2. [12 points] A company manufactures helmets for skiing. Each helmet is sold at a price of 60 dollars.

a. [2 points] Let $F(h)$ be the revenue (in dollars), the total amount of money that the company receives, from selling h helmets in one month. Find a formula for $F(h)$.

Solution: $F(h) = 60h$

The cost of producing 150 helmets in one month is 7,250 dollars, and when the company increases the production to 275 helmets in one month, the company spends 11,800 dollars producing them.

b. [4 points] Let $G(h)$ be the total cost, in dollars, of producing h helmets in one month. Assuming that $G(h)$ is a linear function, find a formula for $G(h)$. Show all your work.

Solution: $m = \dfrac{11800 - 7250}{275 - 150} = 36.4$

Point slope formula:

$G(h) - 11800 = 36.4(h - 275)$ yields

$G(h) = 11800 + 36.4(h - 275) = 1790 + 36.4h$

Slope-intercept formula:

Since $G(h)$ linear, then $G(h) = 36.4h + b$, using one of the points in the graph $11800 = 36.4(275) + b$. Hence $b = 1790$.

Therefore $G(h) = 36.4h + 1790$.

c. [3 points] Find and give a practical interpretation of the slope of $G(h)$.

Solution: Slope= 36.4

Practical interpretation of the slope: The total cost of producing helmets increases by 36.40 dollars per additional helmet produced.

d. [3 points] The company is considering changing the selling price of each helmet. If the company produces 500 helmets in a month and sells all of them, what should be the new price for each helmet in order for the company to break even (i.e. the price of each helmet at which the company do not lose or gain any money)? Show all your work. Your answer should include cents.

Solution: The cost of producing 500 helmets is $G(500) = 36.4(500) + 1790 = 19990$. The revenue of selling 500 helmets at price p is $F(500) = 500p$. To break even $G(500) = F(500)$ $(19990 = 500p)$, hence $p = 39.98$.

New price= 39.98 dollars.