

Partial Solutions to "Graph Your Driving"

III Gas at \$3/gallon = P
 Gas annual budget of \$1,500 =

$Y = f(x)$ or $M = f(E)$ where, M miles per year

E = fuel economy in miles per gallon

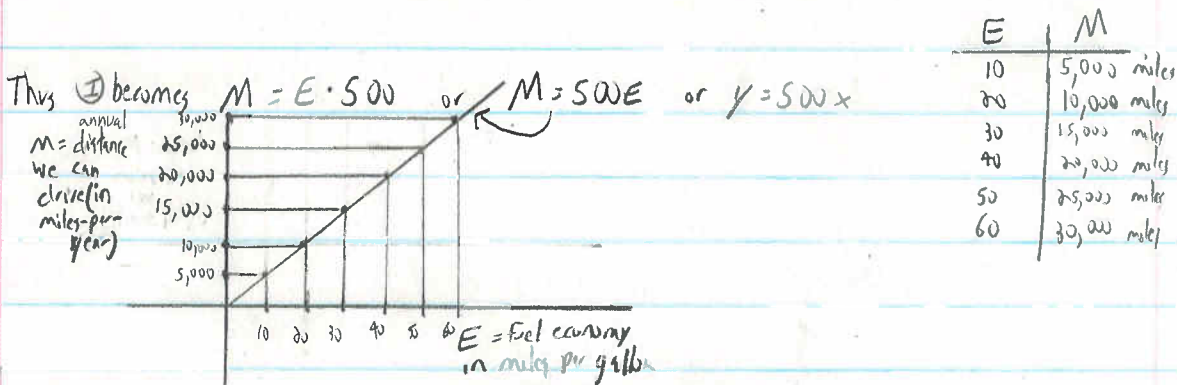
Let $E=10, 20, 30, 40, 50,$ and 60 and plot corresponding points

Derive formula for $M=f(E)$ and graph the corresponding function

If G is the number of gallons we use up per year, then $M = E \cdot G$

Also Annual Cost = $C = P \cdot G$ \downarrow Assum \$3/gallon \downarrow $= 3G$

So Annual Cost = $C = \$1,500 = 3G$ thus $G = \frac{\$1,500}{\$3/\text{gallon}} = 500$ gallons



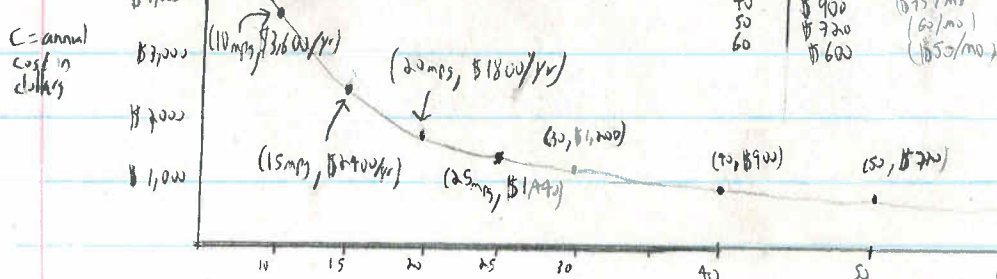
IV Notice we can re-write (i) as $G = \frac{M}{E}$ and substitute this G into (ii) to turn " $C=PG$ " into $C = P \cdot \frac{M}{E}$

Alternatively without using a "Master formula" let's just think about $P = \$3/\text{gallon}$, and

$M = 12,000$ miles (per year). Our annual cost C is $\$3G$ ($G = \text{gallons per yr}$)

How to find G? Again $\frac{12,000 \text{ miles/yr}}{E \text{ miles-per-gallon}} = G$ $\frac{\text{miles}}{\text{miles/gal}} = G \text{ gal/yr}$, so

$C = 3G$ becomes $C = 3 \left(\frac{12,000}{E} \right) = \frac{36,000}{E}$



and finally $CE = PM$ as our "Master formula" and notice in part (IV) $M = 12,000$ miles (per yr) $P = \$3/\text{gallon}$
 $CE = PM = 3 \cdot 12,000 = 36,000$
 Thus $C = (36,000)/E$

Had we used a "Master formula" for E (x-axis) shape \rightarrow

E = fuel efficiency (in miles per gallon)