$$a_{n+1} = a_n + 3$$

$a_1 = 2$, $a_2 = a_1 + 3 = 2 + 3 = 5$, $a_3 = a_2 + 3 = 5 + 3 = 8$

Q: what a_{100} ?

↳ need closed formula !!

$$a_{100} = a_{99} + 3$$
$$= (a_{98} + 3) + 3$$
$$= (a_{97} + 3) + 3 + 3$$
$$\vdots$$
$$= a_1 + \underbrace{3 + 3 + \cdots + 3}_{99 \text{ copies}}$$

$$\Rightarrow \boxed{a_{100} = a_1 + 99 \cdot 3}$$

$a_1 = 2$ (difference

$a_{100} = 2 + 3 \cdot 99$

$\overset{!}{=} 299$

Arithmetic seq only!!

$a_{n+1} = a_n + 5$

$a_1 = -2000$

what is

$a_{200} = -2000 + 199 \cdot 5$

$\overset{!}{=} -2000 + 995$

$\overset{!}{=} -1005$

upshot:

$a_1 \xrightarrow{+d} a_2 \xrightarrow{+d} a_3 \xrightarrow{+d} a_4 \rightarrow \cdots$

arithmetic since recursive $\rightarrow$ $a_{n+1} = a_n + d$

recursive formula

either is ok!

closed formula

$a_{n+1} = a_1 + n \cdot d$

$a_n = a_1 + (n-1)d$

common diff

arithmetic

- $d = 2$
- $a_1 = -3$

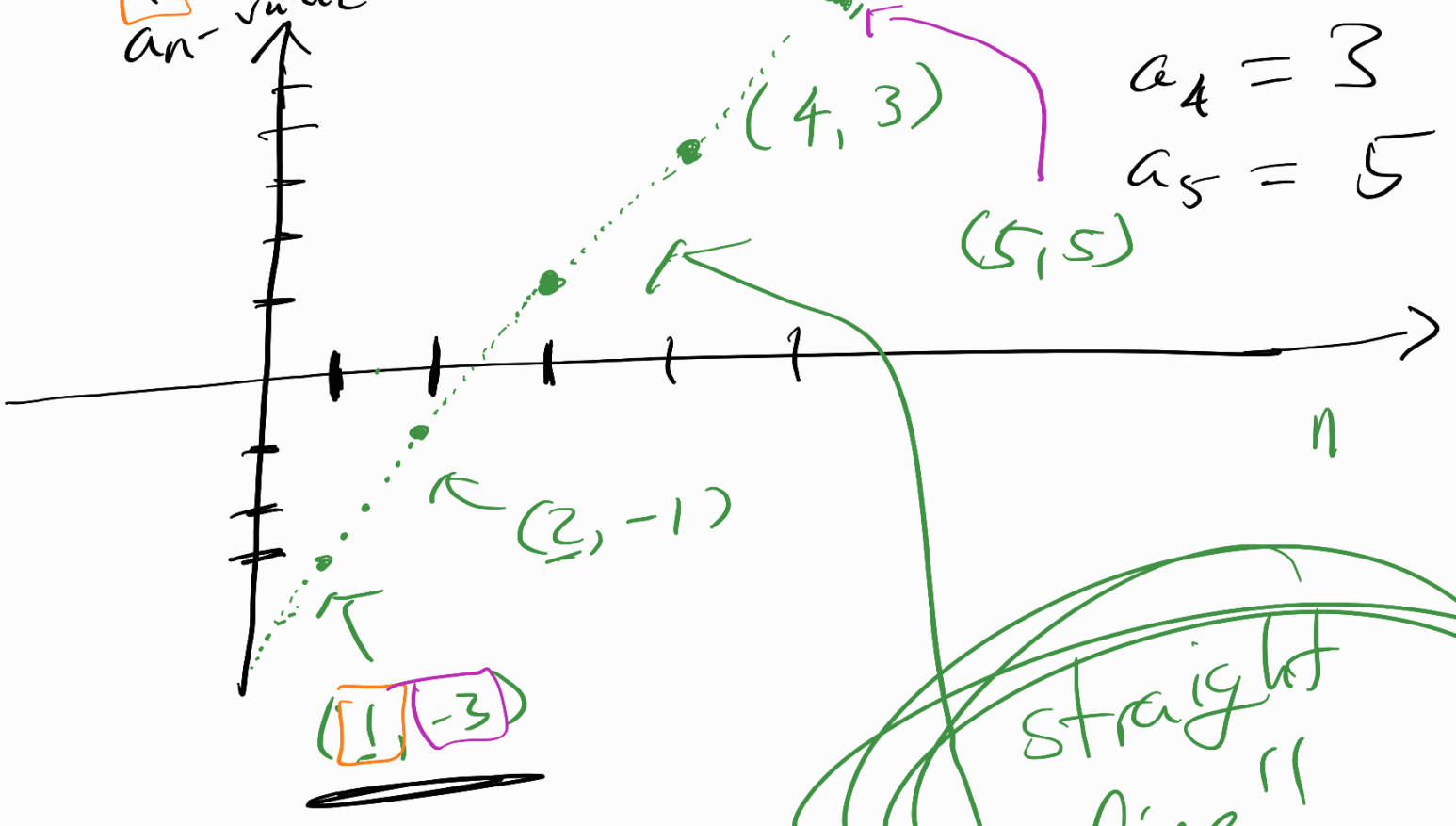
$a_2 = -3 + 2$

$= -1$

$a_3 = 1$

$a_4 = 3$

$a_5 = 5$



straight line!!

slope: $\frac{2}{1} = 2$

same as common difference!!

(should we?)

① Why can we connect the dots?

$$y = 2x + b$$

$$-3 = 2(1) + b$$

$$-3 = 2 + b$$

$$\Rightarrow b = -3 - 2$$

$$b = -5$$

$y = 2x - 5$

this

$a_n = 2n - 5$

$f(x) = 2x - 5$