4.1 Antiderivatives and Indefinite Integration

Page 251 #'s 11-23, 69, 72, 73, 74

11) $\int (x+7)\,dx$

$\frac{1}{2}x^2 + 7x + C$

12) $\int (13-x)\,dx$

$13x - \frac{1}{2}x^2 + C$

13) $\int (x^5+1)\,dx$

$\frac{1}{6}x^6 + x + C$

14) $\int (8x^3 - 9x^2 + 4)\,dx$

$2x^4 - 3x^3 + 4x + C$

15) $\int (x^{3/2} + 2x + 1)\,dx$

$\frac{2}{5}x^{5/2} + x^2 + x + C$

16) $\int \left(\sqrt{x} + \frac{1}{2\sqrt{x}}\right)dx$

$\int \left(x^{1/2} + \frac{1}{2}x^{-1/2}\right)dx$

$\frac{2}{3}x^{3/2} + x^{1/2} + C$

17) $\int \sqrt[3]{x^2}\,dx$

$\int x^{2/3}\,dx$

$\frac{3}{5}x^{5/3} + C$

18) $\int \left(\sqrt[4]{x^3} + 1\right)dx$

$\int \left(x^{3/4} + 1\right)dx$

$\frac{4}{7}x^{7/4} + x + C$

19) $\int \frac{1}{x^5}\,dx$

$\int x^{-5}\,dx$

$-\frac{1}{4}x^{-4} + C$

$\frac{-1}{4x^4} + C$

20) $\int \frac{3}{x^7}\,dx$

$3\int x^{-7}\,dx$

$\frac{3}{-6}x^{-6} + C$

$-\frac{1}{2x^6} + C$

21) $\int \frac{x+6}{\sqrt{x}}\,dx$

$\int \left(\sqrt{x} + \frac{6}{\sqrt{x}}\right)dx$

$\int \left(x^{1/2} + 6x^{-1/2}\right)dx$

$\frac{2}{3}x^{3/2} + 12x^{1/2} + C$

22) $\int \frac{x^4 - 3x^2 + 5}{x^4}\,dx$

$\int \left(1 - 3x^{-2} + 5x^{-4}\right)dx$

$x + 3x^{-1} - \frac{5}{3}x^{-3} + C$

$x + \frac{3}{x} - \frac{5}{3x^3} + C$

23) $\int (x+1)(3x-2)\,dx$

$\int (3x^2 + x - 2)\,dx$

$\boxed{x^3 + \frac{1}{2}x^2 - 2x + C}$

69) False, the +C indicates the antiderivative could be an infinite number of solutions.

72) True

73) True

74) False separating the integral can only be done when a + or - separates functions.