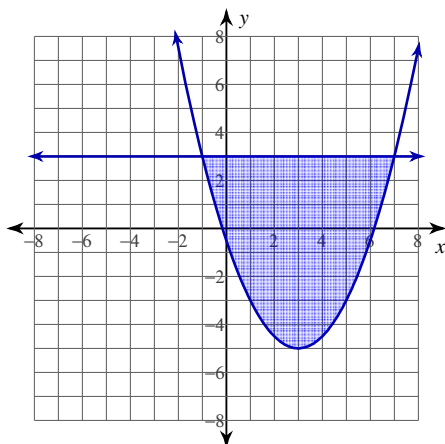$x = -\dfrac{y^2}{2} - 4y - 10$

$y = -3$

$y = -2$

$$\int_{-3}^{-2} \left(2y^2 + 12y + 19 - \left(-\dfrac{y^2}{2} - 4y - 10 \right) \right) dy$$

$$= \dfrac{29}{6} \approx 4.833$$

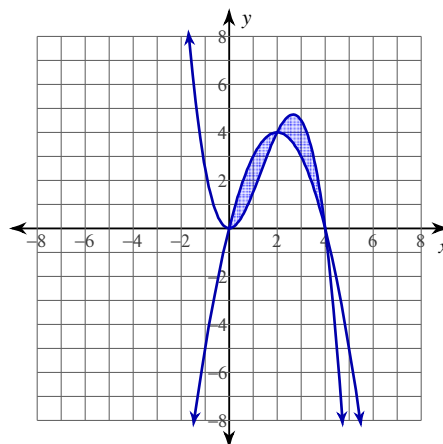3) $y = \dfrac{x^2}{2} - 3x - \dfrac{1}{2}$

$y = 3$

$$\int_{-1}^{7} \left(3 - \left(\dfrac{x^2}{2} - 3x - \dfrac{1}{2} \right) \right) dx$$

$$= \dfrac{128}{3} \approx 42.667$$

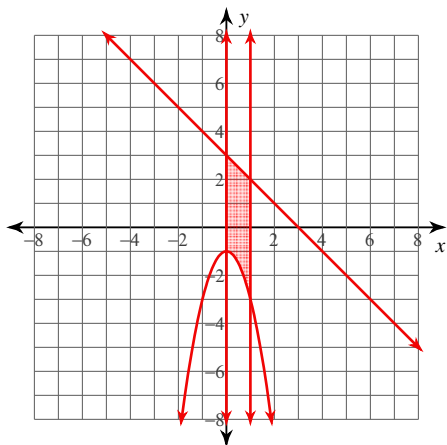4) $y = -\dfrac{x^3}{2} + 2x^2$

$y = -x^2 + 4x$

$$\int_{0}^{2} \left(-x^2 + 4x - \left(-\dfrac{x^3}{2} + 2x^2 \right) \right) dx +$$

$$\int_{2}^{4} \left(-\dfrac{x^3}{2} + 2x^2 - (-x^2 + 4x) \right) dx$$

$$= 4$$

-1-

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.
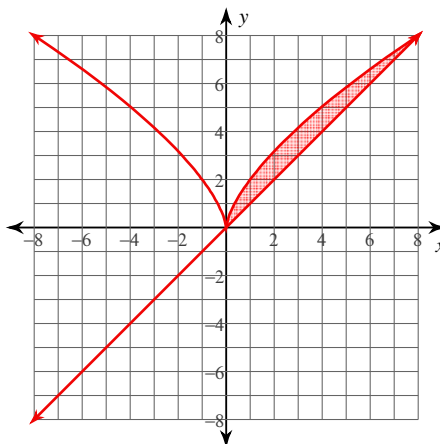
5) $y = -2x^2 - 1$
   $y = -x + 3$
   $x = 0$
   $x = 1$

$$\int_0^1 \left(-x + 3 - (-2x^2 - 1) \right) dx$$
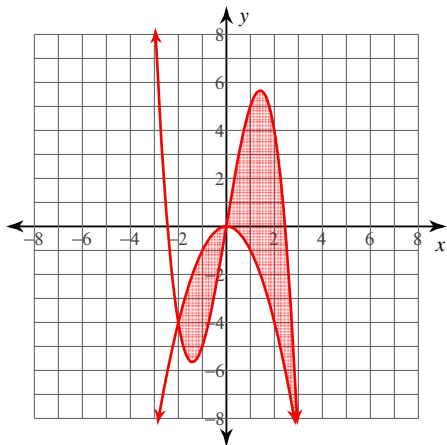
$$= \frac{25}{6} \approx 4.167$$

6) $y = 2\sqrt[3]{x^2}$
   $y = x$

$$\int_0^8 \left(2\sqrt[3]{x^2} - x \right) dx$$
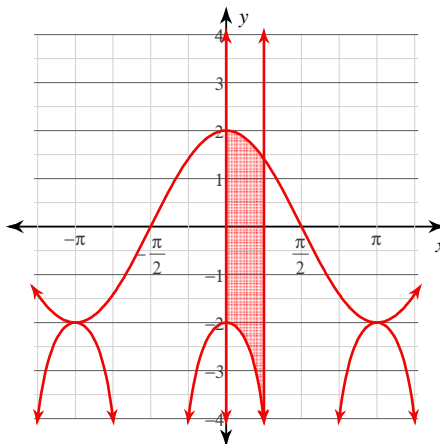
$$= \frac{32}{5} = 6.4$$

7) $y = -x^3 + 6x$
   $y = -x^2$

$$\int_{-2}^0 \left(-x^2 - (-x^3 + 6x) \right) dx +$$

$$\int_0^3 \left(-x^3 + 6x + x^2 \right) dx$$

$$= \frac{253}{12} \approx 21.083$$

8) $y = -2 \cdot \sec^2 x$
   $y = 2\cos x$
   $x = 0$
   $x = \dfrac{\pi}{4}$

$$\int_0^{\frac{\pi}{4}} \left(2\cos x + 2 \cdot \sec^2 x \right) dx$$

$$= 2 + \sqrt{2} \approx 3.414$$

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