

Math 128 December 17, 2003 Final Exam

This exam has 23 questions.

For answers in dollars, round to the nearest dollar

1. You have an income stream of $1000e^{-.07t}$. As the money comes in you invest it at an interest rate of 8%, compounded continuously. How much money will there be in 10 years?

- (a) \$11,458
- (b) \$11,526
- (c) \$11,578
- (d) \$11,593
- (e) \$11,607
- (f) \$11,632
- (g) \$11,665
- (h) \$11,687

2. How much of the money in the previous answer is interest?

- (a) \$4,135
- (b) \$4,435
- (c) \$4,546
- (d) \$4,646
- (e) \$4,715
- (f) \$4,735
- (g) \$4,815
- (h) \$4,888

3. Evaluate the integral

$$\int \int_R (x + 2y)^2 dA$$

Where R is the rectangle $R = \{(x, y) \mid 1 < x < 2, 0 < y < 1\}$.

- (a) 1
- (b) 2
- (c) 3/2
- (d) 5/2
- (e) 7/2
- (f) 10/3
- (g) 17/3
- (h) 20/3

4. Find the minimum value of the function $f(x, y) = 2x^2 + 4xy - 12x + 4y^2 - 20y + 31$.

- (a) 3
- (b) 4
- (c) 5
- (d) 6
- (e) 7
- (f) 8
- (g) 9
- (h) There is no minimum

5. Find the particular solution of the differential equation $xyy' = x^2 + 1$ which has $y(e) = e$.

(a) $\sqrt{x^2 + x^4 - e^4}$

(b) $x + (x - e)^2$

(c) $x + \sqrt{2 \ln x - 2}$

(d) $x + (x - e)^3$

(e) $\sqrt{x^2 + (x - e)^3}$

(f) $x + \sqrt{(x - e)^3}$

(g) $x^3 - ex^2 + e$

(h) $\sqrt{x^2 + 2 \ln x - 2}$

6. Suppose the US population is now $P(0) = 285$ million and that its growing in a way described by the differential equation $P'(t) = .035P(t)$. How many years will it take for the population to reach 310 million?

(a) 1.9

(b) 2.1

(c) 2.2

(d) 2.3

(e) 2.4

(f) 2.5

(g) 2.7

(h) 2.8