

Direct Variation

$k =$  constant of variation

$$\{ y = kx \}$$

$$k = \frac{y}{x}$$

input x	output y	$\frac{y}{x}$	k
-9	3	$\frac{3}{-9}$	$-\frac{1}{3}$
-3	1	$\frac{1}{-3}$	$-\frac{1}{3}$
6	-2	$\frac{-2}{6}$	$-\frac{1}{3}$

If all  $k$  values are the same, then it is an example of direct variation

$$y = -\frac{1}{3}x$$

$$y = kx$$

$$\downarrow$$

$$y = -\frac{1}{3}x$$

x	y	$\frac{y}{x}$	k
-8	-6	$\frac{-6 \div -2}{-8 \div -2}$	$\frac{3}{4}$
-2	$-\frac{3}{2}$	$\frac{-\frac{3}{2}}{-2}$	$\frac{3}{4}$
4	3	$\frac{3}{4}$	$\frac{3}{4}$

yes!

$$\frac{-\frac{3}{2} \div -2}{-2} = \frac{-\frac{3}{2} * \frac{1}{-2}}{-2} = \frac{-\frac{3}{-4}}{-2}$$

Keep, Change, Flip

$$y = \frac{3}{4}x$$

①

x	y	$\frac{y}{x}$	k
3	-6	$-\frac{6}{3}$	-2
5	-10	$-\frac{10}{5}$	-2
-2	8	$\frac{8}{-2}$	<del>-4</del> ?

②

x	y	$\frac{y}{x}$	k
-2	-7	$-\frac{7}{-2}$	$\frac{7}{2}$
4	14	$\frac{14}{4}$	$\frac{7}{2}$
6	21	$\frac{21}{6}$	$\frac{7}{2}$

not direct variation

$\frac{7}{2}$

yes

$y = kx$

$y = \frac{7}{2}x$

$(3, 2)$  and  $(6, 4)$

$x$   $y$   $x$   $y$

$y = 4$

$k = \frac{y}{x}$

$\frac{y}{x} = \frac{kx}{x}$

$k = \frac{2}{3}$

$y = \frac{2}{3}x$

$y = \frac{2}{3}(6) = \frac{12}{3} = 4$

$$(16, 12)$$

$$k = \frac{12 \div 4}{16 \div 4} = \frac{3}{4}$$

$$k = \frac{3}{4}$$

$$y = kx$$

$$y = \frac{3}{4}x$$

$$(4, y)$$

$$x = 4$$

$$y = \frac{3}{4} * x$$

$$\left\{ y = \frac{3}{4} * \frac{4}{1} = \right\}$$

$$\frac{3}{1} * \frac{1}{1} = \boxed{3}$$

①

$$(9, 15)$$

$$(3, y)$$

$$5$$

$$k = \frac{y}{x}$$

$$= \frac{15 \div 3}{9 \div 3} = \frac{5}{3}$$

$$y = \frac{5}{3}x$$

$$y = \frac{5}{3} \left( \frac{3}{1} \right) = 5$$

②

$$(-2, 8)$$

$$(x, 12)$$

$$k = \frac{y}{x}$$

$$y = -4x$$

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

$$k = -4$$

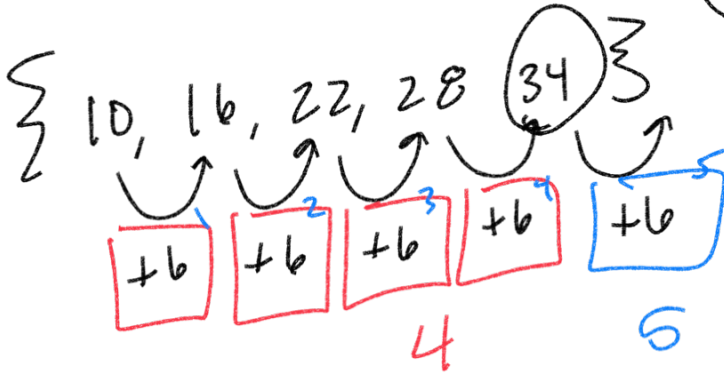
$$\left\{ \frac{12}{-4} = \frac{-4x}{-4} \right\}$$

$$\underline{-3 = x}$$

# Number Patterns

5<sup>th</sup>

6<sup>th</sup>



$n - 1$

27<sup>th</sup> term  
add 6

$27 - 1 = 26$

start # difference

$10 + 6(n - 1)$   $n = \text{term}$

$10 + 6(5 - 1)$

$10 + 6(4) = 10 + 24 = 34$

100<sup>th</sup>

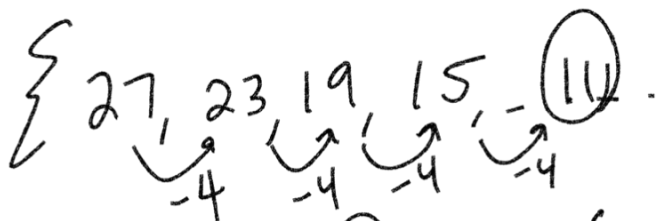
$= 10 + 6(100 - 1)$

$10 + 6(99)$

$10 + 594$

604

$a_n = a_0 + d(n - 1)$   
n<sup>th</sup> term      initial number      difference



$a_n = a_0 + d(n - 1)$

$a_0 = 27$

$d = -4$

5<sup>th</sup>  $n = 5$  11  $27 - 4(5 - 1)$

$27 - 4(4)$

$27 - 16 = 11$

10<sup>th</sup> -9  
 100<sup>th</sup> -369

10<sup>th</sup> term =  $27 - 4(10 - 1)$

$27 - 4(9)$

$27 - 36 = -9$

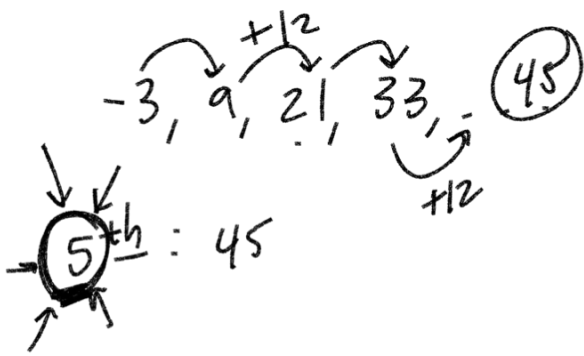
100<sup>th</sup>

$27 - 4(100 - 1)$

$27 - 4(99)$

$27 - 396$

-369



5<sup>th</sup> : 45

10<sup>th</sup> : 105

100<sup>th</sup> 1185

$$a_n = a_0 + 12(n-1)$$

$$\downarrow$$

$$-3 + 12(100-1)$$

$$-3 + 12(99)$$

$$-3 + 1188 = \boxed{1185}$$

$$a_n = a_0 + d(n-1)$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$-3 + 12(5-1)$$

$$-3 + 12(4)$$

$$-3 + 48 = \boxed{45}$$

$$a_n = a_0 + d(n-1)$$

$$\downarrow \quad \downarrow \quad \downarrow$$

$$-3 + 12(10-1)$$

$$-3 + 12(9)$$

$$-3 + 108 = 105$$

HW  
 ch 5.8 evens  
 ch 5.9 evens  
 Online HW 28 } May 4<sup>th</sup>  
 Quiz 28 }  
 HW 26 due tonight  
 HW 27 due April 30<sup>th</sup>

