Curriculum Outcomes:

(PR1) Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.

(PR2) Graph linear relations, analyze the graph and interpolate or extrapolate to solve problems.

Student Friendly: Being able to identify a linear pattern in a t-table.

Feb 6-7:53 AM

Section 4.1

Writing Equations to Describe Patterns

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
1 11 55 165 330 462 462 330 165 55 11 1
1 12 66 220 495 792 924 792 495 220 66 12 1
1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1
14 91 364 1001 2002 3003 3432 3003 2002 1001 364 91 14 1

Pascal's Triangle

Look at each figure is there a pattern?

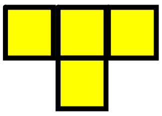


Figure 1

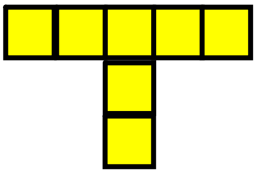


Figure 2

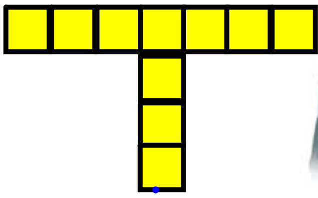


Figure 3

See next slide if you need more help seeing the pattern

F Figure #	B # of Blocks
1 ×3	4
2 ×3	7
3 ×3	10
4	13
5	16
⋮	
100	301

+1 +1 +1 +1

+3 +3 +3 +3

$$\boxed{B = 3f + 1}$$

Equations

$$\boxed{\text{Expression} \quad 3f + 1}$$

100

$$B = 3f + 1$$
$$B = 3(100) + 1$$
$$B = 300 + 1$$
$$B = 301$$

Is there a pattern?

f Figure #	C # Circles
1 ×2	1
2 ×2	3
3 ×2	5
4 ×2	7
5	9
6	11
⋮	
500	999

+1 +1 +1 +1

+2 +2 +2 +2 +2

$C = \#f \pm \#$

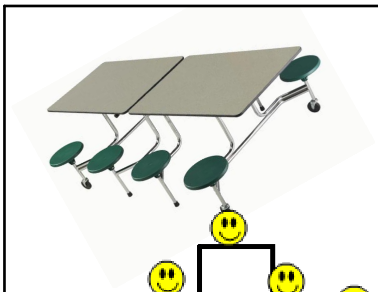
$\boxed{C = 2f - 1}$ Equation

$\boxed{2f - 1}$ Expression

$C = 2(500) - 1$

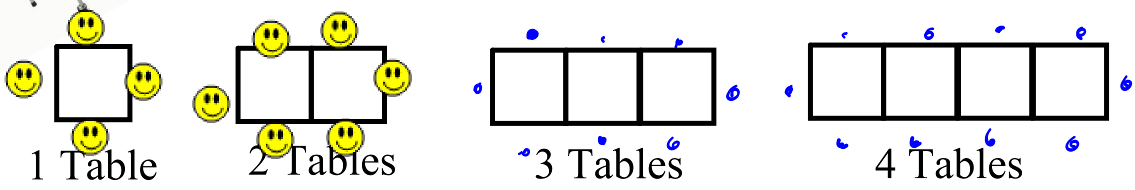
$C = 1000 - 1$

$C = 999$



How many people can sit at the tables?
(only one person per edge)

Table Seating



t # of tables	p # of people	
1 ×2	4	+2
2 ×2	6	+2
3 ×2	8	+2
4	10	
⋮		
⋮		
t		
12	24	

+1 +1 +1

$p = \# t \pm \#$

$$\boxed{p = 2t + 2}$$

Equation

Expression

$2t + 2$

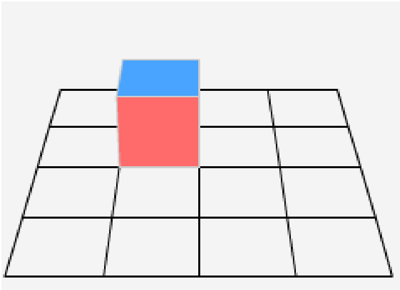
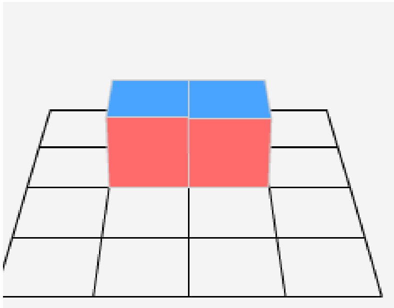
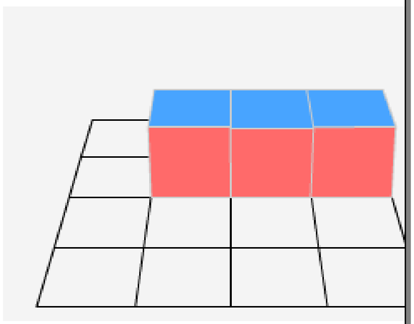
$p = 2(12) + 2$

$p = 24 + 2$

$p = 26$

MIGHT BE TOO HARD
SO Might remove

Remember Connecting Cubes

c # of cubes	f # of faces exposed
1 ×4	6
+1 2 ×4	10 +4
+1 3 ×4	14 +4
+1 4	18 +4
+1 5	22 +4
⋮	
25	102

$f = \#c \pm \#$

$$\boxed{f = \frac{4}{1}c + 2}$$

Equation

Expression
$4c+2$

$f = 4(25) + 2$

$f = 100 + 2$

$f = 102$

T- Tables or Input/Output tables

x	y
1 ×5	3
2 ×5	8
3 ×5	13
4	18
5	23
6	28
⋮	
100	498

+1 +1 +1 +1 +1

+5 +5 +5 +5 +5

$$y = \# x \pm \#$$

change Head

$$\boxed{y = \frac{5}{1}x - 2}$$

Equation

$$y = \frac{5}{1}x - 2$$

$$y = \frac{5}{1}(100) - 2$$

$$y = 500 - 2$$

$$y = 498$$

x	y

change in x

change in y

$$y = \#x \pm \#$$

chart

head

$$y = \frac{\Delta y}{\Delta x}(x) \pm \#$$

T- Tables or Input/Output tables

x	y
1	-3
2	-7
3	-11
4	-15
5	-19
6	-23
.	
.	
.	
100	-399

+1 +1 +1 +1

x(-4) x-4 x(-4) x(-4)

-4 -4 -4 -4

Write an equations $y = \frac{\Delta y}{\Delta x}(x) \pm \#$

$$\boxed{y = \frac{-4}{1}(x) + 1}$$

Write an expression for the relationship

$-4x + 1$

$$y = \frac{-4}{1}x + 1$$

$$y = -4(100) + 1$$

$$y = -400 + 1$$

$$y = -399$$

Mar 9-4:43 PM

T- Tables or Input/Output tables

x	y
1	-2
2	6
3	14
4	22
5	30
6	38
.	
.	
.	
100	790

+1 +1 +1 +1 +1

×8 ×8 ×8

+8 +8 +8 +8 +8

Write an equations

$$y = \frac{\Delta y}{\Delta x} x \pm \#$$

$$\boxed{y = \frac{8}{1} x - 10}$$

Write an expression for the relationship

$$8x - 10$$

$$y = 8x - 10$$

$$y = 8(100) - 10$$

$$y = 800 - 10$$

$$y = 790$$

Equation

x	y

Δx ( ) Δy

chart

head

$$y = \left(\frac{\text{Change y}}{\text{Change x}}\right)(\text{"x"}) \pm \#$$

$$y = \frac{\Delta y}{\Delta x}(x) \pm \#$$

X → independent

y → dependent

Nov 13-11:27 AM

T- Tables or Input/Output tables

$\Delta x = 2$ | Δy

x	y
0	5
2	8
4	11
6	14
8	17
.	
.	
.	
100	1

$+2$ $+2$ $+2$ $+2$ $\times\frac{3}{2}$ $+3$ $+3$ $+3$ $+3$

Write an equations

$y = \frac{\Delta y}{\Delta x} x \pm \#$

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

$\boxed{y = \frac{3}{2} x + 5}$

Write an expression for the relationship

$\frac{3}{2}x + 5$

$y = \frac{3}{2}(100) + 5$

$y = 150 + 5$

$y = 155$

Mar 9-4:43 PM

A large water tower holds 15000 liters of water, however during the winter the water tower was damaged and started to leak. This table shows the amount of water every hour after it sprung the leak. The level of water changes at a constant rate.

Time (t hours)	Amount (A Liters)	
0	15 000	
1	14 800	-200
2	14 600	-200
3	14 400	-200
4	14 200	-200

i) Write an ***equation*** that relates the amount of water to the time since it started leaking.

$$A = -200\,t + 15000$$

i) Write an ***expression*** for the amount in terms of the time since the water tower began to leak.

$$-200\,t + 15000$$

iii) How much water in the water tower after 10 hours?

$$\begin{aligned} A &= -200\,t + 15000 \\ &= -200\,(10) + 15000 \\ &= -2000 \quad + 15000 \\ &= 13000 \end{aligned}$$

iv) When will the water tower be empty?

Solve for t

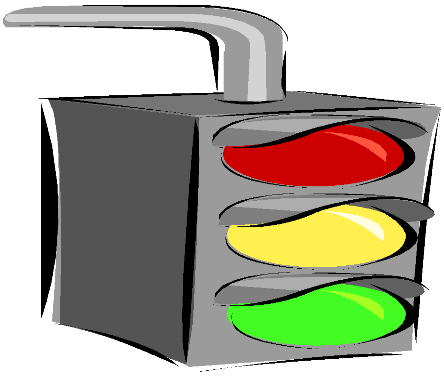
$$0 = -200\,t + 15000$$

$$0 - 15000 = -200\,(t)$$

$$-15000 = -200\,(t)$$

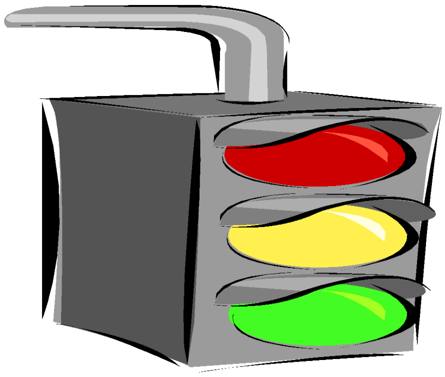
$$\frac{-15000}{-200} = \frac{-200\,(t)}{-200}$$

$$75 \quad = t$$



Now it is time for Home Learning

Oct 27-10:41 PM



Class/Homework

Must
Show
ALL
WORK

PAGE 159-161

QUESTIONS

4,5,6,7,8,9,

11, 12, 14, 15,

16, 18,19,20

Oct 27-10:41 PM