

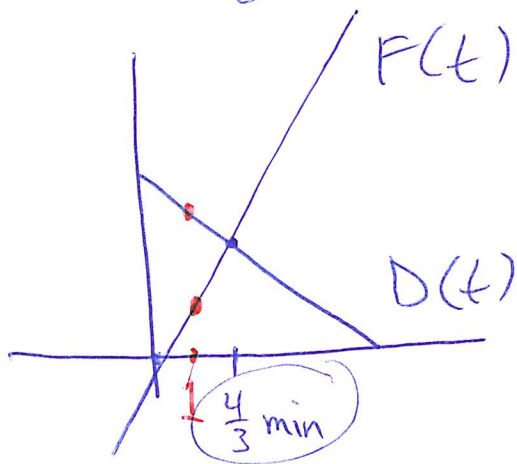
2-2 Obj:

to solve "Two-Rate" Problems.

Let $F(t) = 2t$ rate of filling a tank
(gal/min)

$D(t) = 4 - t$ rate of draining a tank
(gal/min)

Q How fast is the volume of water changing at $t = 1$ minute?



Gain Rate - Loss Rate

$$F(1) - D(1)$$

$$2(1) - (4 - (1))$$

$$-1$$

-1 gal/min

OR

decreasing 1 gal/min

Q Find the minimum and maximum amount of water on $0 \leq t \leq 4$ if there were 10 gallons initially.

Two Rates \rightarrow think as one rate

So New $R(t) = F(t) - D(t)$

Find Critical Pts & test with end pts.

* Set $R(t) = F(t) - D(t) = 0$

No need to take derivative since $R(t)$ is already a derivative.

* $F(t) = D(t)$ *

Test $t = \frac{4}{3}$ & $t = 0$ & $t = 4$

T	$10 + \int_0^T F(t) - D(t) dt$
0	10
$\frac{4}{3}$	7.3 gal \leftarrow Minimum
4	18 gal \leftarrow Maximum