

Assignment: Area between the curve

Date _____

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

1) $y = x^2 - 4x + 3$, $y = -x^2 + 2x + 3$,
 $x = 1$, $x = 4$

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

3) $y = -x^2 + 5$, $y = -\frac{x^2}{2} + 4x - 5$,
 $x = 0$, $x = 3$

4) $y = \frac{x^2}{2} - 2x - 4$, $y = 2$,
 $x = -3$, $x = 2$

5) $y = -x^3 + 6x$, $y = -x^2$

6) $y = x^3 + x^2 - 4x$, $y = 2x$

$$7) y = x^3 - 7x^2 + 11x, y = x^2 - 4x$$

$$8) y = \frac{x^3}{2} + \frac{x^2}{2} - 2x, y = \frac{x^2}{2}$$

$$9) y = 2\sin x, y = 2\cos x, \\ x = -\frac{\pi}{4}, x = \frac{\pi}{4}$$

$$10) y = -\csc x \cot x, y = -2\csc^2 x, \\ x = \frac{\pi}{3}, x = \frac{3\pi}{4}$$

$$11) y = -\sec^2 x, y = 2\sec^2 x, \\ x = -\frac{\pi}{4}, x = 0$$

$$12) y = 2\csc^2 x, y = 2\sin x, \\ x = -\frac{\pi}{2}, x = -\frac{\pi}{4}$$

$$13) y = -2\sqrt{x}, y = \sqrt{x}, \\ x = 0, x = 4$$

$$14) y = \frac{2}{x^2}, y = -3, \\ x = 2, x = 3$$

Answers to Assignment: Area between the curve

$$1) \int_1^3 (-x^2 + 2x + 3 - (x^2 - 4x + 3)) dx + \int_3^4 (x^2 - 4x + 3 - (-x^2 + 2x + 3)) dx = \frac{31}{3} \approx 10.333$$

$$2) \int_{-2}^1 \left(-2x + 2 - \left(\frac{x^2}{2} + x - \frac{3}{2} \right) \right) dx + \int_1^3 \left(\frac{x^2}{2} + x - \frac{3}{2} - (-2x + 2) \right) dx = \frac{137}{6} \approx 22.833$$

$$3) \int_0^2 \left(-x^2 + 5 - \left(-\frac{x^2}{2} + 4x - 5 \right) \right) dx + \int_2^3 \left(-\frac{x^2}{2} + 4x - 5 - (-x^2 + 5) \right) dx = \frac{83}{6} \approx 13.833$$

$$4) \int_{-3}^{-2} \left(\frac{x^2}{2} - 2x - 6 \right) dx + \int_{-2}^2 \left(2 - \left(\frac{x^2}{2} - 2x - 4 \right) \right) dx = \frac{47}{2} = 23.5$$

$$5) \int_{-2}^0 (-x^2 - (-x^3 + 6x)) dx + \int_0^3 (-x^3 + 6x + x^2) dx = \frac{253}{12} \approx 21.083$$

$$6) \int_{-3}^0 (x^3 + x^2 - 6x) dx + \int_0^2 (2x - (x^3 + x^2 - 4x)) dx = \frac{253}{12} \approx 21.083$$

$$7) \int_0^3 (x^3 - 7x^2 + 11x - (x^2 - 4x)) dx + \int_3^5 (x^2 - 4x - (x^3 - 7x^2 + 11x)) dx = \frac{253}{12} \approx 21.083$$

$$8) \int_{-2}^0 \left(\frac{x^3}{2} + \frac{x^2}{2} - 2x - \frac{x^2}{2} \right) dx + \int_0^2 \left(\frac{x^2}{2} - \left(\frac{x^3}{2} + \frac{x^2}{2} - 2x \right) \right) dx = 4$$

$$9) \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} (2\cos x - 2\sin x) dx = 2\sqrt{2} \approx 2.828$$

$$10) \int_{\frac{\pi}{3}}^{\frac{3\pi}{4}} (-\csc x \cot x + 2\csc^2 x) dx = \sqrt{2} + 2 \approx 3.414$$

$$11) \int_{-\frac{\pi}{4}}^0 (2\sec^2 x + \sec^2 x) dx = 3$$

$$12) \int_{-\frac{\pi}{2}}^{-\frac{\pi}{4}} (2\csc^2 x - 2\sin x) dx = 2 + \sqrt{2} \approx 3.414$$

$$13) \int_0^4 (\sqrt{x} + 2\sqrt{x}) dx = 16$$

$$14) \int_2^3 \left(\frac{2}{x^2} + 3 \right) dx = \frac{10}{3} \approx 3.333$$