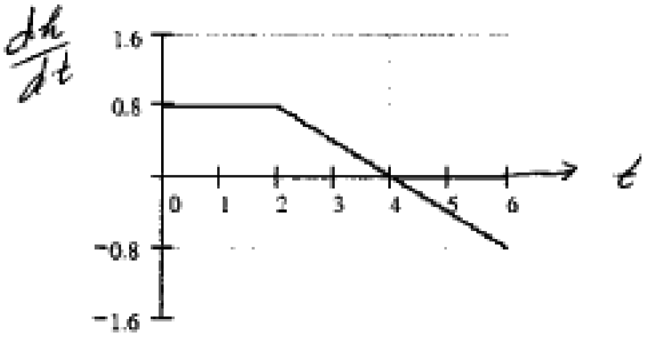
(8.) The graph in the figure below is the graph of $\frac{dh}{dt}$, where h is the altitude in thousands of feet above sea level and t is in hours, for Professor Bob's recent climb to the top of Bear Peak in Colorado. Use the graph to answer the following questions.



(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 = $A_{rec.} + A_\Delta = 2(0.8) + \frac{1}{2}(2)(0.8)$

$= 2.4$ thousand feet or 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.]

$$\int_2^5 (3x^2 - 4x + 1)dx =$$

$$\frac{3x^3}{3} - \frac{4x^2}{2} + x \Big]_2^5 = x^3 - 2x^2 + x \Big]_2^5$$

$$= (125 - 50 + 5) - (8 - 8 + 2)$$

$$= 80 - 2 = 78$$