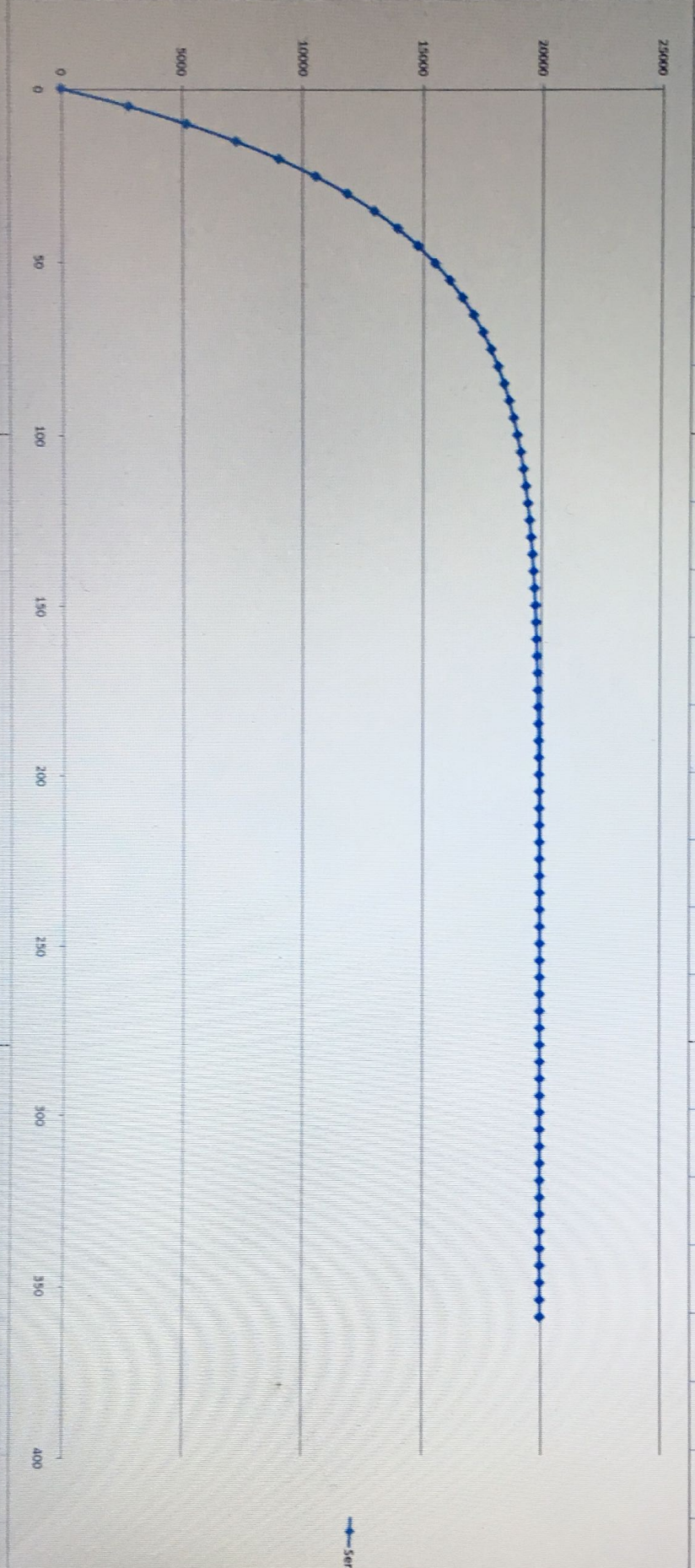


B2 =20000-(20000*EXP(-0.03*A2))

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
85	18438.4																								
90	18655.9																								
95	18884.1																								
100	19004.3																								
105	19143																								
110	19262.3																								
115	19365.1																								
120	19453.5																								
125	19529.6																								
130	19595.2																								
135	19651.6																								
140	19700.1																								
145	19741.9																								
150	19777.8																								
155	19808.8																								
160	19835.4																								
165	19858.3																								
170	19878.1																								
175	19895																								
180	19909.7																								
185	19922.3																								
190	19933.1																								
195	19942.4																								
200	19950.4																								
205	19957.3																								
210	19963.3																								
215	19968.4																								
220	19972.8																								
225	19976.6																								
230	19979.8																								
235	19982.7																								
240	19985.1																								
245	19987.1																								
250	19988.9																								
255	19990.5																								
260	19991.8																								



$$y = y_0 e^{0.03t} + 20,000$$

$$0 = y_0 e^{-0.03(0)} + 20,000$$

$$y_0 = -20,000$$

$$y = y_0 e^{-0.03t} + 20,000$$

B. $\frac{70}{100} \times 20,000 = 14,000$

$$y = 14,000$$

$$y = -20,000 e^{-0.03t} + 20,000$$

$$14,000 = -20,000 e^{-0.03t} + 20,000$$

$$14,000 - 20,000 = -20,000 e^{-0.03t}$$

$$-6,000 = -20,000 e^{-0.03t}$$

$$\frac{-6,000}{-20,000} = e^{-0.03t}$$

$$0.3 = e^{-0.03t}$$

$$\ln(0.3) = -0.03t$$

$$-1.10 = -0.03t$$

$$t = \frac{-1.10}{-0.03}$$

$$t = 36.8 \text{ hours}$$

C. Graph

D. graph

E. $\frac{dy}{dt}$ decreases over time i.e. the rate at which fresh air is deposited in the room tends to zero.

Oyewole Mayowa Sheriff
 17/Engob/104
 Mechanical Engineering

$600 \text{ ft}^3/\text{min}$

fresh air \rightarrow

20,000
 ft^3 of
 air

$\frac{600 \text{ ft}^3}{\text{min}}$

$$\frac{dy}{dt} = y_{in} - y_{out}$$

$$y_{in} = 600$$

$$y_{out} = \frac{600}{20,000} = 0.03y$$

$$\frac{dy}{dt} = 600 - 0.03y$$

$$\frac{dy}{dt} = -0.03(y - 20,000)$$

$$\int \frac{dy}{y - 20,000} = \int -0.03 dt$$

$$\ln(y - 20,000) = -0.03t + C$$

$$y - 20,000 = e^{-0.03t + C}$$

$$y - 20,000 = e^{-0.03t} \cdot e^C$$

$$e^C = J_0$$

$$y - 20,000 = J_0 e^{-0.03t}$$

$$y = J_0 e^{-0.03t} + 20,000$$

* At $t = 0, y = 0$