



Activity 8.7 – Modeling Accumulated Change with the TI-84

The table below gives the flow rate of crude oil into a holding tank.

Time (min)	Flow rate (ft ³ /min)
0	507
2	2245
4	3727
6	4953
8	5923
10	6637

Answer each part by using the appropriate choice from the “calculate” menu.

1. View a scatter plot of the data and write a quadratic model $r(t)$, with units. For the remainder of this example, expand the horizontal range of the viewing window to $[0, 30]$.
2. According to the model in Part 1, when did the flow rate first reach 7000 ft³/min?
3. According to the model in Part 1, when was the flow rate the greatest? What was the flow rate at that time?
4. How much oil flowed into the tank during the first 10 minutes?

5. Assume the holding tank contained 5000 ft^3 of oil when $t = 0$. Use the model from Part 1 to find a model for the *total* amount of oil in the tank after t minutes (include units). Call it $A(t)$.

6. How much total oil was in the tank after 20 minutes?

7. If the capacity of the tank is 150000 ft^3 , how long can the oil flow into the tank before the tank is full?