M251 Practice Exam Questions Larson 8th Ed Sections 7.1-7.3

1. Find the area of the region bounded by the equations by integrating (i) with respect to x and (ii) with respect to y.

$$x = 81 - y^2$$
$$x = y - 9$$

2. Find the area of the region bounded by equations by integrating (i) with respect to x and (ii) with respect to y.

$$y = x^2$$
$$y = 90 - x$$

3. Find the area of the region bounded by the graphs of the algebraic functions.

$$f(x) = x^2 - 4x$$
$$g(x) = 0$$

4. Find the area of the region bounded by the graphs of the algebraic functions.

$$f(x) = x^2 + 30x + 225$$
$$g(x) = 17(x + 15)$$

5. Find the area of the region bounded by the graphs of the algebraic functions.

$$f(x) = \sqrt[3]{x-12}$$
$$g(x) = x-12$$

6. Find the area of the region bounded by the graphs of the algebraic functions.

$$f(y) = y^2 + 9, \quad g(y) = 0, \quad y = -9, \quad y = 10$$

7. Find the area of the region bounded by the graphs of the equations.

$$f(x) = \frac{12x}{x^2+1}, \quad y = 0, \quad 0 \le x \le 6$$

8. Find the area of the region bounded by the graphs of the equations.

$$f(x) = \sin(x), \quad g(x) = \cos(2x), \quad -\frac{\pi}{2} \le x \le \frac{\pi}{6}$$

9. Find the area of the region bounded by the graphs of the equations.

$$f(x) = xe^{-x^2}, \quad y = 0, \quad 0 \le x \le 1$$

10. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region about the x-axis.

$$y = 8, y = 16 - \frac{x^2}{16}$$

11. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region about the y-axis.

$$y = x^4, y = 16 \text{ in the first quadrant}$$

12. Set up and evaluate the integral that gives the volume of the solid formed by revolving the region about the y-axis.

$$y = x^{\frac{10}{11}}, \quad y = 1, \quad x = 0$$

13. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given lines.

$y = x^2, y = 14x - x^2$

(i) x-axis; (ii) the line $y = 51$

14. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given lines.

$x = y^2, x = 14y - y^2$

(i) y-axis; (ii) the line $x = 51$

15. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given lines.

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

(i) x-axis; (ii) the line $y = 2$

16. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 12$.

$y = x, y = 11, x = 0$

17. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 8$.

$$y = \frac{1}{2}x^4, \ y = 8, \ x = 0$$

18. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the line $y = 7$.

$$y = \sin x, \ y = 0, \ 0 \le x \le \frac{\pi}{2}$$

19. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the x-axis.

$$y = \frac{1}{\sqrt{x+13}}, \ y = 0, \ x = 0, \ x = 10$$

20. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the x-axis.

$$y = \frac{1}{x}, \ y = 0, \ x = 6, \ x = 7$$

21. Find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the x-axis. Verify your results using the integration capabilities of a graphing utility.

$y = \sin(x), \ y = 0, \ x = 0, \ x = \dfrac{\pi}{3}$

22. Use the shell method to set up and evaluate the integral that gives the volume of the solid generated by revolving the plane region about the y-axis.

$y = 4x - x^2, \ x = 0, \ y = 4$

23. Use the shell method to set up and evaluate an integral that gives the volume of the solid generated by revolving the plane region about the y-axis.

$y = 9 - x^2, \ y = 0$

24. Use the shell method to set up and evaluate the integral that gives the volume of the solid generated by revolving the plane region about the x-axis.

$y = 8 - x, \ y = 0, \ x = 0$

25. Use the shell method to set up and evaluate the integral that gives the volume of the solid generated by revolving the plane region about the x-axis.

$y = x, \ y = 0, \ x = 4$

26. Use the shell method to set up and evaluate the integral that gives the volume of the solid generated by revolving the plane region about the x-axis.

$y = x^6, \ x = 0, \ y = 64$

27. Use the shell method to find the volume of the solid generated by revolving the plane region about the line $x = 24$.

$y = \sqrt[4]{x}, \ y = 0, \ x = 16$

28. Use the disk *or* shell method to find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given line.

$$y = x^3, \ y = 0, \ x = 2$$

(i) the *x*-axis; (ii) the *y*-axis; (iii) the line $x = 4$

29. Use the disk *or* shell method to find the volume of the solid generated by revolving the region bounded by the graphs of the equations about the given line.

$$y = \frac{16}{x^2}, \ y = 0, \ x = 1, \ x = 8$$

(i) the *x*-axis; (ii) the *y*-axis; (iii) the line $y = 16$

30. Use the disk *or* shell method to find the volume of the solid generated by revolving the region bounded by the graph of the equation about the given line.

$$x^{\frac{2}{3}} + y^{\frac{2}{3}} = 12^{\frac{2}{3}}$$

(i) the *x*-axis; (ii) the *y*-axis