Name:_____

1) Determine the following limits, if they exist:

a) $\lim\limits_{x\to 1}\dfrac{x^a-1}{x^b-1}$. Also, what conditions must be put on a and b?

b) $\lim\limits_{x\to 0^+}\dfrac{\sin x}{1-\cos x}$

c) $\lim\limits_{x\to 1}\dfrac{e^{3t}-1}{t}$

d) $\lim\limits_{x\to 0}(\sin x)^{(\sin x)}$

2) A particle moves along the x-axis with acceleration function given by $a(t)=4-3t^2$, where a is in m/s when t is in s.

a) Find the most general anti-derivative of the function $a(t)$.

b) At t = 0, the velocity of the particle is 3 m/s. Determine its velocity at 2 s.

c) At t = 0 s, the particle is located at x = 0. Determine its position at 2 s.

3) The graph shows the velocity vs time graph for a particle moving along the x-axis, with time in s and velocity in m/s.

a) Estimate the displacement of the particle between 0 seconds and 6 seconds.

b) Estimate the total distance traveled by the particle between 0 seconds and 6 seconds.

c) Can you determine where the particle is at 6 s? If yes, do so, with supporting work. If not, explain why not.