

Spring 2012 Math 151

Week in Review # 10

sections: 5.5 and 5.7

courtesy: Joe Kahlig

Section 5.5

1. A poster is to have an area of 240 in^2 with 2-inch margins at the bottom and the sides and a 3-inch margin at the top. What dimensions will give the largest printed area?

2. A piece of wire 12 inches long is being used to make up to two figures: an equilateral triangle and a circle. How should the wire be divided so that the total area enclosed is a maximum? A minimum?

3. What are the dimensions of the largest rectangle that can be inscribed in the area bounded by the curve $y = 12 - x^2$ and the x -axis?

4. A rectangular storage container with an open top is to have a volume of 10m^3 . The length of the base is twice the width. Material for the base costs \$10 per square meter. Material for the sides cost \$6 per square meter. Find the cost of materials for the cheapest such container.

Section 5.7

5. Find the most general antiderivative.

(a) $f'(x) = x^4 + \frac{8}{x} + \frac{3}{x^2} + \sqrt[3]{x} + 7$

(b) $f'(x) = \frac{10x^2 + 1}{2x^3}$

(c) $f'(x) = x^4(x^2 + 5)$

(d) $f'(x) = \sec^2(x) + \sec(x) \tan(x)$

(e) $f'(x) = 7e^x + \sqrt[5]{x^2}$

(f) $f'(x) = \frac{4}{1+x^2} + 12e^{3x}$

6. Find the position function of a particle whose movement can be described with the following information.

$$\mathbf{a}(t) = \langle 3 \sin(t), 2e^t \rangle, \mathbf{v}(0) = \langle 6, 3 \rangle, \mathbf{s}(\pi) = \langle 0, \pi \rangle$$

7. Find $f(x)$ if $f''(x) = 60x^3 + 6$ and $f(1) = 12$ and $f(-1) = 6$

8. A stone is thrown upward from a building 510 meters tall with a speed of 8 meters per second. Note: acceleration due to gravity is $9.8m/s^2$ or $32ft/s^2$

- (a) Find the distance of the stone above the ground at time t .
- (b) With what velocity does the stone hit the ground?

9. A car is braking with a constant deceleration of $60ft/s^2$ producing skid marks measuring 240ft before coming to a stop. How fast was the car traveling when the breaks were first applied?