

## Area between two curves

Date \_\_\_\_\_ Period \_\_\_\_\_

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

1)  $y = -x^2 - 2x + 3, y = x + 3$

2)  $y = -\frac{x^2}{2} - 1, y = \frac{x^2}{2} + x - \frac{1}{2},$   
 $x = -3, x = 0$

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

4)  $y = 2\sqrt{x}, y = \frac{x^2}{4}$

5)  $y = x^2 - 1, y = -x^2 + 4x - 1$

6)  $x = 2y^2 - 16y + 26, x = -2y^2 + 8y - 6$

7)  $x = -2 \cdot \csc^2 y, x = 2 \cdot \csc^2 y,$   
 $y = -\frac{\pi}{2}, y = -\frac{\pi}{4}$

8)  $x = 2\sqrt{y}, x = \frac{y^2}{4}$

$$9) \quad x = 2y^2 + 2, \quad x = \frac{y^2}{2} - 3,$$
$$y = -1, \quad y = 1$$

$$10) \quad x = 3\sqrt{y}, \quad x = -3\sqrt{y},$$
$$y = 0, \quad y = 4$$

## Answers to Area between two curves (ID: 1)

$$1) \int_{-3}^0 (-x^2 - 2x + 3 - (x + 3)) dx \quad 2) \int_{-3}^0 \left( \frac{x^2}{2} + x - \frac{1}{2} - \left( -\frac{x^2}{2} - 1 \right) \right) dx$$

$$= \frac{9}{2} = 4.5 \quad = 6$$

$$3) \int_0^8 (2\sqrt[3]{x^2} - x) dx \quad 4) \int_0^4 \left( 2\sqrt{x} - \frac{x^2}{4} \right) dx \quad 5) \int_0^2 (-x^2 + 4x - 1 - (x^2 - 1)) dx$$

$$= \frac{32}{5} = 6.4 \quad = \frac{16}{3} \approx 5.333 \quad = \frac{8}{3} \approx 2.667$$

$$6) \int_2^4 (-2y^2 + 8y - 6 - (2y^2 - 16y + 26)) dy \quad 7) \int_{-\frac{\pi}{2}}^{-\frac{\pi}{4}} (2 \cdot \csc^2 y + 2 \cdot \csc^2 y) dy$$

$$= \frac{16}{3} \approx 5.333 \quad = 4$$

$$8) \int_0^4 \left( 2\sqrt{y} - \frac{y^2}{4} \right) dy \quad 9) \int_{-1}^1 \left( 2y^2 + 2 - \left( \frac{y^2}{2} - 3 \right) \right) dy \quad 10) \int_0^4 (3\sqrt{y} + 3\sqrt{y}) dy$$

$$= \frac{16}{3} \approx 5.333 \quad = 11 \quad = 32$$