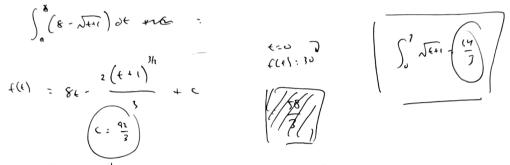
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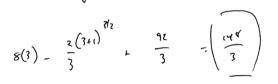
Rates

Water is pumped into an underground tank at a constant rate of 8 gallons/minute. Water leaks out of the tank at the rate of $\sqrt{t+1}$ gallons per minute, for $0 \le t \le 120$ minutes. At time t = 0, the tank contains 30 gallon of water.

(a) How many gallons of water leak out of the tank from time t = 0 to t = 3 minutes?



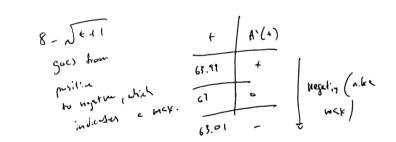
(b) How many gallons of water are in the tank at time t = 3 minutes.



(c) Write an expression for A(t), the total number of gallons of water in the tank at time t.

$$A(4) = 8t - \frac{2(4+1)^{2/4}}{3} + \frac{91}{3}$$

(d) At what time t, for $0 \le t \le 120$, is the amount of water in the tank a maximum? Justify.



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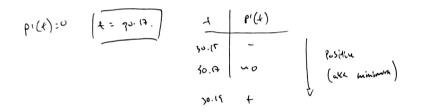
Rates

The number of gallons, P(t), of a pollutant in a lake changes at the rate $P'(t) = 1 - 3e^{-0.2\sqrt{t}}$ gallons per day, where *t* is measured in days. There are 50 gallons of the pollutant in the lake at time t = 0. The lake is considered to be safe when it contains 40 gallons or less of pollutant.

(a) Is the amount of pollutant increasing at time t = 9? Why or why not?

NO, it's decreasing. This is because the given conclaim p'(c) = (-3e^{-0.1} NF at t29 results to -0.69, which indicates a hypetere rate of change, or a decrease in polluted.

(b) For what value of t will the number of gallons of pollutant be at its minimum? Justify.



(c) Is the lake safe when the number of gallons of pollutant is at is minimum? Justify.

(d) An investigator uses the tangent line approximation to P(t) at t = 0 as a model for the amount of pollutant in the lake. At what time *t* does this model predict that the lake becomes safe?

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