

M1B/Schoenbrun Homework-3

Section 5.3 Page 374 (34,40,48,51,55,61,62,65,93)

$$34. \int_4^9 \frac{2 + \sqrt{t}}{t} dt = \int_4^9 2t^{-1} + t^{-1/2} dt = \left[2 \ln t + 2t^{1/2} \right]_4^9 = 2 \ln 9 + 6 - (2 \ln 4 + 4) = 2 \ln \frac{9}{4} + 10$$

$$40. \int_0^{1/2} \frac{1}{\sqrt{1-x^2}} dx = [\arcsin x]_0^{1/2} = \frac{\pi}{6} - 0 = \frac{\pi}{6}$$

$$48. \int_0^1 10e^{2x} dx = \left[5e^{2x} \right]_0^1 = 5e^2 - 5$$

$$51. \int_1^4 \sqrt{x} dx = \frac{2}{3} \left[x^{3/2} \right]_1^4 = \frac{2}{3} (8 - 1) = \frac{14}{3}$$

55.

$$\int_2^4 |x^2 - 25| dx = \int_2^4 x^2 - 25 dx = \left[\frac{x^3}{3} - 25x \right]_2^4 = \left(\frac{64}{3} - 100 \right) - \left(\frac{8}{3} - 50 \right) = \left| \frac{56}{3} - 50 \right| = 50 - \frac{56}{3} = \frac{94}{3}$$

$$61. \frac{d}{dx} \int_3^x (t^2 + t + 1) dt = x^2 + x + 1$$

$$62. \frac{d}{dx} \int_0^x e^t dt = e^x$$

$$65. \frac{d}{dx} \int_x^1 \sqrt{t^4 + 1} dt = \frac{d}{dx} - \int_1^x \sqrt{t^4 + 1} dt = -\sqrt{x^4 + 1}$$

$$93. \int_1^2 \frac{z^4 + 4}{z} dz = \int_1^2 z^3 + \frac{4}{z} dz = \left[\frac{z^4}{4} + 4 \ln z \right]_1^2 = (4 + 4 \ln 2) - \left(\frac{1}{4} + 4 \ln 1 \right) = \frac{15}{4} + 4 \ln 2$$