Calculus Honors

In exercises 1 through 30, evaluate each indefinite integral. (See Examples 3 through 10.)

1. $\int 5\,dx$
2. $\int 2\,dx$
3. $\int 4x^3\,dx$
4. $\int 3x^2\,dx$
5. $\int 4x^5\,dx$
6. $\int 6y^4\,dy$
7. $\int (3x^2 - 2x + 5)\,dx$
8. $\int (4t^3 - 3t^2 + 1)\,dt$
9. $\int (6y^5 - 30y^2 + 7y - 4)\,dy$
10. $\int (5x^5 - 20x^4 + 6x^2 - 2x + 5)\,dx$
11. $\int (3x^6 - 4x + 7)\,dx$
12. $\int (x^3 - x^2 + x - 1)\,dx$
13. $\int \frac{1}{x}\,dx$
14. $\int \frac{2}{x}\,dx$
15. $\int \left(5 - \frac{3}{x}\right)dx$
16. $\int \left(\frac{1}{x} - \frac{1}{\sqrt{x}}\right)dx$
17. $\int \frac{20x^3 - 6x + 1}{4}\,dx$
18. $\int \frac{3x^4 + x^2 - 5}{x^2}\,dx$
19. $\int \left(\frac{30}{x^3} - \frac{2}{x^2} - \frac{1}{x}\right)dx$
20. $\int -6e^x\,dx$
21. $\int (x - e^x)\,dx$
22. $\int \sqrt[3]{x}\,dx$
23. $\int (\sqrt[3]{x} - 4\sqrt{x})\,dx$
24. $\int \frac{1}{\sqrt{x^3}}\,dx$
25. $\int \frac{20}{\sqrt[4]{x^3}}\,dx$
26. $\int \frac{5 - x}{\sqrt{x}}\,dx$
27. $\int \frac{x}{\sqrt[3]{x^2}}\,dx$
    (*Hint*: Use the law of exponents to rewrite.)
28. $\int \frac{1 - \sqrt{x}}{x}\,dx$
29. $\int (2x + 1)^2\,dx$
    (*Hint*: Expand first.)
30. $\int 3(2 - x)^2\,dx$

In exercises 31 through 35, find the specific antiderivative, $f(x)$, of the given function with initial condition. (See Example 11.)

31. $f'(x) = 3x^2 - 6x + 1, \quad f(0) = -10$
32. $f'(x) = 3x^2 - 6x + 1, \quad f(2) = 15$
33. $f'(x) = 8x^3 - x^2 + x, \quad f(0) = 10$
34. $f'(x) = 8x^3 - x^2 + x, \quad f(-1) = 0$
35. $f'(x) = \frac{3}{x} - 5, \quad f(1) = 0$