- 4. [8 points] For a certain computer, P(f) measures the amount of power the computer consumes in Watts (W) as a **linear** function of the frequency, f, which is measured in Gigahertz (GHz). At the frequency f = 0.8 GHz the computer consumes 8 W of power; at the frequency f = 3.4GHz the computer consumes 125 W of power.
  - **a**. [3 points] Find the slope of P(f) and give its units. Show all work. Give your answer rounded to at least two decimal places.

Solution:  $\frac{\text{change in output}}{\text{change in input}} = \frac{125\text{W}-8\text{W}}{3.4\text{GHz}-0.8\text{GHz}} = \frac{117\text{W}}{2.6\text{GHz}} = 45\text{W}/\text{GHz}$ 

45 W/GHz

b. [2 points] Suppose we open a new application on the computer and the frequency increases by 2.8 GHz. By how many watts (W) did the power consumption, P(f), increase? Show all work. Give your answer in exact form or rounded to at least two decimal places.

Solution:  $45 \text{ W/GHz} \times 2.8 \text{ GHz} = 126 \text{ W}$ 

**126** Watts

c. [3 points] Find a formula for P(f). Show all work. Express all constants in exact form or rounded to at least two decimal places.

Solution: One of the fastest (and more error-free!) ways to answer this question is using point-slope form. Since we know the slope is 45 W/GHz and we know one point on the graph is (0.8, 8), we can find the formula for the line as shown below: