

## 2.5 Class Notes

### 2.5 Making My Point

#### Learning Target-

Write linear and exponential equations starting at any point.

	$f(x)$
1	7 $\downarrow(2)$
2	14 $\downarrow(2)$
3	28 $\downarrow(2)$
4	

Zac's equation  $f(x) = 3.5(2)^x$

Sione's equation -  $f(x) = 7(2)^{x-1}$

Which of these equations work for the pattern?

Both work. Zac started with the 0<sup>th</sup> term and Sione started at the 1<sup>st</sup> term.

Mark says these equations work too.

$$f(x) = 14(2)^{x-2} \quad f(x) = 28(2)^{x-3}$$

Why do these work too?

If you start at the 2<sup>nd</sup> term you have to multiply by 2 2 fewer times.

If you start at the 3<sup>rd</sup> term then 2 is multiplied 3 fewer times.

Can you think of some more equations that would work?

## Different pattern

n	f(n)
1	7
2	13
3	19
4	25

$\uparrow +6$   
 $\uparrow +6$   
 $\uparrow +6$

Zac's equation

$$f(n) = 6n + 1$$

Sione's equation

$$f(n) = 6(n-1) + 7$$

Do these both work? Yes

Try  $f(4) \rightarrow f(4) = 6(4) + 1 = 24 + 1 = 25$

$$f(4) = 6(4-1) + 7 = 18 + 7 = 25$$

Mark's equations:

$$f(n) = 6(n-2) + 13 \quad f(n) = 6(n-3) + 19$$

$$f(n) = 6(n-4) + 25$$

n	f(n)	Expanded
1	7	
2	13	Let's start at 19
3	19	19
4	25	19 + 6
5	31	19 + 6 + 6
6	37	19 + 6 + 6 + 6 = 19 + 6(3)
7		19 + 6 + 6 + 6 + 6 = 19 + 6(4)
8		19 + 6(5)

$\swarrow$   $\searrow$   
 3 less than n  
 $19 + 6(n-3)$

If we start at the 5th output then we add 5 fewer 6's.

This would be true for any term

$$f(n) \text{ or } y = 6(n - \text{term \#}) + \text{output}$$

Write equations for these tables:

a.

x	y
32	50
33	55
34	60

$+1 \downarrow$  (32 | 50)  $\rightarrow +5$   
 $+1 \downarrow$  (33 | 55)  $\rightarrow +5$   
 $+1 \downarrow$  (34 | 60)  $\rightarrow +5$

$y = 5(x - 32) + 50$   
 $y = 5(x - 34) + 60$

slope-intercept form  $y = 5x - 110$

b.

x	y
26	78
28	70
30	62

$+2 \downarrow$  (26 | 78)  $\rightarrow -8$   
 $+2 \downarrow$  (28 | 70)  $\rightarrow -8$   
 $+2 \downarrow$  (30 | 62)  $\rightarrow -8$

$\frac{-8}{2} = -4$

$y = -4(x - 26) + 78$   
 $y = -4(x - 28) + 70$

slope-int  $y = -4x - 34$

c.

x	y
-15	32
-14	39
-13	46

$+1 \downarrow$  (-15 | 32)  $\rightarrow +7$   
 $+1 \downarrow$  (-14 | 39)  $\rightarrow +7$   
 $+1 \downarrow$  (-13 | 46)  $\rightarrow +7$

$\frac{7}{1} = 7$

$y = 7(x + 15) + 32$   
 $y = 7(x + 14) + 39$

slope-int  $y = 7x + 137$

If we know the slope and we know one input and <sup>(x<sub>1</sub>, y<sub>1</sub>)</sup> output then we can make an equation.

$$y = m(x - x_1) + y_1 \quad \text{or} \quad y - y_1 = m(x - x_1)$$

Point-slope form

Reflection: