

Lesson 13 : Tasks Involving Net Profit (a function of a Rate) April 19, 2023

Question 1: You own a business and to make 250 meals you must pay your employees \$1,010.50. Calculate the net profit of your business given that you charge 7.25\$/meal. Is your business doing well?

Definition:
(Revenue Net)

- Net Profit (Net Income)
- \$ you see in the bank
- \$ after deductions
- ex. \$ 150

compared with

(Revenue Brutt)
• Gross Profit (Taxable Profit)

• total \$ you earn (@ a rate)

ex \$50 per hour
∴ for 4hr, GP = 200\$

$$N.P. = G.P. - \text{costs} - \text{taxes} - \text{union dues} - \text{health insurance} - \text{paternity leave} - \text{Employment Insurance}$$

(social net)

simplified.

$$\textcircled{1} \quad \text{Net Profit} = \text{Gross Profit} - \text{Total Cost}$$

$$\textcircled{1} \quad N.P. = \text{Total Profit} - T.C.$$

$$\textcircled{1} \quad N.P. = \# \text{ of things} \times \text{price \$ per thing} - T.C.$$

ex
you sell 2 bananas @ 3\$/b

Question 1: You own a business and to make 250 meals you must pay your employees \$1,010.50. Calculate the net profit of your business given that you charge 7.25\$/meal. Is your business doing well?

$$N.P. = \text{Total Profit} - \text{Costs}$$

$$N.P. = \# \text{ of things} \times \text{Price per thing} - \text{Costs}$$

$$N.P. = 250 \cancel{m} \times 7.25 \frac{\$}{\cancel{m}} - 1010.50 \$$$

$$N.P. = 1812.50 \$ - 1010.50 \$$$

$$N.P. = 802 \$$$

$$\begin{array}{l} \cancel{m} \times \frac{\$}{\cancel{m}} \\ \rightarrow \\ \frac{\$}{m} \end{array}$$

↳ since N.P. > 0 you have a surplus (a deficit)
 ↳ you're "making a profit"

∴ your business is doing well
 You do #2 and #3.

a well defined problem is half solved!

Question 2: You make beer with a friend, and you have to pay \$23,621.50 in storage costs. If you sell each bottle for \$5.75 and you sold 2,000 bottles, calculate the net profit of your business. Is your business doing well?

$$N.P. = -12\ 121.50 \$$$

*→ you're in the red/indebt
→ a gross deficit*

$$N.P. = T.P. - T.C.$$

$$N.P. = \# \text{ of things} \times \text{price per thing} - T.C.$$

$$N.P. = 2000 \text{ b} \times \$5.75/\text{b} - 23\ 621.50 \$$$

∴ your business is not doing well

*2017 student protests
le printemps érable*


le carré rouge

Question 3: You have been commissioned by a not-for-profit organization to make 120 smoothies for the students at James Lyng Adult Education Centre. If the fresh ingredients cost you \$744 and you sell each smoothie at \$6.20, calculate the net profit of your business. Is your business doing well?

$$N.P. = 0 \$$$

→ you "broke even"
it's doing fine
since it's non-profit
- not-for-profit

Solving for Unknowns in a Net Profit Context

Question 1: You own a business and, to make a certain amount of meals, you must pay your employees \$1010.50. In order to make a profit, how many meals should you make if you are charging 7.25\$/meal? \hookrightarrow net profit > 0

• Costs
 $\rightarrow \$1010.50$

• Profits
 $\Rightarrow 7.25 \text{ \$/meal}$

WANT: n when N.P. > 0

TOOL: one equation (what's @ play)

N.P. = T.P. - T.C.
 N.P. = # of things \times price per thing - T.C.

N.P. = n \times price per thing - Cost

INFO: Cost = 1010.50 \$
 PPT = 7.25 \$/m

N.P. > 0 \leftarrow start w this

Simplify the process and say Net Profit = 1

~~N.P. > 0~~
~~T.P. - T.C. > 0~~ (sub in N.P. = T.P. - T.C.)

~~$7.25n - 1010.50 > 0$~~

~~$\frac{7.25 \cdot n}{7.25} > \frac{1010.5}{7.25}$~~

~~$n > 139.37 \text{ meals}$~~

~~$n > 140 \text{ meals}$~~

\hookrightarrow a natural number... no decimal
 (139 meals won't give you a profit)

You do #2 and #3. moving on @ 10:15!

(sub in T.P. = # of things \times price per thing)

(solve for n) w o.o.

B
E
D
W
A
S

2 bananas for 3 \$/b

Question 2: You make beer with a friend, and you have to pay \$23,621.50 in storage costs. If you sell each bottle for \$5.75, how many beers do you have to sell to make a profit?

Question 3: You have been commissioned to make 120 bottles of carbonated water. If the equipment costs amount to \$744, how much should you sell each bottle for to see a profit?

Question 1: You are a student at James Lynn Adult Education Centre, and you need to make a business plan with some projections for your smoothie business. You plan to make smoothies 3 days a week for 12 weeks, and you expect to sell 60 smoothies a day.

costs (the lower, the better)

You need to decide whether to hire high school students or adult education students to make the smoothies. Each group presents you with the cost of their labour:

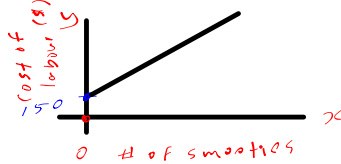
Option A: High School Students

There is a linear relation between the total cost of their labour and the number of smoothies they make as described in the table of values below.

# of smoothies	Cost (\$)
0	150 = b
22	227
100	500

Option B: Adult Education Students

They would charge you \$3 for every smoothie made plus a fixed travel cost of \$150 paid once.



You pick the cheaper option. How much will you have to charge for each smoothie to make a profit?

come back @ 10:50!

Option A

$$y = ax + b$$

$$a = \frac{y_2 - y_1}{x_2 - x_1}$$

$$a = \frac{227 - 150}{22 - 0}$$

$$a = 3.5 \text{ \$/sm}$$

$$y = 3.5x + 150$$

sub $x = 2160$ to find y

$$y = 3.5(2160) + 150$$

$$y = 7710 \text{ \$}$$

Option B

$$y = ax + b$$

$$y = 3x + 150$$

$$y = 3(2160) + 150$$

$$y = 6630$$

go with option B
 \therefore T.C. = \$6630

FULL-ON TASK
 TIPS: notes and writing formulas
 $N.P. = T.P. - T.C.$

$$3 \frac{\$}{\text{sm}} \times 12 \text{ w} \times 60 \frac{\text{sm}}{\text{day}}$$

$$\therefore 2160 \text{ smoothies}$$

WANT: price per smoo when $N.P. > 0$

TOOL: equation

$$N.P. = T.P. - T.C.$$

$$N.P. = 2160 \cdot P - T.C.$$

INFO $N.P. > 0$
 $T.C. = ?$

WANT: $T.C. = y$ when $x = 2160$

TOOL: equation $[N.P. = T.P. - T.C.]$
 no good cuz too many unk.

Option A
 $y = ax + b$

INFO:
 $a = ?$
 $a = \frac{y_2 - y_1}{x_2 - x_1}$

$b = 150$
 $(0, 150)$ $(22, 227)$
 $x_1 \ y_1 \quad x_2 \ y_2$

Option B
 $y = ax + b$

$a_B = 3$
 $b_B = 150$

Find P:

$$N.P. > 0$$

$$N.P. = T.P. - T.C.$$

$$T.P. - T.C. > 0$$

$$T.P. = 2160 \cdot P$$

$$T.C. = 6630 \text{ \$}$$

$$2160 \cdot P - 6630 > 0 + 6630$$

solve for P

$$\frac{2160P}{2160} > \frac{6630}{2160}$$

Total Profit, for example,
 $T.P. = \text{price} \times \text{\# of things}$
 $= \text{something} \times \text{\# of things}$

$$P > 3.07 \text{ \$}$$

$$P \geq 3.08 \text{ \$}$$

$$P \geq 3.10 \text{ \$}$$

\therefore you should charge 3.08 \$ or more to make a profit!

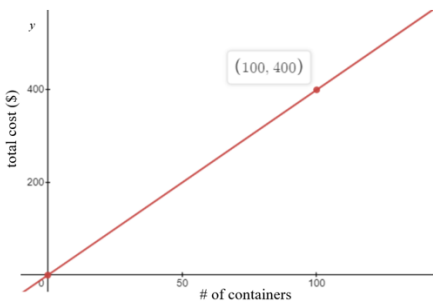
Question 2: You are a student at James Lyng Adult Education Centre, and you need to make a business plan with some projections for your smoothie business. You plan to make smoothies 3 days a week for 12 weeks, and you expect to sell 60 smoothies a day. Since you cannot guarantee that you will sell all 60 smoothies made on a given day, you will sell each smoothie at 4.50\$.

You need to decide whether to buy reusable glass containers for your smoothies or recyclable glass containers for your smoothies.

Option A: Reusable Glass Containers

Option B: Recyclable Glass Containers

The below graph models the total cost for the containers as a function of the number of containers you buy:



There's a linear relation between the total cost for the containers and the number of containers you buy. For example, 100 containers will cost you \$350, and 200 containers will cost you \$600.

Assuming you pick the cheaper option, how many drinks of the smoothie would you have to sell in order to see a profit?

- You do Q 2. (or any question)
- You can work with peers normally:
 - with tutor (Brock)
 - with teacher (Mr. Albert)

PRETEST
on FRIDAY