

Pokémath: Group Work 3

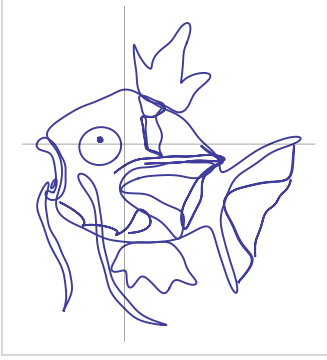

Name _____,

The mysterious team of Pokémon® thieves has struck again! Last night, they left behind what seems to be their calling card: a big red tornado. I wonder what this could mean?

Reports are coming in that Magikarp have been disappearing! We need to find which ones have the most favorable stats and protect them!

In this activity, we will compare the attack, defense and HP stats of several Magikarp with different individual values (IVs) often listed in the order Attack, Defense, HP. Magikarp A has IVs of 5,5,5. Magikarp B has IVs of 10,10,10. Magikarp C has IVs of 15,15,15. To do this, we will investigate the attack, defense and HP stats as functions of the CPM.

Popular curves:

| Magikarp-like curve | Gyarados-like curve |
|---|---|
|  |  |

Here are the “Base Stats” for Magikarp from the link on ICON. They are in the **order HP, attack, defense**.

| | | | | | |
|-----|---|----------|----|----|----|
| 129 |  | Magikarp | 85 | 29 | 85 |
|-----|---|----------|----|----|----|

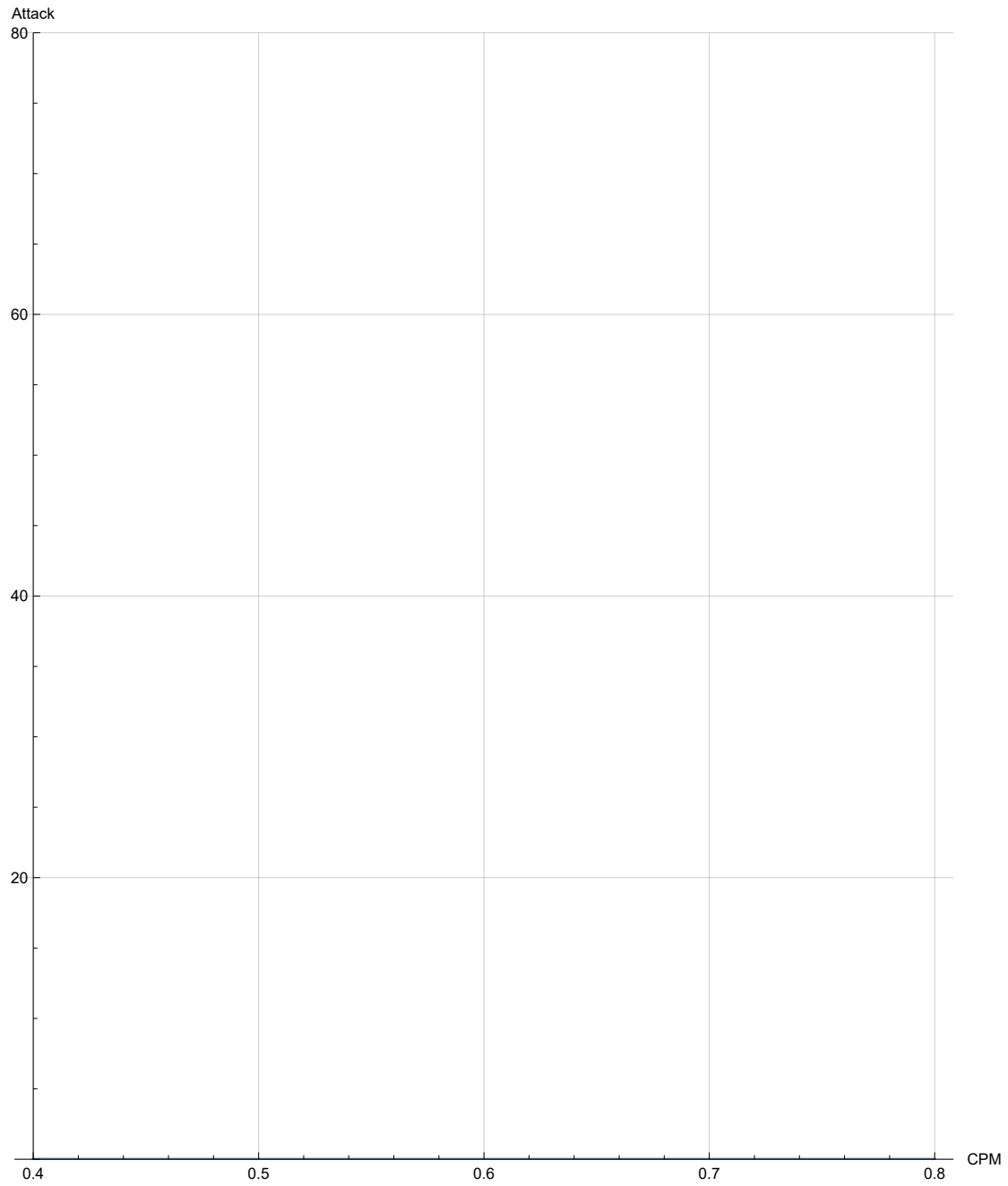
1) Sketch three different graphs, one for each Magikarp, of Attack with respect to CPM. To do this, calculate the Attack stat for Magikarp A (with Attack IV = 5) at CPM = 0.4 and CPM = 0.8. Then plot both points: (CPM, Attack). Then, draw a line between the two points. Repeat this process for Magikarp B and Magikarp C. Recall that the formula for Attack is

$$\text{Attack} = (\text{Base Attack} + \text{Attack IV}) * \text{CPM}$$

Magikarp A: Attack IV = 5

Magikarp B: Attack IV = 10

Magikarp C: Attack IV = 15



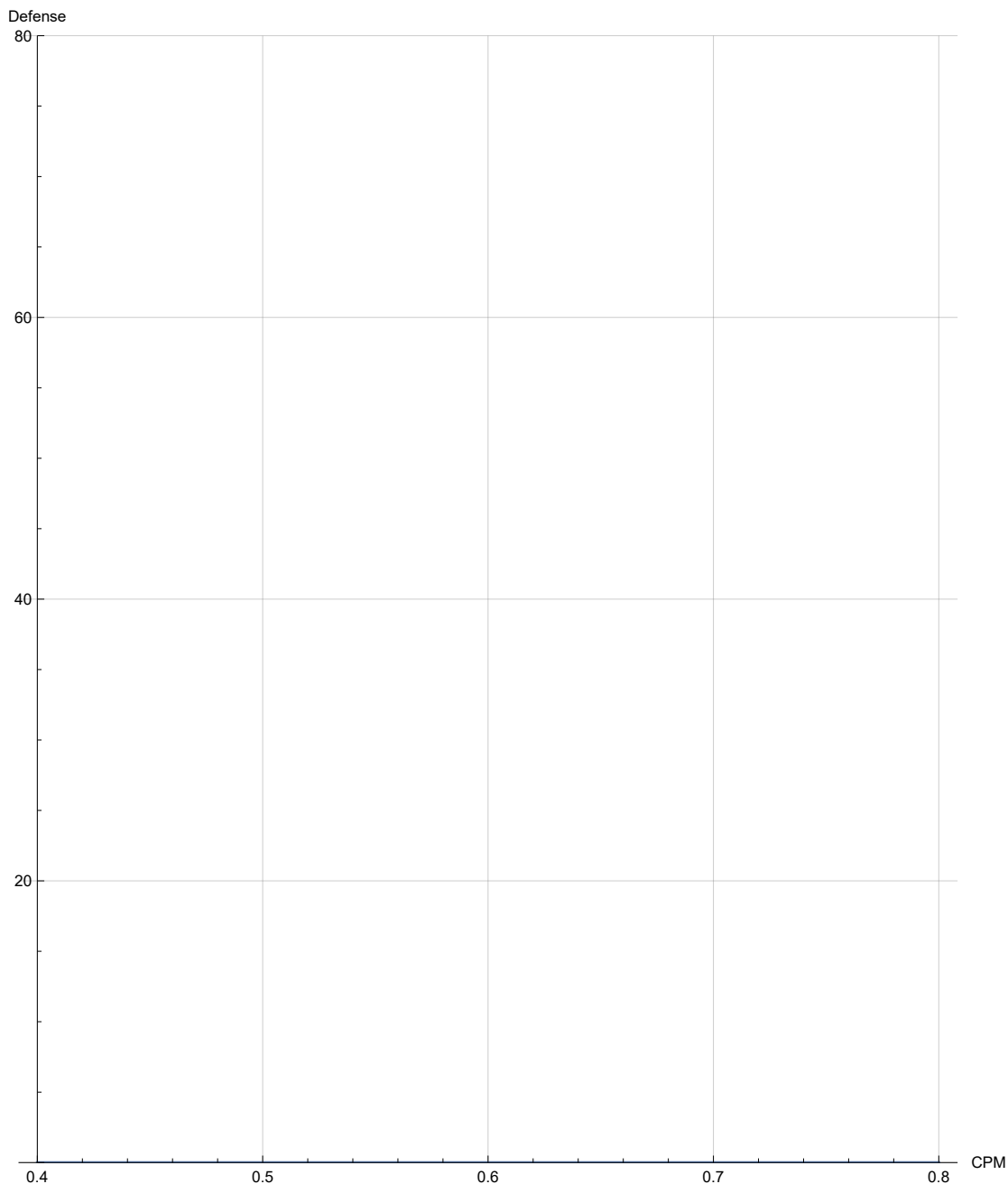
1) Sketch three different graphs, one for each Magikarp, of **Defense** with respect to CPM. To do this, calculate the Defense stat for Magikarp A (with Defense IV = 5) at CPM = 0.4 and CPM = 0.8. Then plot the point (CPM, Defense). Then, draw a line between the two points. Repeat this process for Magikarp B and Magikarp C. Recall that the formula for Defense is

$$\text{Defense} = (\text{Base Defense} + \text{Defense IV}) * \text{CPM}$$

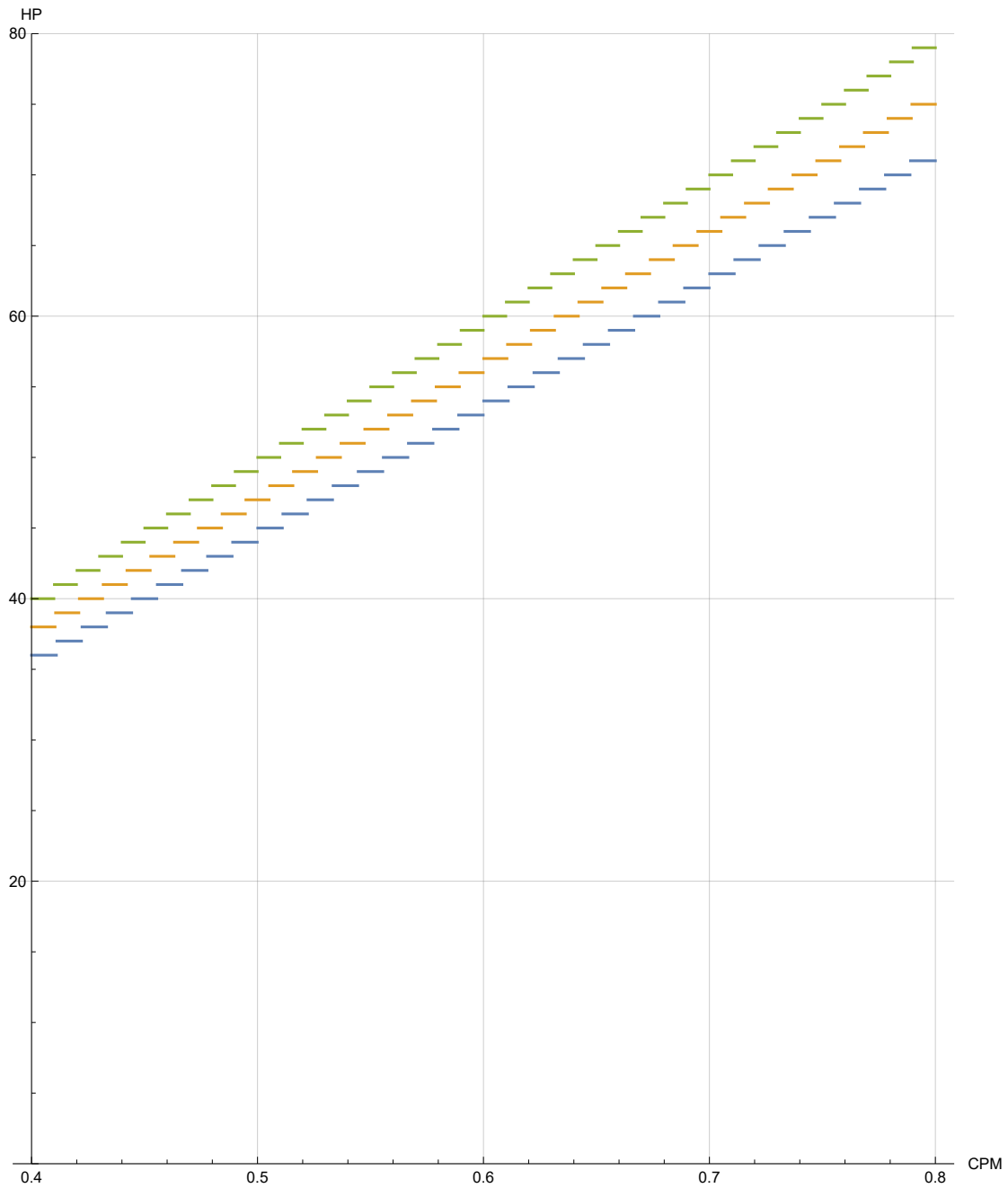
Magikarp A: Defense IV = 5

Magikarp B: Defense IV = 10

Magikarp C: Defense IV = 15



3) Because of the rounding, the graph for HP is tedious to draw by hand, so I had the computer do it. Here is the graph for HP IV = 15, HP IV = 10, HP IV = 5 in order from top to bottom. Why does it look so different from the previous two graphs?



4) You have caught a ton of Magikarp to earn candies. Maybe it is time to evolve your best Magikarp into a Gyarados? Your perfect (15,15,15) Magikarp is low level, with CPM = 0.4.

a) The stats of this Magikarp **before you evolve** are

Attack = _____, Defense = _____, HP = _____

| | | | | | |
|-----|---|----------|-----|-----|-----|
| 130 |  | Gyarados | 216 | 237 | 186 |
|-----|---|----------|-----|-----|-----|

b) **After you evolve**, you have a Gyarados! The stats of this Gyarados with CPM = 0.4 (using the new base stats) are

Attack = _____, Defense = _____, HP = _____

c) It costs almost as many candies (and a ton of stardust) to “power up” this Magikarp to a high level with CPM = 0.8.

The stats of this Magikarp if you **instead spend your candies to “power up”** to CPM = 0.8

Attack = _____, Defense = _____, HP = _____.

d) Which is better for Magikarp, to evolve or level up? Do you think this holds true for all Pokemon?

e) In the long run, you will want to **do both**. If you power up this Magikarp to high level (CPM = 0.8) and then evolve it to a Gyarados, you will have a very strong Pokémon®! Find the stats of the Gyarados with CPM = 0.8

Attack = _____, Defense = _____, HP = _____.