MAT 2270: Section 3.4 – Applying Derivatives WS

1 A particle's distance (cm) from a fixed point at time t (sec) is controlled by the function			
$D(t) = 95t^3 - 12t^2 + 40t \qquad 0 < t < 8 $ Use the derivative to answer all the following questions:			
	-Show your work and give your answers with correct units.		
а	How fast is the particle moving when $t - 4$		
a.	sec? (Give the correct units.)		
	(5.7, 14.05335)		
b.	Is the particle's distance from the fixed point $D(t) = Distance Particle is from Fixed Point$	40	
	increasing or decreasing at $t = 2 \sec$?	Ť	
	10		
	How fast is it going?		
	What is the particle's acceleration at $t = 2 \sec ?$		
	Explain what these values are telling you.		
C	Find the exact times the particle changes direction?		
с.	The the exact times the particle enanges uncertain.		
d.	When is the acceleration equal to 0? What is happening at this point?		
e.	What total distance does the particle travel over the 8 sec. interval?		

2.	A child is tossing a small ball into the air. The position of the ball above the ground at a time t , seconds after it is thrown upward is given by $s(t) = -5.2t^2 + 25t + 4$ feet. Find $s'(4)$, explain the meaning of the value you found. Is the ball speeding up or slowing down? How do you know?
3.	 The cost function, in dollars, of a company that manufactures food processors is given by C(x) = 200 + ⁷/_x + ^{x²}/₇, where x is the demand, equal to the number of food processors manufactured. a. Find the marginal cost function. b. Find the marginal cost of manufacturing the 12th food processor. Explain what this means.
4.	How fast is the volume of a cube changing with respect to its side length when the side length is 15 in? Give your answer using correct units.
5.	The stopping distance of a car is based on reaction time and braking time. Data was collected on several midsize cars to create a mathematical model: $T(v) = .0056v^2 + .418v + .02$ where <i>v</i> is the speed of the car in kilometers/hr. and <i>T</i> is the total stopping distance in meters. Find the rate of change of total stopping distance for $v = 40$, $v = 80$ and $v = 100$.
	Give your answers with correct units. Draw conclusions about the stopping distances as speed increases.