1. One process undoes what the other one does. The precise version of this statement is given by the Fundamental Theorem of Calculus. See the statement of this theorem and the paragraph that follows it on page 393.

19. $\int_{-1}^{2} (x^3 - 2x)\, dx = \left[\frac{x^4}{4} - x^2\right]_{-1}^{2} = \left(\frac{2^4}{4} - 2^2\right) - \left(\frac{(-1)^4}{4} - (-1)^2\right) = (4-4) - \left(\frac{1}{4} - 1\right) = 0 - \left(-\frac{3}{4}\right) = \frac{3}{4}$

22. $\int_0^1 \left(1 + \frac{1}{2}u^4 - \frac{2}{5}u^9\right) du = \left[u + \frac{1}{10}u^5 - \frac{1}{25}u^{10}\right]_0^1 = \left(1 + \frac{1}{10} - \frac{1}{25}\right) - 0 = \frac{53}{50}$

26. $\int_{-5}^{5} e\, dx = \left[ex\right]_{-5}^{5} = 5e - (-5e) = 10e$

35. $\int_1^2 \frac{v^3 + 3v^6}{v^4} = \int_1^2 \left(\frac{1}{v} + 3v^2\right) dv = \left[\ln|v| + v^3\right]_1^2 = (\ln 2 + 8) - (\ln 1 + 1) = \ln 2 + 7$

41. $\int_{-1}^{1} e^{u+1}\, du = \left[e^{u+1}\right]_{-1}^{1} = e^2 - e^0 = e^2 - 1$ [or start with $e^{u+1} = e^u e^1$]

46. $f(x) = \frac{4}{x^3}$ is not continuous on the interval $[-1, 2]$, so FTC2 cannot be applied. In fact, f has an infinite discontinuity at $x = 0$, so $\int_{-1}^{2} \frac{4}{x^3}\, dx$ does not exist.

54. $\int_{\pi/6}^{2\pi} \cos x\, dx = \left[\sin x\right]_{\pi/6}^{2\pi} = 0 - \frac{1}{2} = -\frac{1}{2}$