

Math 152 - Sample Exam 3 Answers - Spring 2004

1. The greater zooplankton numbers are at midnight since

$$\int_0^4 \rho_N(x) dx = 173$$

$$\int_0^4 \rho_M(x) dx = 238$$

2. (a) $\frac{1}{6} (4x + 1)^{\frac{3}{2}} + C$

(b) $\frac{1}{5} \ln(1 + t^5) + C$

(c) $-\frac{1}{3} e^{-y^3} + C$

(d) $-e^{-x} (x + 1) + C$

(e) $\frac{1}{2} \ln \frac{x-3}{x+1} + C$

(f) $\frac{1}{18} (x^2 + 4)^9 + C$

3.

$$\int_0^2 \frac{x}{1+x^2} dx = .5 \ln(5) = .805$$

4.

$$\int_0^1 (\sqrt{x} - x^4) dx = \frac{7}{15}$$

5.

$$\int_0^1 \pi (x^2 + x)^2 dx = \frac{31}{30} \pi = 3.25 \text{cubicunits}$$

6.

$$W = \int_0^4 100 \pi (8x - x^2) (8 - x) dx = 23467 \pi = 73721 \text{kg } m$$

$$7. (a) 2\ln(2) - \frac{3}{4} = .63$$

$$(b) 2\ln(2) - \ln(3) = .29$$

$$(c) \frac{8}{3}\sqrt{2} - 2\sqrt{3} = .31$$