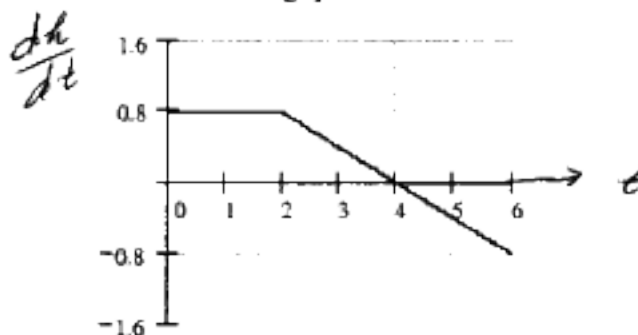


- (8.) The graph in the figure below is the graph of $\frac{dh}{dt}$, where h is the altitude in thousands of feet above sea level and t is in hours, for Professor Bob's recent climb to the top of Bear Peak in Colorado. Use the graph to answer the following questions.



- (a) (3 pts) How long did it take Bob to reach the peak of the mountain?

4 hours

- (b) (5 pts) What was the total change in altitude between $t = 0$ and $t = 4$?

Represented by the area under
the curve = $A_{\text{rec.}} + A_{\Delta} = 2(0.8) + \frac{1}{2}(2)(0.8)$
= 2.4 thousand feet = 2400 feet

- (c) (4 pts) If Bob began his climb at 6000 feet above sea level, how high is the peak above sea level?

Height of peak = $6000 + 2400 = 8400$ feet

[Note: $f(4) = f(0) + \int_0^4 f'(t) dt = 6000 + 2400$]

- (d) (4pts) After 6 hours, Bob stopped at a lookout point to have a snack. What was the altitude of the lookout point?

Bob descended 800 feet from the peak,
so his altitude was $8400 - 800 = 7600$ feet

- (9.) (3 pts) Use the Fundamental Theorem of Calculus to evaluate the function below. To get credit, you must show all of your work. Please circle your answer.

[Note: This is a different problem from above.]

$$\begin{aligned} \int_2^5 (3x^2 - 4x + 1) dx &= \\ \left. \frac{3x^3}{3} - \frac{4x^2}{2} + x \right|_2^5 &= \left. x^3 - 2x^2 + x \right|_2^5 \\ &= (125 - 50 + 5) - (8 - 8 + 2) \\ &= 80 - 2 = 78 \end{aligned}$$