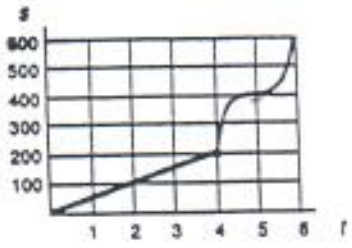
1, Refer to the graph below of the position function s(t) of some object (e.g. a car) over the interval [0,6]. s is measured in feet, t in seconds



a) At what time does the object appear to be at rest?

b) Find the speed, velocity and acceleration at t=3 seconds.

c) State the interval where the velocity is constant.

d) State the interval where velocity is increasing.

2. Differentiate the following:

a) $f(x)=(2x-1)^2$

b) $y=\sin(2x^2+1)$

c) $y=\dfrac{5x^3-6x+8}{2x^2}$

3. A particle moving on a line is at position $s=-2t^3+6t^2-4$ at time t.
s is measured in feet, t in seconds.

a) Write a function that describes the particle's velocity at time t.

b) Write a function that describes the particle's acceleration at time t.

At 3 seconds, what is the particle's c) position, d) velocity, e) speed, f) acceleration?

g) Is the particle speeding up or slowing down at t = 3 seconds? Explain.

h) In which direction is the particle moving at t = 3 seconds? Explain.

4. If $f'(x)=20x^{-3}$, a) what would the monomial function $f(x)$ equal?

b)Find the general equation: $f(x)=$

c)Find the specific/particular equation given (1,1) on $f(x)$. $f(x)=$

5. Find the equation of the *normal line* to $y=3x^4-2x^3+3x^2+1$ at the point where x =1.
(The normal line is perpendicular to the tangent line)

6. Given the following function, sketch a graph of the derivative on the same set of axes.
(careful! get some good slope approximations!)