Lesson 1.6 Notes

The Food-Mart grocery store has a candy machine. 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.

Describe the pattern of candies in the machine.	How many customers will there be before the machine is empty?	Recursive rule:	Explicit rule:
The number of candies in the machine subtracts seven with each customer.	$15 \cdot 180 = 2{,}700$ $2{,}700 \div 7 = 385.71\ldots$ About 385 customers. The 386th customer would not get all 7 candies.	$f(0) = 2700$ $f(x) = f(x-1) - 7$	$f(x) = -7x + 2700$
Describe the pattern of money in the machine.	How full should the machine look if the owners take out the money when there is about $25 in it?	Recursive rule:	Explicit rule:
The amount of money in the machine adds $0.25 per customer.	$25 is 100 quarters. If 100 customers buy candy, 700 candies have been taken from the machine leaving 2,000. $\frac{2000}{2700} = 0.74074\ldots$ The machine should be about 75%, or $\frac{3}{4}$, full.	$f(0) = 0$ $f(x) = f(x-1) + 0.25$	$f(x) = 0.25x$

Other important notes from today:

Find the missing terms for each arithmetic sequence and state the constant difference.

**Arithmetic means adding or subtracting. The constant difference is what we are adding or subtracting.

1) 7, 6, ___, ____, 3, … The constant difference is -1.

5, 4

2) 4, ____, ____, 13, 16, … The constant difference is $+3$.

7, 10

3) 18, ____, ____, ____, 42, … The constant difference is $+6$. $(42-18)/4$

24, 30, 36

4) -31, ____, _____, ____, 5, … The constant difference is $+9$. $(5--31)/4$

-22, -13, -4

Two consecutive terms in an arithmetic sequence are given. Find the constant difference and the recursive equation. **Arithmetic means addition

1) If $f(3) = -9$ and $f(4) = -12$. $f(5) =?$ $f(6) =?$ The constant difference is -3.

   $f(5) = -15$ Recursive Rule: $f(0) = 0$ $-3 \cdot 3 = -9$ $-9 - -9 = 0$

   $f(6) = -18$ $f(x) = f(x-1) - 3$

2) If $f(2) = 1$ and $f(3) = 1.5$. $f(4) =?$ $f(5) =?$ The constant difference is 0.5.

   $f(4) = 2$ Recursive Rule: $f(0) = 0$ $0.5 \cdot 2 = 1$ $1 - 1 = 0$

   $f(5) = 2.5$ $f(x) = f(x-1) + 0.5$

3) If $f(5) = 3\frac{7}{12}$ and $f(6) = 4\frac{1}{3}$. $f(7) =?$ $f(8) =?$ The constant difference is $4\frac{1}{3} - 3\frac{7}{12} = +\frac{3}{4}$.

   $f(7) = 5\frac{1}{12}$ Recursive Rule: $f(0) = -\frac{1}{6}$ $\frac{3}{4} \cdot 5 = 3\frac{3}{4}$ $3\frac{7}{12} - 3\frac{3}{4} = -\frac{1}{6}$

   $f(8) = 5\frac{5}{6}$ $f(x) = f(x-1) + \frac{3}{4}$

Two consecutive terms in a geometric sequence are given. Find the constant ratio and the recursive equation.
**Geometric means multiplication

1) If $f(3) = -9$ and $f(4) = -18$. $f(5) =?$ $f(6) =?$ The constant ratio is $\frac{-18}{-9} = 2$.

   $f(5) = -36$ Recursive Rule: $f(0) = 0$ $2^3 = 8$ $-9 \div 8 = -1\frac{1}{8}$

   $f(6) = -72$ $f(x) = f(x-1) \cdot 2$

2) If $f(2) = 1$ and $f(3) = .5$. $f(4) =?$ $f(5) =?$ The constant ratio is $\frac{.5}{1} = .5$.

   $f(4) = .25$ Recursive Rule: $f(0) = 4$ $(.5)^2 = .25$ $1 \div .25 = 4$

   $f(5) = .125$ $f(x) = f(x-1) \cdot 0.5$

3) If $f(5) = 13.4$ and $f(6) = 6.7$. $f(7) =?$ $f(8) =?$ The constant ratio is $\frac{6.7}{13.4} = 0.5$.

   $f(7) = 3.35$ Recursive Rule: $f(0) = 428.8$ $(0.5)^5 = 0.03125 \rightarrow 13.4 \div 0.03125 = 428.8$

   $f(8) = 1.675$ $f(x) = f(x-1) \cdot 0.5$

Find the indicated value.

$f(n) = 2 - 4(n+2)$

Find $f(6)$.

$f(6) = 2 - 4(6+2)$ → $f(6) = 2 - 32$

$f(6) = 2 - 4(8)$ $f(6) = -30$

Find $f(-1)$.

$f(-1) = 2 - 4(-1+2)$ → $f(-1) = 2 - 4$

$f(-1) = 2 - 4(1)$ $f(-1) = -2$