Part 1

Mr. and Mrs. Gloop want their son, Augustus, to do his homework every day. Augustus loves to eat candy, so his parents have decided to motivate him to do his homework by giving him candies for each day that the homework is complete. Mr. Gloop says that on the first day that Augustus turns in his homework, he will give him 10 candies. On the second day he promises to give 20 candies, on the third day he will give 30 candies, and so on.

1. Write both a recursive and an explicit formula that shows the number of candies that Augustus earns on any given day with his father's plan. $f(x) = 10(x)$ $f(1) = 10$
2. Use a formula to find how many candies Augustus will get on day 30 in this plan.

$f(x) = f(x-1) + 10$

$f(30) = 10(30)$

300 candies

Part 2

Augustus looks in the mirror and decides that he is gaining weight. He is afraid that all that candy will just make it worse, so he tells his parents that it would be ok if they just give him 1 candy on the first day, 2 on the second day, continuing to double the amount each day as he completes his homework. Mr. and Mrs. Gloop like Augustus' plan and agree to it.

3. Model the amount of candy that Augustus would get each day he reaches his goals with the new plan.
4. Use your model to predict the number of candies that Augustus would earn on the 30th day with this plan. 2^{29}
5. Write both a recursive and an explicit formula that shows the number of candies that Augustus earns on any given day with this plan.

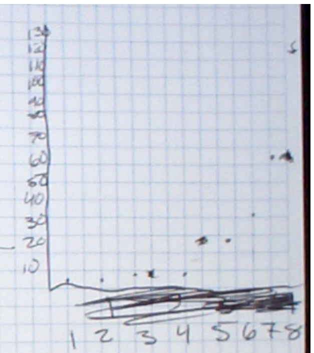
$f(x) = f(x-1) \times 2$ $f(x) = 2^{(x-1)}$

Part 3

Augustus is generally selfish and somewhat unpopular at school. He decides that he could improve his image by sharing his candy with everyone at school. When he has a pile of 100,000 candies, he generously plans to give away 60% of the candies that are in the pile each day. Although Augustus may be earning more candies for doing his homework, he is only giving away candies from the pile that started with 100,000. (He's not that generous.)

6. Model the amount of candy that would be left in the pile each day.
7. How many pieces of candy will be left on day 8?
8. When would the candy be gone?

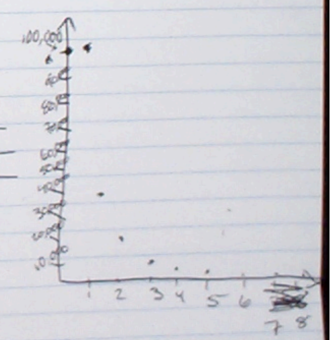
1	10	1x10
2	20	2x10
3	30	3x10



1	1	$1(2^0)$
2	2	$1(2^1)$
3	4	$1(2^2)$

$f(x) = 2^{(x-1)}$

0	100,000	$100,000^x \cdot .4 \times 0$
1	400,000	$100,000 \times .4^1$
2	16,000	$100,000 \times .4^2$
3	6400	
4	2560	



$f(x) = 100,000(.4)^x$

$f(0) = 100,00$

$f(x) = f(x-1) \times .40$

1.7

Part 1

Recursive

$\begin{cases} f(1) = 10 \\ f(x) = f(x-1) + 10 \end{cases}$

Explicit

$f(x) = 10 + 10^{x-1}$

x	f(x)
1	10
2	20
3	30
4	40
5	50

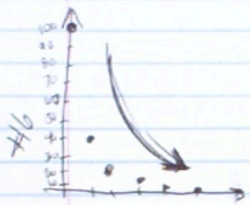
$10 + 10(x-1)$

$10 + 10x - 10$

$10x + 10$

$10x$

#6



x	f(x)
1	1
2	2
3	4
4	8
5	16
6	32

Part 2

Recursive

Explicit

Part 3

Day x	f(x) candy
1	100,000
2	40,000
3	16,000
4	6,400
5	2560
6	1024
7	409
8	
9	
8	

#6

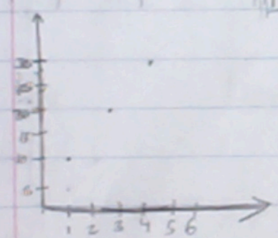
#7 Day 8 ~65 pieces

#8, The candy will never be at a complete zero

Part 3

x	y	expresion	Recrsive
1	10	10	f(1)=10
2	20	10+10	f(2)=20
3	30	10+10+10	f(3)=30
30	$\boxed{300}$	10×30	f(30)=300
x		$\boxed{10+10(x-1)}$	$\boxed{f(x)=f(x-1)+10}$ $\boxed{f(1)=10}$

x	y	explisit	Recursive
1	1	1	f(1)=10
2	2	1·2	f(2)=20
3	4	1·2	f(3)=30
30	300	2·30	f(30)=300
x		$1\cdot 2^{x-1}$	f(x)=f(x-1)·2 f(2)=1



2^29=536,870,912 candys

100% − 60% = .4

#7 65.536

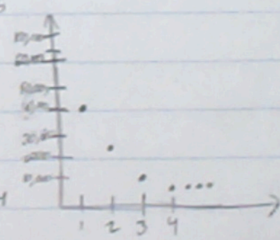
#8 Never

100% × 4^3

100,000 · 0.4^x =

Recursive f(x)=f(x−1)·.4

f(0)=100,000



Part 2 #3 Model → Graph & Table

Part 1

#1 recursive: F(x)=F(n−1)+10 F(1)=10

Eplicit: 10+10(x−1)

10+10x−10

$\boxed{F(x)=10x}$

#2 10(30)=300 candy on the 30th day

Part 2

#3 F(x)=$1\cdot 2^{(n-1)}$ F(x)=F(x−1)+2 F(1)=1

#4 2^29 = 536,870,912 candys

#5

Part 3

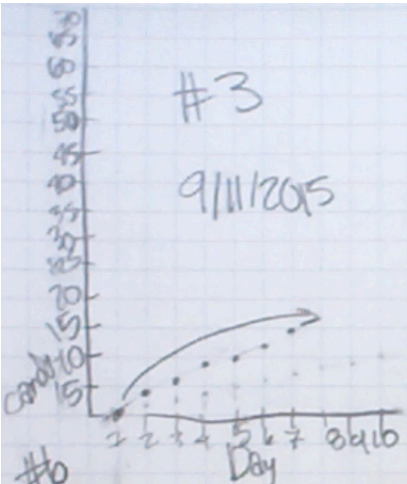
#6

#7 65.536

#8 13 day

3

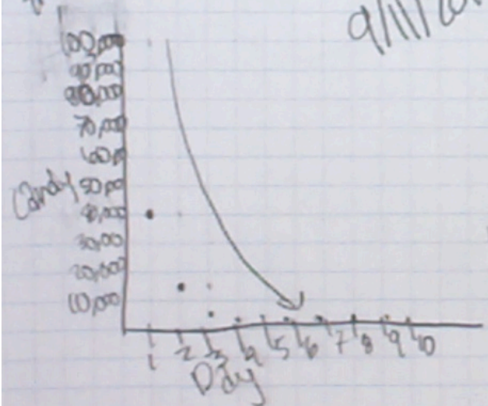
9/11/2015



Days	Candys	Explicit	Recursive
1	1	$1+2^{(n-1)}$	$F(x)=F(x-1)+2$
2	2		$F(1)=1$
3	4		
4	6		
5	8		
6	10		
7	14		
100	102		
n	n+2		

6

9/11/2015



Day	Candy	Explicit	Recursive
0	100,000	$100{,}000 \times .4^0$	
1	40,000	$100{,}000 \times .4^1$	
2	16,000	$100{,}000 \times .4^2$	$100\% - 60\% = .4$
3	6,400	$100{,}000 \times .4^3$	$F(x)=F(x-1)\cdot 100{,}000 \cdot .4^x$
100			
x		$100{,}000 \times .4^{(x-1)}$	$F(1)=100{,}000$