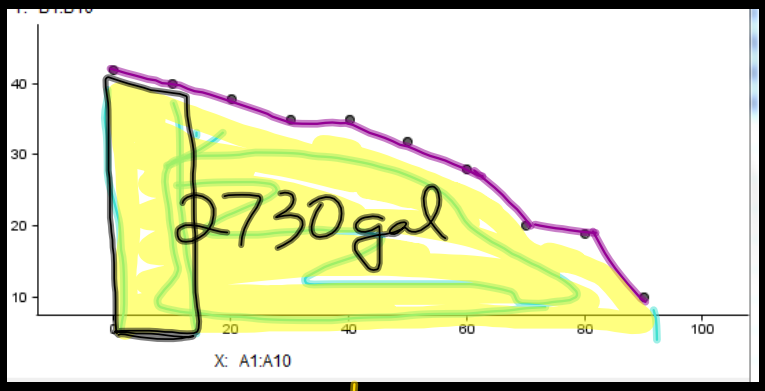
AP Calculus AB

Wednesday, January 16, 2013

Summarize "pump" problem

Work on airplane problem

ETEH...Twiz



gal/min

time, min

pump is slowing down

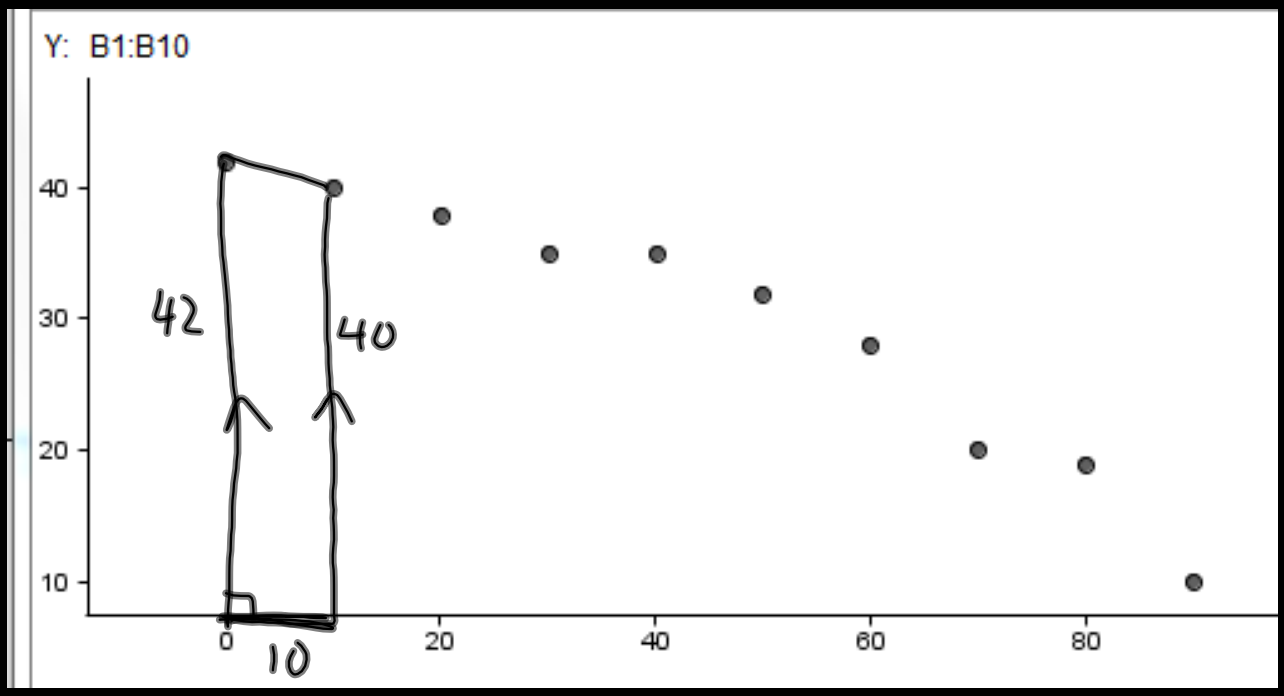
$41 \cdot 10 + 39 \cdot 10 + 36.5 \cdot 10 + 35 \cdot 10 + 33.5 \cdot 10 + 30 \cdot 10 + 24 \cdot 10 + 19.5 \cdot 10 + 14.5 \cdot 10$

2730 gallons

This method assumes that the pump is slowing down at a constant rate on each 10 minute interval.

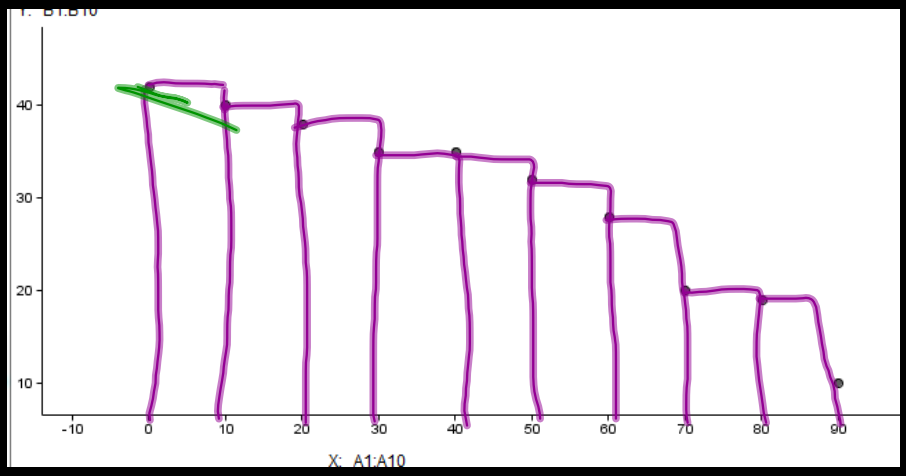
$41 \frac{\text{gal}}{\cancel{\text{min}}} \cdot 10 \cancel{\text{min}}$

410 gallons



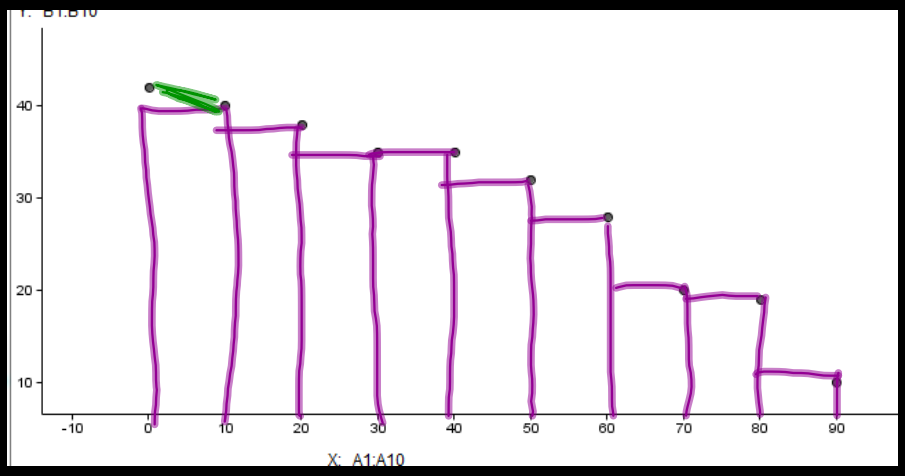
$$A = \frac{1}{2} \cdot h(b_1 + b_2)$$

$$A = \frac{1}{2} \cdot 10(42 + 40)$$



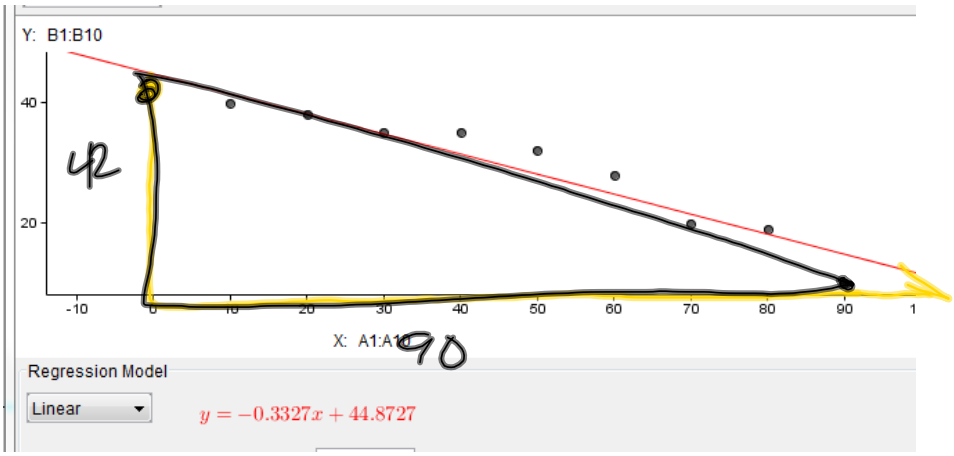
Area = 10(42+40+38+35+35+32+28+20+19)

Area = 2890 gallons

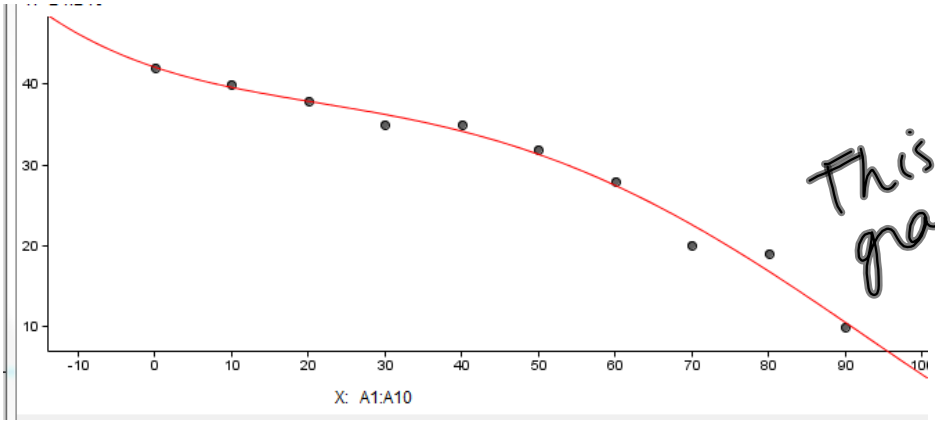


area = 10(40+38+35+35+32+28+20+19+10)

area = 2570 gallons


Y: B1:B10
40
20
42
-10
0
10
20
30
40
50
60
70
80
90
X: A1:A10
90
Regression Model
Linear
$y = -0.3327x + 44.8727$

$A = \frac{1}{2}$



This is the graph of a Rate vs. time ↗ deriv.

$ax^4+bx^3+cx^2+dx+e=f'(x)$

$f(x)$

$f'(x)$

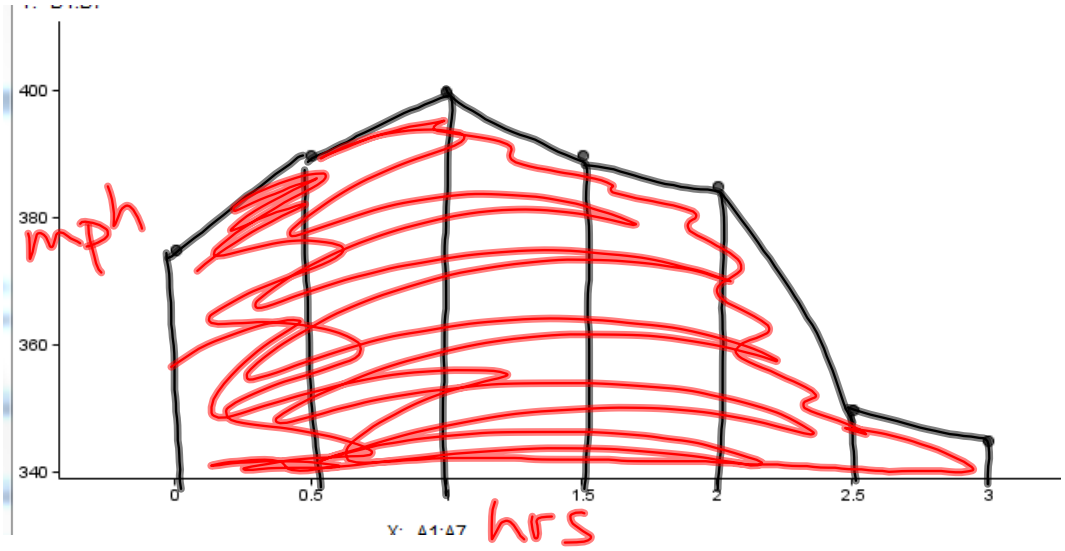
$f''(x)$

$a, b, c, d, e \rightarrow$ constants

integrate to find

$$f(x)=\frac{ax^5}{5}+\frac{bx^4}{4}+\frac{cx^3}{3}+\frac{dx^2}{2}+ex$$

$f(90)\approx 2729.5$ gallons



Trapezoid: 1134.5 miles