

Spring 2015 Math 151

Week in Review 10

courtesy: Amy Austin

(Covering 5.5-6.1)

Section 5.5

1. A rectangular storage container with an open top is to have a volume of 10 cubic meters. The length of its base is twice the width. Material for the base costs \$10 per square meter. Material for the sides costs \$6 per square meter. Find the cost of materials for the cheapest such container.
2. Find the point on the parabola $x + y^2 = 0$ that is closest to the point $(0, -3)$.
3. A piece of wire 12 inches long is cut into two pieces. One piece is bent into an equilateral triangle and the other is bent into a circle. How should the wire be cut so that the total area enclosed is a maximum? A minimum?
4. 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?

Section 5.7

5. Given $f''(x) = 2e^x - 4\sin(x)$, $f(0) = 1$, and $f'(0) = 2$, find $f(x)$.
6. A particle accelerates according to the equation $a(t) = .12t^2 + 4$. If the initial velocity is 10 and the initial position is 0, find the position function $s(t)$.
7. A stone is dropped from a 450 meter tall building.
 - a.) *Derive* a formula for the height of the stone at time t . Note the acceleration due to gravity is -9.8 meters per second squared.
 - b.) With what velocity does the stone hit the ground?
8. A car is traveling at a speed of $220/3$ feet per second when the brakes are fully applied thus producing a constant deceleration of 40 feet per second squared. How far does the car travel before coming to a stop?

9. Find the vector functions that describe the velocity and position of a particle that has an acceleration of $\mathbf{a}(t) = \langle 0, 2 \rangle$, initial velocity of $\mathbf{v}(0) = \langle 1, -1 \rangle$ and an initial position of $\mathbf{r}(0) = \langle 0, 0 \rangle$.

Section 6.1

10. Compute $\sum_{i=2}^5 \frac{i}{i+1}$
11. Compute $\sum_{i=1}^{500} (9) =$
12. Compute $\sum_{i=3}^{300} (2) =$
13. Using the formula $\sum_{i=1}^n i = \frac{n(n+1)}{2}$, find $\sum_{i=1}^{99} 4i$.
14. Write in sigma notation:
 - a.) $\sqrt{3} + \sqrt{4} + \sqrt{5} + \sqrt{6} + \sqrt{7}$
 - b.) $1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \frac{1}{25}$
 - c.) $1 - x + x^2 - x^3 + x^4 - x^5 + x^6$