

MATH 221: Calculus and Analytic Geometry
Prof. Ram, Fall 2006

HOMEWORK 10: SELECTED ANSWERS

Problem A. Integrals with exponential functions and logarithms.

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|---------------------------------------|---|
| (1) $(1/2)e^{(2x-1)} + c$ | (2) $(-1/3)e^{(1-3x)} + c$ |
| (3) $\frac{-3^{(2-3x)}}{3 \ln 3} + c$ | (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.

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|-----------|---------------------------|-----------------------------|----------|
| (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.

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|------------------------|-------|--------------------|
| (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) $\frac{2^8}{\ln 2}$ (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