

Day 25 classwork: Selected answers:

- Graph the Market Price and the Cost per fish on the same axes.
- Estimate the intersection point.  
**Approximately (11, 28)**
- Why is the intersection point called the equilibrium point? What does that mean?  
**If the fish population is away from that point in either direction, the market forces will push it toward that equilibrium point. (See Activity 2, page 33-34)**
- Write the Market Price formula. (First write it with  $x$  and  $y$ , then translate to a formula with  $N$  and  $p$ .)  
 **$p = -0.1N + 29$**
- Write the Cost per Fish formula.  
 **$c = -N + 40$**
- Find the equilibrium point algebraically.  
$$\begin{array}{l} p = c \\ -0.1N + 29 = -N + 40 \\ 0.9N = 11 \\ N = 12.2222 \end{array} \quad \begin{array}{l} p = -0.1(12.2222) + 29 \\ p = -1.22222 + 29 \\ p = 27.77778 \end{array} \quad \begin{array}{l} c = -N + 40 \\ c = -12.22222 + 40 \\ c = 27.77778 \end{array}$$
  
**So the approximate intersection point is (12.2, 27.8)**
- Did the point you found algebraically consistent with the point you estimated from your graph?
- For this process, how does the Market Price change when the Fish Population size increases by 1 million?  
**When the pop'n increases by 1 million fish, the market price decreases by \$0.10.**
- For this process, how does the Cost per Fish change when the Fish Population size increases by 1 million?  
**When the pop'n increases by 1 million fish, the cost per fish decreases by \$1.**
- Use the words slope or intercept to describe the values in the each of the two previous questions.  
**Both are slopes.**
- Add a column to the table which is "Profit per Fish" and compute the values of Profit per Fish for the given  $N$ -values. Call this column "Profit per Fish,  $f$ ."
- For what values of  $N$  is the fishery making a profit?  
**At  $N = 20, 30, 40$**
- For what values of  $N$  is the fishery having a loss?  
**At  $N = 10$**
- Write the Profit per Fish formula. (First write it with  $x$  and  $y$ , then translate it to a formula with  $N$  and  $f$ , where  $f$  means Profit per Fish.) For what values of  $N$  is the fishery making a profit?  
**Formula:  $f = p - c$  so  $f = 0.9N - 11$**   
**So there is a profit when  $f = 0.9N - 11 > 0$  or  $N > 12.22$**   
**It is making a profit when the number of fish is greater than 12.22 million.**
- What is the Profit per Fish when the Fish population is 28 million?  
 **$f = 0.9 \cdot 28 - 11 = 14.2$ . So \$14.2 is the profit per fish.**