REVIEW EXERCISES FOR CHAPTER 6

6.1 ***Area*** **In Exercises 1–10, sketch the region bounded by the graphs of the equations, and determine the area of the region.**

1. $y = \frac{1}{x^2}$, $y = 0$, $x = 1$, $x = 5$
2. $y = \frac{1}{x^2}$, $y = 4$, $x = 5$
3. $y = \frac{1}{x^2 + 1}$, $y = 0$, $x = -1$, $x = 1$
4. $x = y^2 - 2y$, $x = -1$, $y = 0$
5. $y = x$, $y = x^3$
6. $x = y^2 + 1$, $x = y + 3$
7. $y = e^x$, $y = e^2$, $x = 0$
8. $y = \csc x$, $y = 2$ (one region)
9. $y = \sin x$, $y = \cos x$, $\frac{\pi}{4} \le x \le \frac{5\pi}{4}$
10. $x = \cos y$, $x = \frac{1}{2}$, $\frac{\pi}{3} \le y \le \frac{7\pi}{3}$

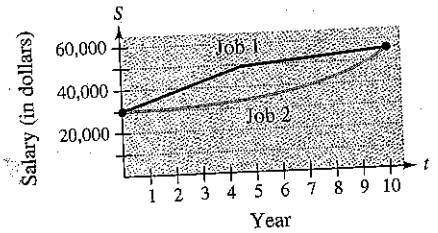
In Exercises 11–14, use a graphing utility to graph the region bounded by the graphs of the functions, and use the integration capabilities of the graphing utility to find the area of the region.

11. $y = x^2 - 8x + 3$, $y = 3 + 8x - x^2$
12. $y = x^2 - 4x + 3$, $y = x^3$, $x = 0$
13. $\sqrt{x} + \sqrt{y} = 1$, $y = 0$, $x = 0$
14. $y = x^4 - 2x^2$, $y = 2x^2$

In Exercises 15–18, use vertical and horizontal representative rectangles to set up integrals for finding the area of the region bounded by the graphs of the equations. Find the area of the region by evaluating the easier of the two integrals.

15. $x = y^2 - 2y$, $x = 0$
16. $y = \sqrt{x - 1}$, $y = \frac{x - 1}{2}$
17. $y = 1 - \frac{x}{2}$, $y = x - 2$, $y = 1$
18. $y = \sqrt{x - 1}$, $y = 2$, $y = 0$, $x = 0$

19. ***Think About It*** A person has two job offers. The starting salary for each is \$30,000, and after 10 years of service each will pay \$56,000. The salary increases for each offer are shown in the figure. From a strictly monetary viewpoint, which is the better offer? Explain.



20. ***Modeling Data*** The table shows the annual service revenue R_1 in billions of dollars for the cellular telephone industry for the years 1992 through 1998. *(Source: Cellular Telecommunications Industry Association)*

Year	1992	1993	1994	1995	1996	1997	1998
R_1	7.8	10.9	14.2	19.1	23.6	27.5	33.1

(a) Use the regression capabilities of a graphing utility to fit an exponential model to the data. Let t be time in years, with $t = 2$ corresponding to 1992. Use the graphing utility to plot the data and graph the model.

(b) A financial consultant believes that a model for service revenue for the years 2000 through 2005 is

$$R_2 = 10 + 5.28e^{0.2t}.$$

What is the difference in total service revenue between the two models for the years 2000 through 2005?

6.2, 6.3 In Exercises 21–28, find the volume of the solid generated by revolving the plane region bounded by the equations about the indicated lines.

21. $y = x$, $y = 0$, $x = 4$
    (a) the x-axis (b) the y-axis
    (c) the line $x = 4$ (d) the line $x = 6$
22. $y = \sqrt{x}$, $y = 2$, $x = 0$
    (a) the x-axis (b) the line $y = 2$
    (c) the y-axis (d) the line $x = -1$
23. $\frac{x^2}{16} + \frac{y^2}{9} = 1$ (a) the y-axis (oblate spheroid) (b) the x-axis (prolate spheroid)
24. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (a) the y-axis (oblate spheroid) (b) the x-axis (prolate spheroid)
25. $y = \frac{1}{x^4 + 1}$, $y = 0$, $x = 0$, $x = 1$
    revolved about the y-axis
26. $y = \frac{1}{\sqrt{1 + x^2}}$, $y = 0$, $x = -1$, $x = 1$
    revolved about the x-axis
27. $y = 1/(1 + \sqrt{x - 2})$, $y = 0$, $x = 2$, $x = 6$
    revolved about the y-axis
28. $y = e^{-x}$, $y = 0$, $x = 0$, $x = 1$
    revolved about the x-axis

In Exercises 29 and 30, consider the region bounded by the graphs of the equations $y = x\sqrt{x + 1}$ and $y = 0$.

29. ***Area*** Find the area of the region.
30. ***Volume*** Find the volume of the solid generated by revolving the region about (a) the x-axis and (b) the y-axis.