6.4

1. Evaluate $\int_0^2 (4v + 3) (3v - 2) \, dv$.

2. Evaluate $\int_1^e \frac{x^2 - 9x - 9}{x} \, dx$.

3. Compute $\int x^2 + 3 + \frac{6}{x^2 + 1} \, dx$.

6.5

4. Evaluate $\int 2x (x^2 + 1)^9 \, dx$.

5. Evaluate $\int \sin (3\pi t) \, dt$.

6. Evaluate $\int \frac{e^x}{e^x + 6} \, dx$.

7. Evaluate $\int \frac{3 + x}{1 + x^2} \, dx$.

8. Evaluate $\int e^{49} \frac{dx}{x\sqrt{\ln x}}$.

9. If $f$ is continuous and $\int_0^8 f (x) \, dx = 6$, find $\int_0^9 xf(x^2) \, dx$ by hand.

10. Evaluate $\int \sqrt{x} \sin (6 + x^{3/2}) \, dx$.

11. Evaluate $\int_0^1 x^2 (1 + 2x^3)^5 \, dx$.

12. Evaluate $\int_0^9 xe^{-x^2} \, dx$.

7.1

13. Find the area of the region enclosed by the curves $y = 7x$ and $y = 7x^2$.

14. Find the area of the region enclosed by the curves $x = 1 - y^2$ and $x = y^2 - 1$.

15. Find the area of the region enclosed by the curves $y = 3 \sin x$, $y = 3 \sin 2x$, $x = 0$, and $x = \pi/2$.

16. Find the area of the region enclosed by the curves $y = x^2$ and $y = \frac{162}{x^2 + 9}$.

17. Evaluate the integral $\int_{-1}^1 |5x^3 - 5x| \, dx$.

18. Find the area of the region enclosed by the curve $y = 2x^2$, the tangent line to this parabola at (3, 18), and the x-axis.

19. Find the area of the region bounded by $y = x + 6$, $y = 19 - x^2$, $x = -1$, and $x = 2$. 
20. Find the volume of the solid obtained by rotating the region bounded by the following curves about the \( x \)-axis.
\[ y = \sqrt{x - 3} \quad x = 5 \quad x = 8 \quad y = 0 \]

21. Find the volume of the solid obtained by rotating the region bounded by the following curves about the \( y \)-axis.
\[ y = 7x^2 \quad x = 0 \quad x = 2 \quad y = 28 \]

22. Find the volume of the solid obtained by rotating the region bounded by the following curves about the \( x \)-axis.
\[ y = \frac{1}{2}x^2 \quad y = \sqrt{2x} \]

23. Find the volume of the solid obtained by rotating the region bounded by the following curves about the line \( y = 4 \).
\[ y = x^2 \quad y = 4 \]

24. Find the volume of the solid obtained by rotating the region bounded by the following curves about the \( x \)-axis.
\[ y = e^x \quad y = 0 \quad x = 0 \quad x = 5 \]

25. Find the volume of the solid \( S \) whose base in the \( xy \)-plane is \( \{ (x, y) : 3x^2 \leq y \leq 27 \} \). Cross-sections perpendicular to the \( y \)-axis are equilateral triangles.

26. Use the method of cylindrical shells to find the volume of the region obtained by rotating the region bounded by the following curves about the \( y \)-axis.
\[ y = \frac{1}{x} \quad y = 0 \quad x = 3 \quad x = 4 \]

27. Use the method of cylindrical shells to find the volume of the region obtained by rotating the region bounded by the following curves about the \( x \)-axis.
\[ x = 1 + y^2 \quad x = 0 \quad y = 1 \quad y = 4 \]

28. Use the method of cylindrical shells to find the volume of the region obtained by rotating the region bounded by the following curves about the line \( y = 5 \).
\[ y = \sqrt{x - 1} \quad y = 0 \quad x = 5 \]

29. The region bounded by the curve \( y = x^2 - 7x + 12 \) and the \( x \)-axis is rotated about the \( y \)-axis. Find the volume of the resulting solid by the method of your choice.