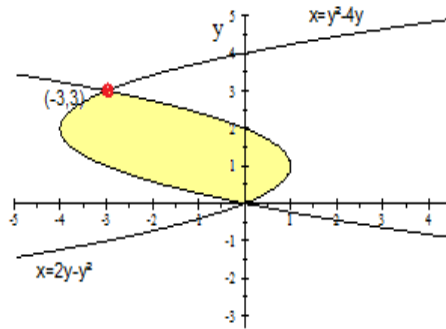


MATH-119

WEEK 8

RECITATION QUESTIONS

- Find the area of the shaded region



- Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y . Draw a typical approximating rectangle and label its height and width. Then find the area of the region.

a) $x = 2y^2$, $x + y = 1$

b) $x = 1 - y^2$, $x = y^2 - 1$

- Use calculus to find the area of the triangle with the given vertices.

$$(0, 0), \quad (2, 1), \quad (-1, 6)$$

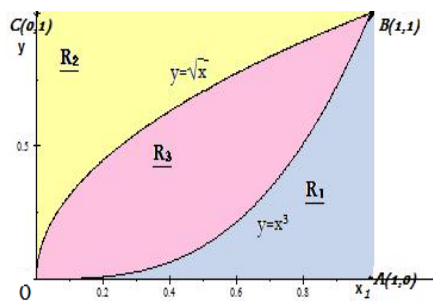
- Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region, the solid, and a typical disk or washer.

a) $y = x^2$, $y^2 = x$; about the x -axis

b) $y^2 = x$, $x = 2y$; about the y -axis

c) $y = x$, $y = \sqrt{x}$; about $y = 1$

- Refer to the figure and find the volume generated by rotating the given region about the specified line.



a) R_1 about AB

b) R_2 about OC

6. Find the volume common to two spheres, each with radius r , if the centre of each sphere lies on the surface of the other sphere.

7. Use the method of cylindrical shells to find the volume of the solid obtained by rotating the region bounded by the given curves about the x -axis. Sketch the region and a typical shell.

$$y = 4x^2, \quad 2x + y = 6$$

8. Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the given curves about the specified axis. Sketch the region and a typical shell.

$$y = x^2, y = 0, x = 1, x = 2; \text{ about } x = 4$$

9. Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis.

$$x = \sqrt{\sin y}, 0 \leq y \leq \pi, x = 0; \text{ about } y = 4$$

10. The region bounded by the given curves is rotated about the specified axis. Find the volume of the resulting solid by any method.

$$x^2 + (y - 1)^2 = 1; \text{ about the } y\text{-axis}$$

11. Find the average value of the function on the given interval.

$$h(x) = \cos^4 x \sin x, [0, \pi]$$

12. a) Find the average value of f on the given interval.

b) Find c such that $f_{ave} = f(c)$

c) Sketch the graph of f and a rectangle whose area is the same as the area under the graph of f .

i) $f(x) = (x - 3)^2, [2, 5]$

ii) $f(x) = \sqrt{x}, [0, 4]$

13. (for review) Find the area of the region bounded by the given curves

$$y = 20 - x^2, y = x^2 - 12$$

14. (for review) Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis.

$$y = x^3, y = 8, x = 0; \text{ about } x = 2$$

15. (for review) Following integral represent the volume of a solid. Describe the solid.

$$\int_0^2 2\pi y(4 - y^2) dy$$