

Part 2: Solve this system. Make sure to show your work.

$$21768 = 9a + 3b + c = -9a - 3b + 21768 = c$$

$$22440 = 100a + 10b + c = 22440 = 100a + 10b + (-9a - 3b + 21768)$$

$$20680 = 400a + 20b + c \quad 22440 = 91a + 7b + 21768$$

$$\begin{aligned} 20680 &= 400a + 20(96 - 13a) - 9a - 3b + 21768 \\ 400a + 192a - 260a &= 9a + 3b + 21768 - 21768 \end{aligned}$$

$$\begin{aligned} 20680 &= 131a + 23688 - 3b \\ -23688 & \quad -23688 \end{aligned}$$

$$-3008 = 131a = 3(2b - 13a)$$

$$\begin{aligned} -3008 & \quad 131a - 288 + 39a \\ + 288 & \quad + 288 \end{aligned}$$

$$\frac{-2720}{170} = \frac{170a}{170}$$

$$\boxed{-16 = a}$$

$$9b = 13a + b$$

$$-8b = 13a$$

$$9b - 13a = b$$

$$9b - 13(-16) = b$$

$$9b + 208 = b$$

$$\boxed{304 = b}$$

$$-9(-16) - 3(304) + 21768 =$$

$$144 - 912 + 21768$$

$$\boxed{21000 = c}$$

Part 3: Using your solutions to the system from part 2 to form your quadratic model of the data.

$$f(x) = ax^2 + bx + c$$

$$f(x) = -16x^2 + 304x + 21000$$

Part 4: Find the maximum value of the quadratic function. Make sure to show your work.

$$\frac{-b}{2a} \Rightarrow \frac{-(304)}{2(-16)} = \left( 9.5, 22444 \right)$$

work?  
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