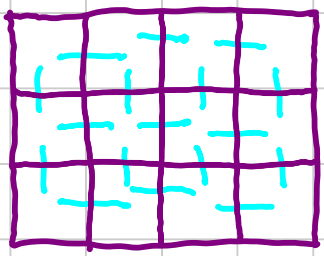
5-22-21 Navajo Math Session

Note Title 5/22/2021

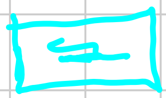
Give yourself points when your students talk.
Subtract points when you talk....

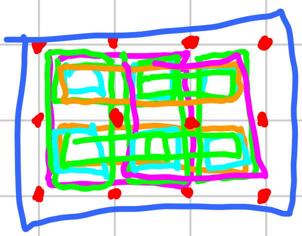


4 × 3 = 12.

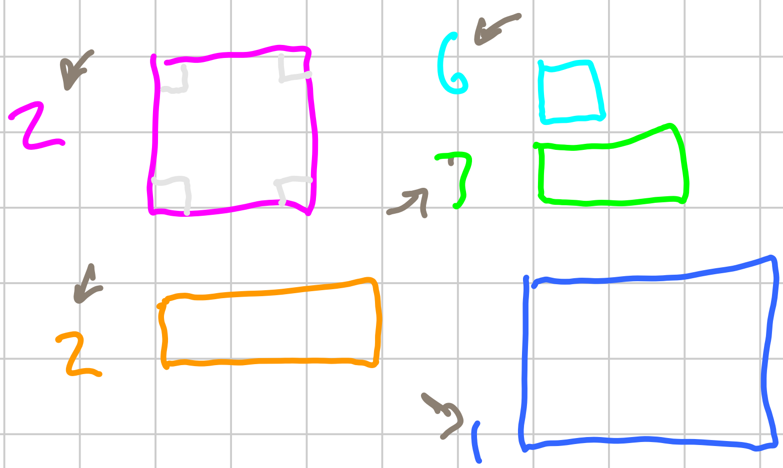
17

or





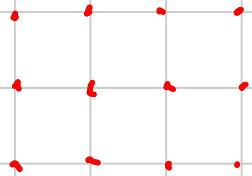
4×3 = 12 Dots



So

18 rectangles.

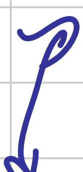
rectangles/squares



4 # 3 = 18

= # of rectangles

Related??



4×3 = 12 2×3 = 6 12+6 = 18

THINK ABOUT *.

Examples

$1 \times 5 = 5$ $1 \times 53 = 53$

Q: $= * 5 = 5$?

A table.

x	1	2	3
1	1	2	3
2	2	4	6
3	3	6	9

$14 \times 13 = 13 \times 14$

$14 * 13 = 13 * 14$

$13 * 14 = ?$ ← Need to Draw account?

$4 * 3$ $13 \times 4 =$

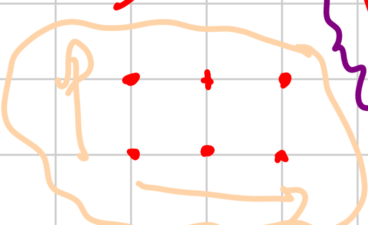
18

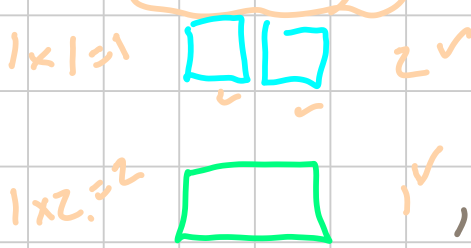
$2 \cdot 2 \cdot 2 \cdot 2 = 16$

$+ 2 = 18$?

EXAMPLES ROCK !!

$3 * 2.$





$3 * 2 = 3$

" 3 types of rectangles?

Conjecture

1x1 = 1

1x4 = 4

1x2 = 2

4 * 2

3 — 1x1

2 — 1x2

1 — 1x3

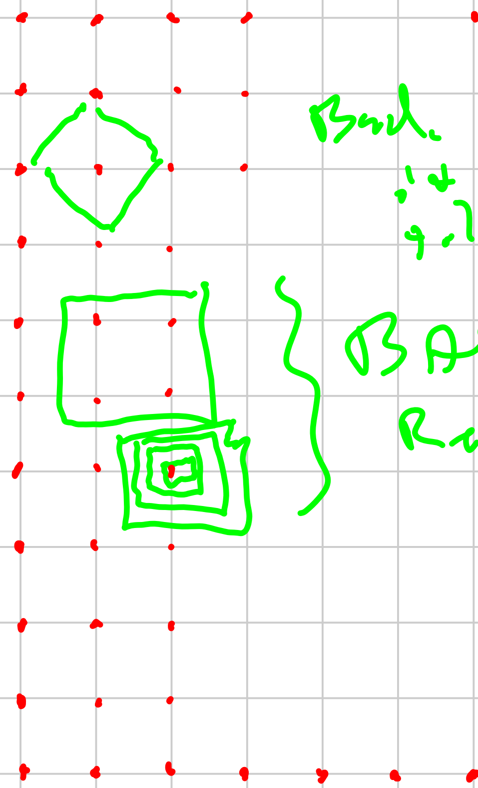
= 6

1 3 5

7 x 11

→ 6 x 10

Draw a grid with 7 dots horiz. & 11 dots vertical.



Bad. Square not tilted.

BAD Rectangles

Can rectangles go around dot?

Can rectangles overlap?

6x10 + 7x11 ??

State the problem

A triangle . . .

*** DRAW A PICTURE ***

→ Great problem solving technique.

Question

Does orientation matter? [Name.!]

Ans No! Guess [Name]

Reason Just turn your paper!

David's observation!!

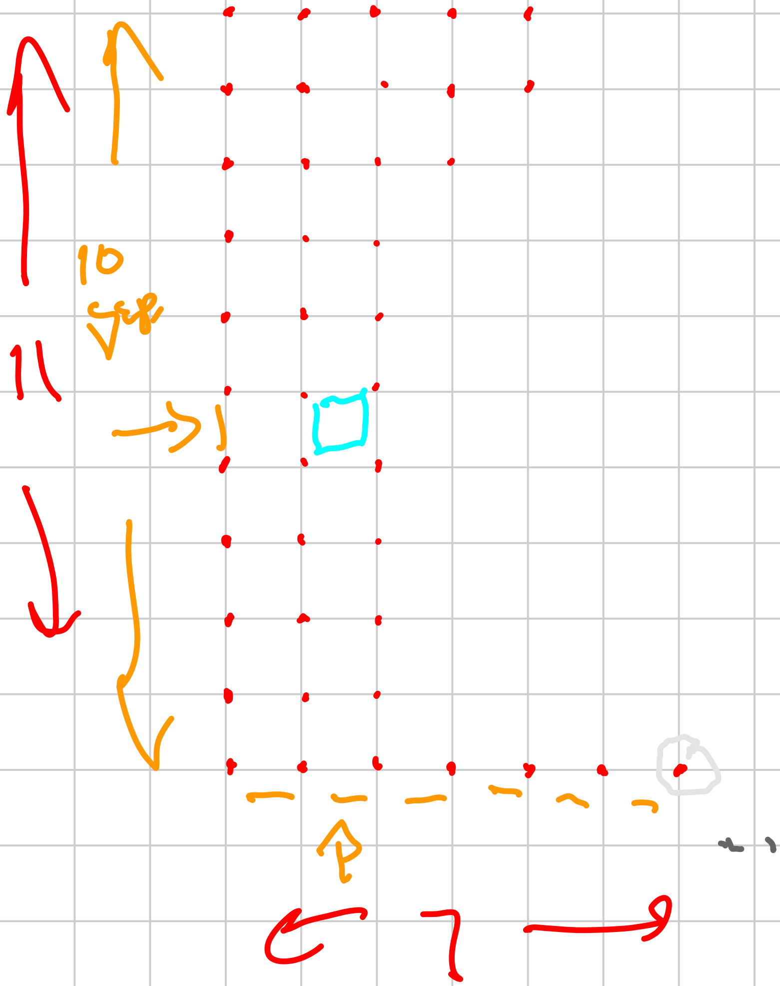
Would need to state at the

unknown . . .

1 * 5 = 1 * 17 = . . .

David conjecture

5 17.



1st Draw a grid, with 7 dots wide & 11 dots high

2nd Draw rectangles with rect

a) Corners on grid

b) & vertical & horizontal sides

c) i) must have 4 distinct corners

⟺ ii) must have positive area,

⟺ iii) each side must be positive

3rd Count total rectangles meeting 2 a, b, c.

7 dots ⇒ 6 Gaps

43 dots ⇒ ~~48~~ Gaps
42.
||
43 − 1

Because the last Dot: is not the left of a Gap

7 * 11

(7 - 1) = 6 unit gaps

(11 - 1) = 10 unit gaps

∴ 60 1 × 1 squares!

1 * 5 ⋮ 1 * 5 = 0

1 * 17 = 0

No width.

ANS 1 * n = 0 [Joy!]

Reason: Because there is no ways to draw rectangle count from 1 column.

Collect Data.

Examples First!

ORGANIZE YOUR WORK

#	1	2	3	4	5	6	7
1	0	0	0	0	0	0	
2	0	1	3	6	10	15	21
3	0	3		18			
4	0	6					
5	0						
6	0						

2 × 2

Rule.

Conjecture

$2 * (n+1) = 2 * n + n.$

Example

$2 * 8 = 2 * 7$

$21 + 7 = 28$

1

3

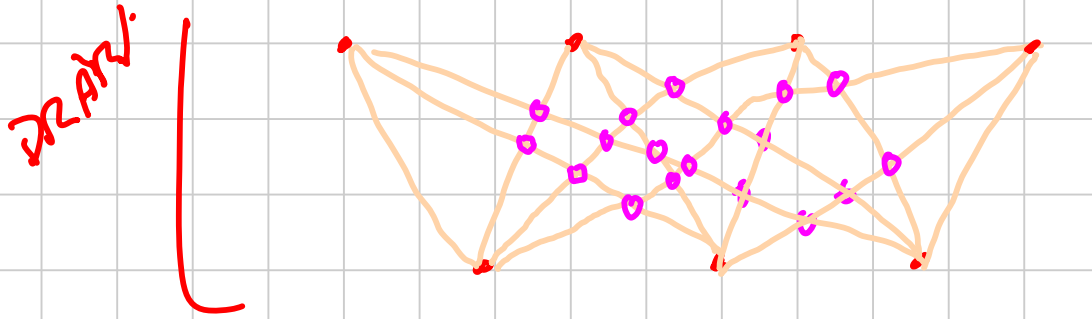
6

10

Triangular Numbers

Mult 2 1) Put a row of 4 Dots.

2) Put a row of 3 Dots Beneath.



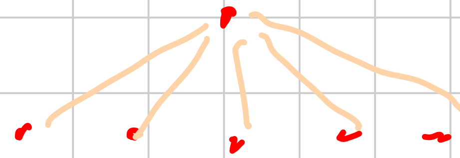
# of Comp = 4×3

AND CONNECT DOTS ON TOP WITH DOTS ON BOTTOM (IN ALL WAYS)

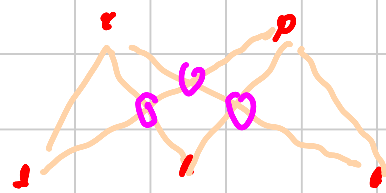
(NO * : intersecting)

4 th Count Dots Coincidence??

$4 \otimes 3 = 18$

$1 \otimes 5$  $= 0$

$1 \otimes 17 = 0$

$2 \otimes 3$  $= 3$

Next >

G_1 G_2 G_3 G_4

B_1 B_2 B_3

How many ways can you Make a "Double date"?

2 boys 2 Girls.

G_1 G_2

B_1 B_2 B_3

$G_1 G_2 B_1$

$G_1 G_2 B_2$

$G_1 G_2 B_3$

3 ways!

2 D 3 = 3 !

Look at #s in TRADITIONAL NAVAJO WEDDING BASKETS!!

4 sacred mountains

2 in middle

clouds...

Women

Fix #s

& patterns.

Patho

UTES use 5's Fe...