

## 1.6 Something to Chew On

The Food-Mart grocery store has a candy machine like the one pictured here. Each time a child inserts a quarter, 7 candies come out of the machine. The machine holds 15 pounds of candy. Each pound of candy contains about 180 individual candies.



1. Represent the number of candies in the machine for any given number of customers. About how many customers will there be before the machine is empty?
2. Represent the amount of money in the machine for any given number of customers.
3. To avoid theft, the store owners don't want to let too much money collect in the machine, so they take all the money out when they think the machine has about \$25 in it. The tricky part is that the store owners can't tell how much money is actually in the machine without opening it up, so they choose when to remove the money by judging how many candies are left in the machine. About how full should the machine look when they take the money out? How do you know?

$$f(x) = f(x-1) - 7$$

3 write the recursive function

4 make a graph

5 arithmetic or geometric

constant difference

customers	candy	process	recursive function
0	9000	9000	$f(0) = 9000$
1	8993	$9000 - 7$	$f(1) = f(0) - 7$
2	8986	$9000 - 7 - 7$	$f(2) = f(1) - 7$
3		$9000 - 7 - 7 - 7$	$f(3) = f(2) - 7$
100		$9000 - 7(100)$	$f(100) = f(99) - 7$
x		$9000 - 7(x)$	$f(x) = f(x-1) - 7$

customers	candy	process	recursive function
1	25¢	25¢	$f(1) = 25¢$
2	50¢	$25¢ + 25¢$	$f(2) = f(1) + 25¢$
3	75¢	$25¢ + 25¢ + 25¢$	$f(3) = f(2) + 25¢$
4	1.00	$25¢ + 25¢ + 25¢ + 25¢$	$f(4) = f(3) + 25¢$

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a quarter = 7 candies

$$15 \text{ pounds} \times 180 \text{ candies per pound} = 2700$$

$$2700 \div 7 = 385$$

385 quarters

1 385 customers

Sequence

$$\begin{array}{r} 25 \\ 25 \\ 25 \\ 25 \\ 25 \end{array} \begin{array}{l} + 25(0) \\ + 25(1) \\ + 25(2) \\ + 25(3) \end{array}$$

Customer	Candy	Amount	Recursive
0	2700		$f(0) = 2700$
1	2693		$f(1) = f(0) - 7$
2	2686		$f(2) = f(1) - 7$
3	2679		$f(3) = f(2) - 7$
		$2700 - 7x$	$f(x) = f(x-1) - 7$

  

1	.25	.25	$f(1) = 0.25$
2	.50	.25 + .25	$f(2) = f(1) + .25$
3	.75		$f(3) = f(2) + .25$
4		0.25(4)	$f(x) = f(x-1) + .25$