HOMEWORK 10: SELECTED ANSWERS

Problem A. Integrals with exponential functions and logarithms.

(1) $(1/2)e^{(2x-1)} + c$

(2) $(-1/3)e^{(1-3x)} + c$

(3) $\dfrac{-3^{(2-3x)}}{3\ln 3} + c$

(4) $\ln|\ln x| + c$

(5) $(\ln x)^2 + c$

(6) $(1/3)(\ln x)^3 + c$

(7) $e^{-1/x} + c$

(8) $\tan^{-1}(e^x) + c$

(9) $(1/2)\ln|e^{2x} - 2| + c$

(10) $(2/3)(2 + \ln x)^{3/2} + c$

(11) $(1/3)(x + \ln x)^3 + c$

(12) $2\sqrt{e^x - 1} + 2\tan^{-1}\sqrt{e^x - 1} + c$

Problem B. Definite integrals.

(1) -12

(2) $1/2$

(3) -1

(4) $26/3$

(5) 231

(6) $19/15$

(7) $16/3$

(8) $7/10$

(9) $28/81$

(10) $11/6$

(11) $(6/5)(3\sqrt{2} - 2)$

(12) $86/7$

(13) $29/35$

(14) Does not exist

(15) $29/6$

(16) 0

(17) Does not exist

(18) 2

(19) $2/3$

(20) $63/4$

(21) $1/4$

(22) 36

(23) $(1/2)e^2 + e - 1/2$

(24) $85/2 + \ln(9/4)$

(25) 1

(26) $33/4$

Problem C. Definite integrals with trigonometric functions.

(1) $(\sqrt{2} - 1)/2$

(2) 3

(3) Does not exist

(4) $-1 + 2\sqrt{3}/3$ (5) $2\sqrt{3}/3$ (6) Does not exist

(7) $\pi/2$ (8) $\pi/6$

Problem D. Definite integrals with other functions.

(1) $\ln 2$ (2) 24   (3) $\dfrac{2^8}{\ln 2}$ (4) -3

(5) 28/3   (6) 11/6   (7) -3.5 (8) 5/3

(9) 10.7   (10) $2 - \pi^2/2$

Problem F. Finding areas bounded by lines and curves.

(1) $3 + 16\ln 2$ sq. units   (2) 32/3 sq. units

(3) 9π sq. units   (4) 253/12 sq. units

(5) 1/2 sq. units   (6) 1/2 sq. units

(7) 3 sq. units   (9) 1/3 sq. units

(10) $1 - \pi/4$ sq. units   (11) infinite

(12) both areas are $\pi/2$ sq. units   (13) $3\pi/2$ sq. units

(14) 4 sq. units

Problem G. Areas between curves.

(1) 1/3 sq. units   (2) 9/16 sq. units

(3) 9/8 sq. units   (4) 1/3 sq. units

(5) 41/6 sq. units   (6) 1/6 sq. units

(7) $(3/4)(3\pi - 8)$ sq. units   (8) $8\sqrt{3}$ sq. units

(9) 8 sq. units

(10) 9/2 sq. units

(11) 8/3 sq. units

(12) 2/3 sq. units

(13) 4 sq. units

(14) $\pi/2 + 1/3$ sq. units

(15) $8\sqrt{5}/15$ sq. units

(16) $8\pi/3 - 2\sqrt{3}$ sq. units

(17) $8a^2/3m^3$ sq. units

(18) $16a^2/3$ sq. units

(19) $2\pi/3 - \sqrt{3}/2$ sq. units

(20) 1/2 sq. units

(21) $2 - \sqrt{2}$ sq. units