SKILLS WARM P 5.2

The following warm-up exercises involve skills that were covered in earlier sections. You will use these skills in the exercise set for this section. For additional help, review Section 5.1.

In Exercises 1–9, find the indefinite integral.

1. $\int (2x^3 + 1)\,dx$
2. $\int (x^{1/2} + 3x - 4)\,dx$
3. $\int \frac{1}{x^5}\,dx$
4. $\int \frac{1}{8x^2}\,dx$
5. $\int (1 + 2t)t^{3/2}\,dt$
6. $\int \sqrt{x}(2x - 1)\,dx$
7. $\int \frac{5x^3 + 2}{x^2}\,dx$
8. $\int \frac{2x^2 - 5}{x^4}\,dx$
9. $\int \frac{8x^2 + 3}{\sqrt{x}}\,dx$

Exercises 5.2

See *CalcChat.com* for tutorial help and worked-out solutions to odd-numbered exercises.

Finding u and du/dx In Exercises 1–8, identify u and du/dx for the integral $\int u^n(du/dx)\,dx$.

1. $\int (5x^2 + 1)^2(10x)\,dx$
2. $\int (3 - 4x^2)^3(-8x)\,dx$
3. $\int \sqrt{1 - x^2}(-2x)\,dx$
4. $\int 3x^2\sqrt{x^3 + 1}\,dx$
5. $\int \left(4 + \frac{1}{x^2}\right)^5\left(\frac{-2}{x^3}\right)dx$
6. $\int \frac{1}{(1 + 2x)^2}(2)\,dx$
7. $\int (1 + \sqrt{x})^3\left(\frac{1}{2\sqrt{x}}\right)dx$
8. $\int (4 - \sqrt{x})^2\left(\frac{-1}{2\sqrt{x}}\right)dx$

Applying the General Power Rule In Exercises 9–34, find the indefinite integral. Check your result by differentiating. *See Examples 1, 2, 3, and 5.*

9. $\int (x - 1)^4\,dx$
10. $\int (x - 3)^{5/2}\,dx$
11. $\int (7 - 2x)^2(-2)\,dx$
12. $\int (x^2 - 1)^3(2x)\,dx$
13. $\int (x^2 + 3x)(2x + 3)\,dx$
14. $\int (x^4 + 3x^2)(4x^3 + 6x)\,dx$
15. $\int \sqrt{4x^2 - 5}(8x)\,dx$
16. $\int \sqrt[3]{1 - 2x^2}(-4x)\,dx$
17. $\int \frac{6x}{(3x^2 - 5)^4}\,dx$
18. $\int \frac{-12x^2}{(1 - 4x^3)^2}\,dx$
19. $\int x^2(2x^3 - 1)^4\,dx$
20. $\int x(7 - 6x^2)^5\,dx$
21. $\int t\sqrt{t^2 + 6}\,dt$
22. $\int t^4\sqrt[3]{t^5 - 9}\,dt$
23. $\int \frac{x^4}{(3 - 2x^5)^3}\,dx$
24. $\int \frac{x^2}{(3x^3 + 8)^2}\,dx$
25. $\int (x^2 - 6x)^4(x - 3)\,dx$
26. $\int (4x^3 + 8x)^3(3x^2 + 2)\,dx$
27. $\int \frac{x^2 + 3}{(x^3 + 9x - 4)^2}\,dx$
28. $\int \frac{x - 2}{\sqrt{x^2 - 4x + 3}}\,dx$
29. $\int 5x\sqrt[3]{1 - x^2}\,dx$
30. $\int 9x^3\sqrt{x^4 + 2}\,dx$
31. $\int \frac{6x}{(1 + x^2)^3}\,dx$
32. $\int \frac{4x + 6}{(x^2 + 3x + 7)^3}\,dx$
33. $\int \frac{-3}{\sqrt{2t + 3}}\,dt$
34. $\int \frac{3x^2}{\sqrt{1 - x^3}}\,dx$

Integration by Substitution In Exercises 35–42, use the method of substitution to find the indefinite integral. Check your result by differentiating. *See Examples 6 and 7.*

35. $\int \sqrt[3]{4x + 3}\,dx$
36. $\int (5x - 3)^{2/3}\,dx$
37. $\int x(6x^2 - 7)^3\,dx$
38. $\int t\sqrt{t^2 + 1}\,dt$
39. $\int \frac{2}{\sqrt{7x - 1}}\,dx$
40. $\int \frac{3}{\sqrt{2x + 1}}\,dx$
41. $\int \frac{x^2 + 1}{\sqrt{x^3 + 3x + 4}}\,dx$
42. $\int \frac{x^2 + 3}{\sqrt[3]{x^3 + 9x}}\,dx$

Comparing Methods In Exercises 43–46, (a) perform the integration in two ways: once using the Simple Power Rule and once using the General Power Rule. (b) Explain the difference in the results. (c) Which method do you prefer? Explain your reasoning.

43. $\int (x - 1)^2\,dx$
44. $\int (3 - x)^2\,dx$
45. $\int x(x^2 + 2)^2\,dx$
46. $\int x(2x^2 + 1)^2\,dx$