

Math 200 Notes Based on Section 1.2:

Kiersten puts x dollars into an investment with an interest rate of 4% per year. She puts y dollars into an investment with an interest rate of 12% per year. She invests a total of \$5600, and the interest earned after one year is \$368.

$$x+y=5600 \text{ (amount 1+amount 2=total amount)}$$

$$0.04x+0.12y=368 \text{ (interest from } x+\text{interest from } y=\text{total interest)}$$

interest for one year= decimal number \cdot variable (4% becomes $.04 \cdot x$)

$$\text{eq 1: } x+y=5600 \quad \text{eq2: } 0.04x+0.12y=368$$

$$\text{solve eq1 for } x: x=5600-y \xrightarrow{\text{replace } x \text{ with } 5600-y \text{ in Eq2}} 0.04(5600-y)+0.12y=368$$

$$\xrightarrow{\text{distribute } .04} 0.04 \cdot 5600 - 0.04y + 0.12y = 368$$

$$\rightarrow 224 - 0.04y + 0.12y = 368$$

$$\rightarrow 0.08y = 368 - 224$$

$$\rightarrow 0.08y = 144$$

$$\xrightarrow{\text{divide by } .08} y = 144 / 0.08 = 1800 \text{ dollars invested at 12\%}$$

$$\text{So } x = 5600 - 1800$$

$$x = 3800 \text{ is invested at 4\%}$$

$$\text{reminder: } 4\% = \frac{4}{100} = 0.04, \quad 25\% = \frac{25}{100} = 0.25, \quad 12.5\% = \frac{12.5}{100} = 0.125$$

$$1\% = \frac{1}{100}, \quad 0.25\% = \frac{0.25}{100} = 0.0025!, \quad \frac{1}{4}\% = \frac{1}{4} \cdot \frac{1}{100} = \frac{1}{400}$$

Homework Question 2 on MyOpenMath:

A company produces CD's. that cost 13 per CD and the fixed costs are \$5000. The will sell the CD's for \$89 each. (These numbers are not meant to be realistic.) Let x be the number of CD's produced. Write the total cost C as a function of the number of CD's produced.

big idea: unique idea (hard to replicate) and highly desired by people!

$$C = \$ \text{ fixed cost} + \text{variable cost} = 5000 + 13 \cdot x \leftarrow \text{red part is the answer}$$

fixed cost+ cost per CD \cdot number of CD's

$$\text{Revenue} = \text{price per unit to customer} \cdot \text{number of units sold} = 89x \leftarrow \text{answer in red}$$

$$\text{Profit} = \$ \text{ Revenue} - \text{Cost} = 89x - (5000 + 13x) \leftarrow \text{parenthesis b/c two terms in cost}$$

$$= 89x - 5000 - 13x \text{ (distribute the -1)}$$

$$= 76x - 5000 \leftarrow \text{profit function}$$

Find the number of CD's required to break even:

"break even" means Revenue=Cost or Cost=Revenue (either one is fine)

$$5000 + 13x = 89x \leftarrow \text{linear equation b/c it's } x^1$$

$$5000 = 89x - 13x \text{ (subtract } 13x)$$

$$5000 = 76x$$

$$\frac{5000}{76} = x \rightarrow x = 65.789 \leftarrow \text{should be able to input rounded to ones place, so 66!}$$

Question 3 from Homework:

A coffee distributor needs to mix a Rift Valley coffee blend that normally sells for \$8.40 per pound with a Mexican Shade Grown coffee blend that normally sells for \$12.10 per pound to create 60 pounds of a coffee that can sell for \$11.55 per pound. How many pounds of each kind of coffee should they mix?

construct an equation for the first box:

we have 60 pounds of coffee in all. $r + m = 60$ (rift + Mexican=60)

income : $8.40 \cdot r + 12.10m = 60(11.55)$ (income from Rift+income from Mexican=total income)

replae m with 60-r: $8.40r + 12.10(60 - r) = 60(11.55)$ \leftarrow very similar to above

$$8.40r + 12.10 \cdot 60 - 12.10 \cdot r = 693 \quad \uparrow \textit{first} \text{ box on the homework}$$

$$8.40r + 726 - 12.10r = 693$$

but you use what they, which is x!

$$8.40r - 12.10r = 693 - 726$$

$$8.40x + 12.10(60 - x) = 60(11.55)$$

\uparrow box on homework

$$-3.7r = -33$$

$$r = -33 / -3.7 = 8.92 \text{ pounds of the Rift Valley Blend (second box)}$$

$$m = 60 - 8.92 = 51.08 \leftarrow \text{third box}$$