November 11, 2025

Veterans Day

Today in History:

World War I ends (1918)

Louisa May Alcott publishes her first story (1852)

Number of the Day: 766

766 = 2 x 383

766 is a centered pentagonal number

Fun Fact:

Obetz, Ohio hosts an annual zucchini festival every August.

Quote of the Day:

"Advice is what we ask for when we already know the answer but wish we didn't"

- Erica Jong

Today's Weather:

Windy with on and off snow showers. High of 36°.

Math 121 - Quiz #38

Find

$$\frac{d}{dx}\left[\int_2^{\ln x} \sqrt{t+\cos t}\; dt\right]$$

$$= \left(\sqrt{\ln x + \cos(\ln x)}\right) \frac{1}{x}$$

(6) $G(x) = \int_1^x \tan t \; dt$

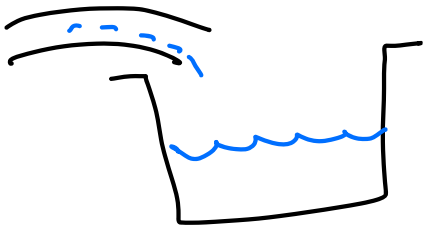
(a) $G(1) = \int_1^1 \tan t \; dt = 0$

(b) $G'\left(\frac{\pi}{4}\right)$

$G'(x) = \tan x$

$G'\left(\frac{\pi}{4}\right) = \tan\left(\frac{\pi}{4}\right) = 1$

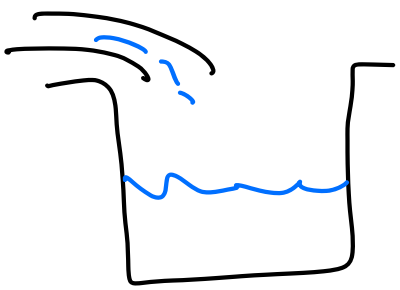
NET CHANGE



RATE OF $\frac{3 \text{ gal}}{\text{min}}$

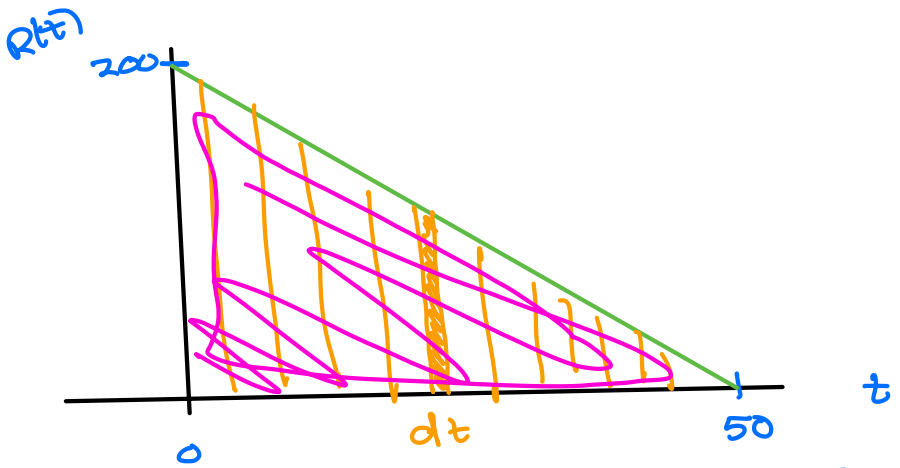
5 MINUTES.

$$\frac{3 \text{ gal}}{\text{min}} \cdot 5 \text{ min} = 15 \text{ gal.}$$



RATE $(200 - 4t)$ gal/min

AFTER 50 min.



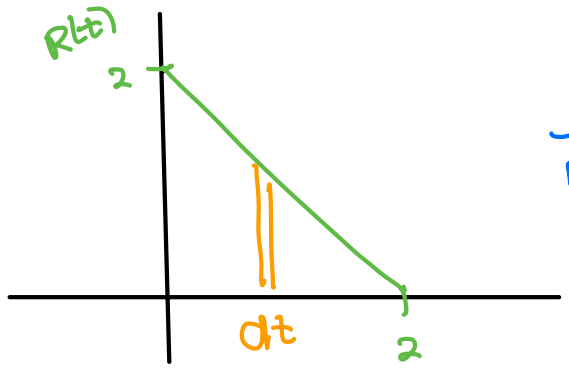
$$\lim_{N \to \infty} \sum_{j=1}^{N} (200 - 4t)\,dt = \int_0^{50} (200 - 4t)\,dt$$

$$200t - 2t^2 \Big|_0^{50} = 5000 \text{ gal.}$$

30 m/s 10 SECONDS.

$\frac{30\text{m}}{\cancel{s}} \cdot 10\cancel{s} = 300\text{m}.$

$R(t) = (2-t)$ m/s $0 \le t \le 2$



$$\lim_{N\to\infty} \sum_{j=1}^{N} (2-t)\,dt$$

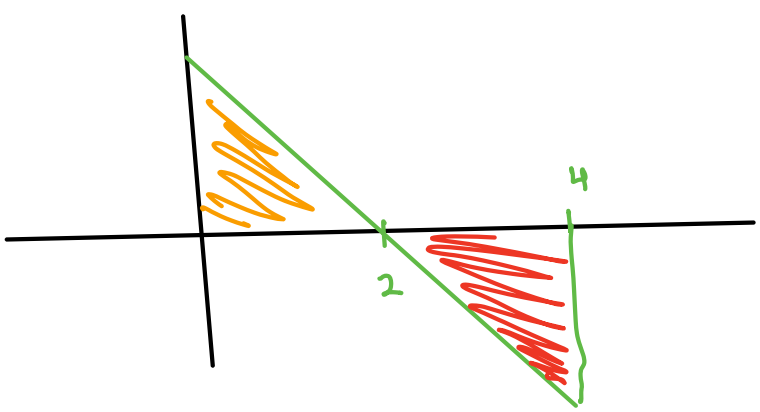
$$= \int_0^2 (2-t)\,dt$$

$$= 2t - \frac{t^2}{2}\Big|_0^2 = 2\text{m}.$$

$R(t) = 2-t$ $0 \le t \le 4$

$$\text{Disp.} = \int_0^4 (2-t)\,dt = 2t - \frac{t^2}{2}\Big|_0^4 =$$

$$= 8 - 8 = 0$$



DIST. TRAVELED.

$$\text{DIST TRAV.} = \int_a^b |R(t)|\,dt$$

$$\text{DIST} = \int_0^4 |2-t|\,dt = \int_0^2 |2-t|\,dt + \int_2^4 |2-t|\,dt$$

$$= \int_0^2 (2-t)\,dt + \left| \int_2^4 (2-t)\,dt \right|$$

$$2t - \frac{t^2}{2}\Big|_0^2 + \left| 2t - \frac{t^2}{2}\Big|_2^4 \right|$$

$$2 + |-2| = 4$$

$$R(t) = t^2 - 4t + 3 \qquad 0 \le t \le 5$$

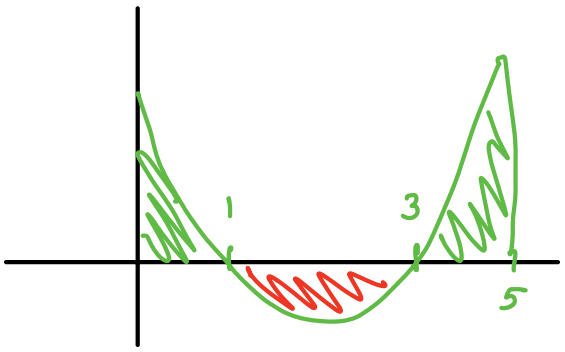
DISP. & DIST.

$$\text{DISP} = \int_0^5 (t^2 - 4t + 3)\,dt$$

$$= \frac{t^3}{3} - 2t^2 + 3t\Big|_0^5 = \frac{20}{3}$$

$$\text{DIST TRAV.} = \int_0^5 |t^2 - 4t + 3|\,dt$$

$$y = t^2 - 4t + 3$$



① $\int_0^1 |t^2-4t+3|\,dt$

$+$ ② $\int_1^3 |t^2-4t+3|\,dt$

$+$ ③ $\int_3^5 |t^2-4t+3|\,dt$

① $\int_0^1 (t^2-4t+3)\,dt = \frac{t^3}{3} - 2t^2 + 3t \Big|_0^1 = \frac{4}{3}$

② $\left| \int_1^3 (t^2-4t+3)\,dt \right| = \left| \frac{t^3}{3} - 2t^2 + 3t \Big|_1^3 \right| = \left| -\frac{4}{3} \right| = \frac{4}{3}$

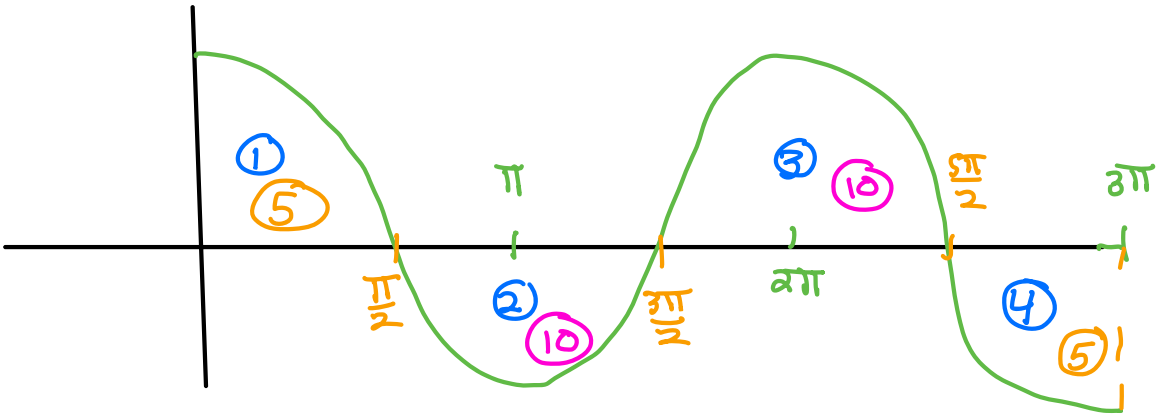
③ $\int_3^5 (t^2-4t+3)\,dt = \frac{t^3}{3} - 2t^2 + 3t \Big|_3^5 = \frac{20}{3}$

$$\frac{4}{3} + \frac{4}{3} + \frac{20}{3} = \frac{28}{3}$$

$R(t) = v(t) = 5\cos t \qquad 0 \le t \le 3\pi$

Dis. & Dist

$$\text{Disp} = \int_0^{3\pi} 5\cos t\,dt = 5\sin t \Big|_0^{3\pi} = 5(0-0) = 0$$



$$\text{DIST TRAV.} = \int_0^{\frac{\pi}{2}} |5\cos t|\,dt + \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} |5\cos t|\,dt + \int_{\frac{3\pi}{2}}^{\frac{5\pi}{2}} |5\cos t|\,dt + \int_{\frac{5\pi}{2}}^{3\pi} |5\cos t|\,dt$$

$$\int_0^{\frac{\pi}{2}} |5\cos t|\,dt = \int_0^{\frac{\pi}{2}} 5\cos t\,dt = 5\sin t \Big|_0^{\frac{\pi}{2}} = 5$$

$$\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} |5\cos t|\,dt = \left| \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} 5\cos t\,dt \right| = \left| 5\sin t \Big|_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \right|$$

$$= 10$$

$$5 + 10 + 10 + 5 = 30$$