

Study Guide: 6.1

Find the area between $y = x^2 + 3x - 9$ and $y = 2x - 7$.

Where do they intersect? $x^2 + 3x - 9 = 2x - 7$ $x^2 + x - 2 = 0$

$$(x+2)(x-1) = 0 \quad x = -2, 1$$

Which is the upper curve? $0^2 + 3(0) - 9 = -9$ $2 \cdot 0 - 7 = -7$

Straight line is upper curve

$$\int_{-2}^1 (2x - 7) - (x^2 + 3x - 9) dx = 4.5$$

-2

Find the area of the region enclosed by $x = 12 - y$, $x = y$ and $x = 2y$.

Where do $x = 12 - y$ and $x = y$ intersect?

$$12 - y = y \quad y = 6$$

Where do $x = 12 - y$ and $x = 2y$ intersect?

$$12 - y = 2y \quad y = 4$$

Integrating along the y-axis:

$$\int_0^4 (2y - y) dy + \int_4^6 (12 - y - y) dy$$

$$\int_0^4 y dy + \int_4^6 (12 - 2y) dy = 12$$