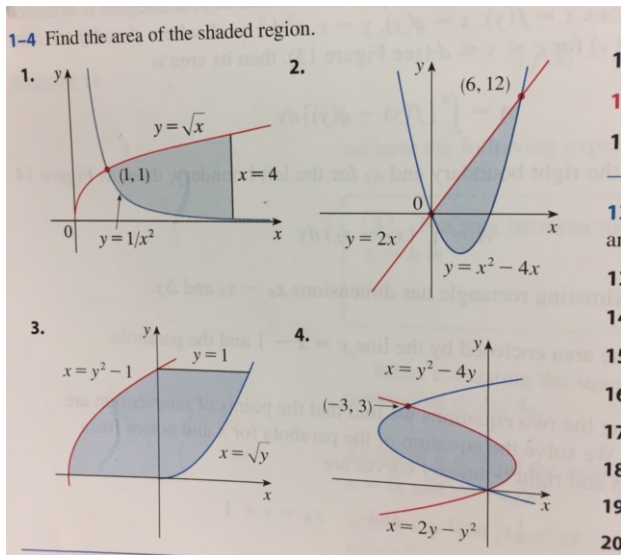


Directions: Show all work on a separate sheet of paper for full credit.

1. Find the area of the shaded regions.



1  $47/12$

2  $36$

3  $4/3$

4  $9$

2. Sketch the region enclosed the the given curves and find its area.

(a)  $y = 12 - x^2$  and  $y = x^2 - 6$

$$\int_{-3}^3 (18 - x^2) - (x^2 - 6) dx = 72$$

(b)  $y = \sqrt{x-1}$ ,  $x - y = 1$

$$\int_1^2 \sqrt{x-1} - (x-1) dx = 1/6$$

(c)  $y = \cos(x)$  and  $y = 2 - \cos(x)$  for  $0 \leq x \leq 2\pi$

$$\int_0^{2\pi} 2 - 2\cos(x) dx = 4\pi$$

(d)  $x = y^2 - 1$ ,  $x = \sqrt{y}$ ,  $y = 0$ , and  $y = 1$

$$\int_0^1 \sqrt{y} - (y^2 - 1) dy = 4/3$$

(e)  $y = x^4$  and  $y = 2 - |x|$

$$\int_{-1}^0 (2+x) - x^4 dx + \int_0^1 (2-x) - x^4 dx = 13/5$$

3. Find the area of the triangle with the given vertices:  $(0,0)$ ,  $(3,1)$ , and  $(1,2)$ .

$$\int_0^1 (2x - x/3) dx + \int_1^3 (-x/2 + 5/2) - x/3 dx = 5/2$$