Notes 6-6

Sec 1 H | **Solving Systems in Context** | **Unit 6**

Provide the desired information about each situation given. You may use your graphing calculator to find the graph and table of the information.

Example 1: You are having some friends over for a party this weekend at your house. Your parents have said you have $60 that you can spend on food, and you've decided to use that money to buy pizzas and ice cream. Macey's has pizzas for $6.00 each and tubs of ice cream for $3.00 each. Smith's has pizzas for $4.00 each and tubs of ice cream for $4.00 each.

a) Define your variables: x = Pizzas
y = Ice cream

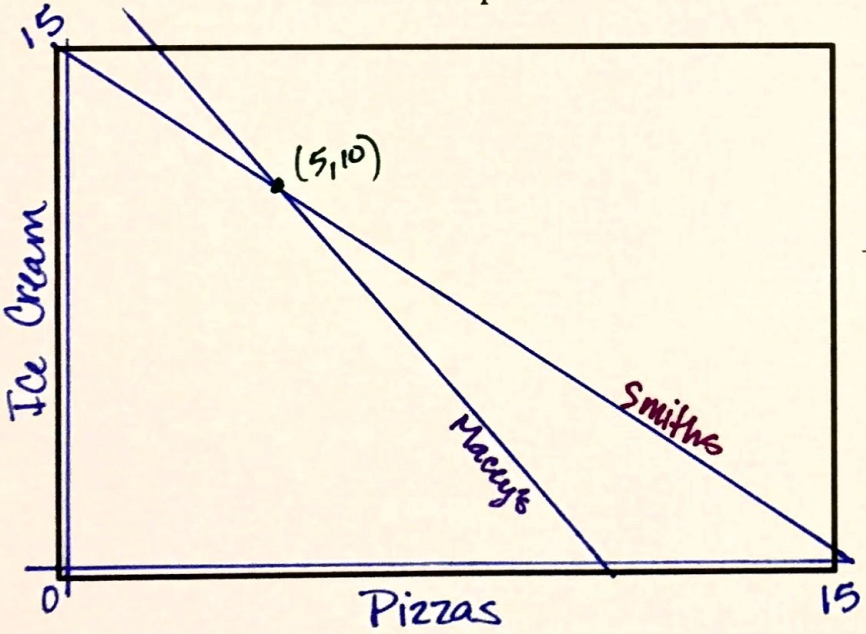
b) Write your equations:

Macey's: $6x + 3y = 60$

Smith's: $4x + 4y = 60$

$3y = -6x + 60$

c) Graph: Label axes, lines, intercepts and intersection point.



d) Table: Must go from y-intercept to x-intercepts and include WHOLE # VALUES.

Equation 1: Macey's	Equation 2: Smith's	
Ordered Pairs	Ordered Pairs	
(0,20)	(0,15)	(10,5)
(1,18)	(1,14)	(11,4)
(2,16)	(2,13)	(12,3)
(3,14)	(3,12)	(13,2)
(4,12)	(4,11)	(14,1)
(5,10)	(5,10)	(15,0)
(6,8)	(6,9)	
(7,6)	(7,8)	
(8,4)	(8,7)	
(9,2)	(9,6)	
(10,0)		

e) What is the coordinate of intersection?

(5,10)

f) What does the intersection point mean in context of the story?

When we buy 5 pizzas & 10 ice creams we spend the same amount at either store.

g) If you decide to spend all of your money on pizza, which store should you choose? Why? How does this decision show up on the graph?

Smiths

h) If you decide that you need to buy 7 pizzas, which store will allow you to buy more ice cream on your budget? How does this decision show up on the graph?

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Example 2: Addie and Ben are 15 years old and are in 9th grade right now. They decide to start saving up their money to take a dream vacation one day. Addie puts $500.00 into a savings account and decides to deposit $45.00 into this special savings account every year. Ben puts $450.00 into a savings account and plans to just get more money off of the interest he will earn. His account earns 7.5% interest compounded annually.

a) Define your variables:

(t) x = Time (years)

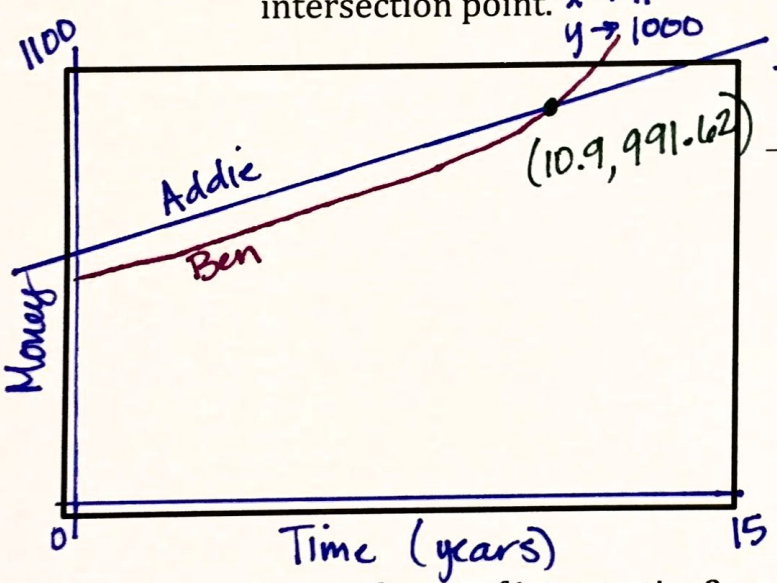
y = Amount of Money

b) Write your equations:

Addie: $y = 45x + 500$

Ben: $y = 450(1 + 0.075)^x$

c) Graph: Label axes, lines, intercepts and intersection point.



d) Table: Include x values from 0 – 15.

x: Time (yrs)	Eq. 1: Addie	Eq. 2: Ben
0	500	450
1	545	483.75
2		
3		
4		
5		
⋮		
⋮		

e) What is the coordinate of intersection?

(10.9, 991.62)

f) What does the intersection point mean in context of the story?

After 10.9 years both Addie & Ben have $991.62

g) If they decide to take this dream vacation in 3 years right after high school graduation, who will have more money towards the trip? How do we know?

Addie

h) If they decide to go on the trip together when they turn 30, who will have had the better savings plan? How do we know?

Example 3:
John invests $20,000 into an account that earns 3.2% interest compounded quarterly.
Rebecca invests $24,000 into an account that earns 2.4% interest compounded monthly.

a) Define your variables: x = Time (years)
y = Money in account

b) Write your equations:
John: $y = 20000\left(1 + \frac{0.032}{4}\right)^{4x}$
Rebecca: $y = 24000\left(1 + \frac{0.024}{12}\right)^{12x}$

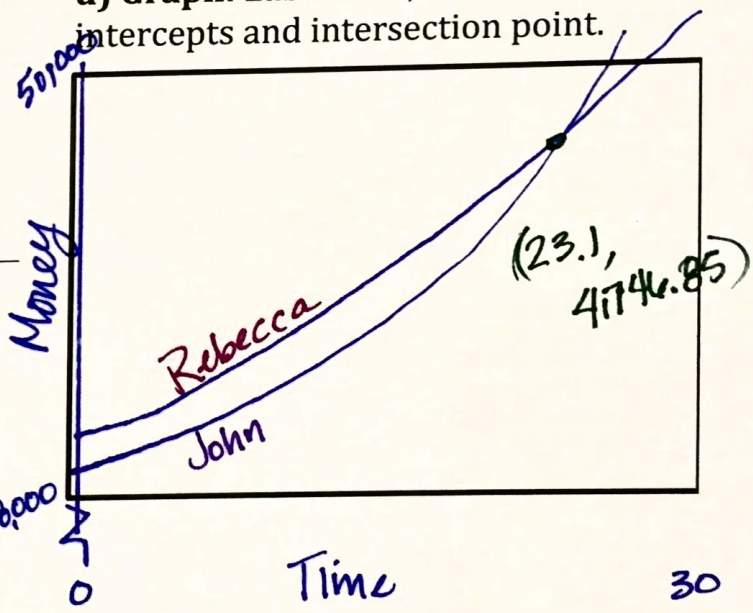
c) Table: Pull up the table on your graphing calculator and find the 2 x values between which the intersection occurs.

x: Time (yrs)	Eq. 1: John	Eq. 2: Rebecca
23	41629	41658
24	42977	42669

What is the maximum x and y value that we should use for our window?

$X \rightarrow 24$
$y \rightarrow 43{,}000$

d) Graph: Label axes, lines, intercepts and intersection point.



e) What is the coordinate of intersection?
(23.1, 41746.85)

f) What does the intersection point mean in context of the story?

g) Who has the better investment in the short term? Who has the better investment in the long term?