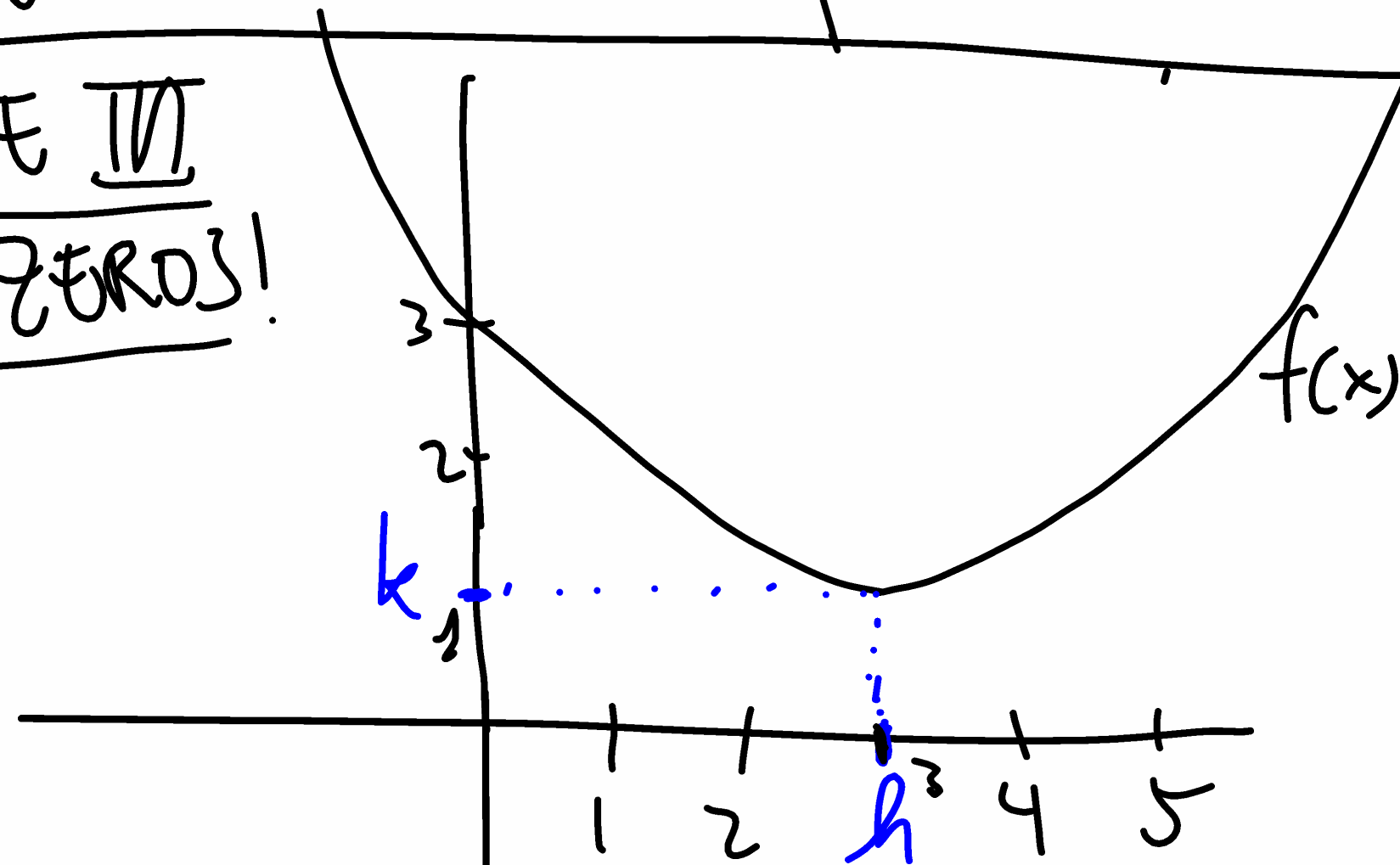


Determine a function from its graph (II) Fri Mar 1 2019

CASE III
NO ZEROS!



ANS: We cannot use factor form. But we can use vertex form

$$f(x) = a(x-h)^2 + k$$

$f(x) = \frac{2}{9}(x-3)^2 + 1$

From the graph we can read the location of the vertex $(3, 1)$. Hence

For a , we look at the y-intercept: $f(0) = 3$

Substituting $f(0)$

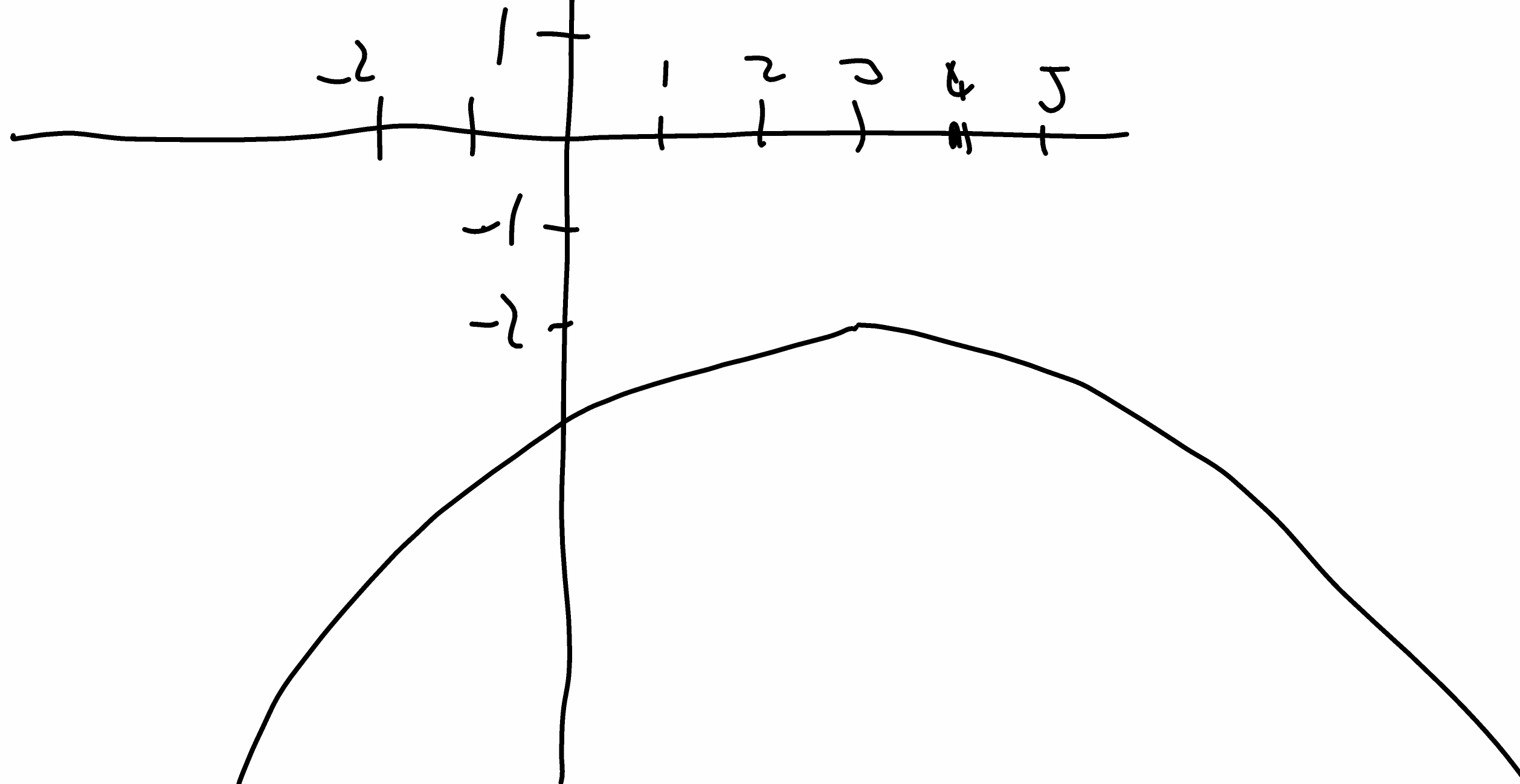
$$a(0-3)^2 + 1 = 3$$

$$\rightarrow 9a + 1 = 3 \rightarrow 9a = 2 \rightarrow a = \frac{2}{9}$$

$$\boxed{\begin{matrix} h=3 \\ k=1 \end{matrix}}$$

Exercise:

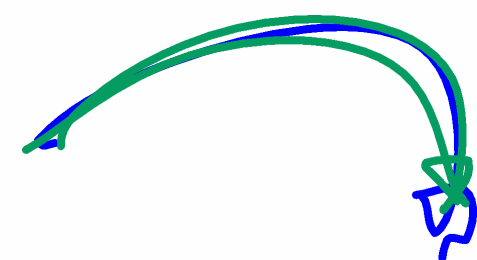
Determine the function from its graph
(Solution in next slide)



$$f(x) = a(x-3)^2 - 2$$

$$f(0) = a(0-3)^2 - 2$$

$$9a - 2 = -3$$



y-intercept is $f(0)$
& $f(0) = -3$
From graph

$$a(0-3)^2 - 2 = -3$$

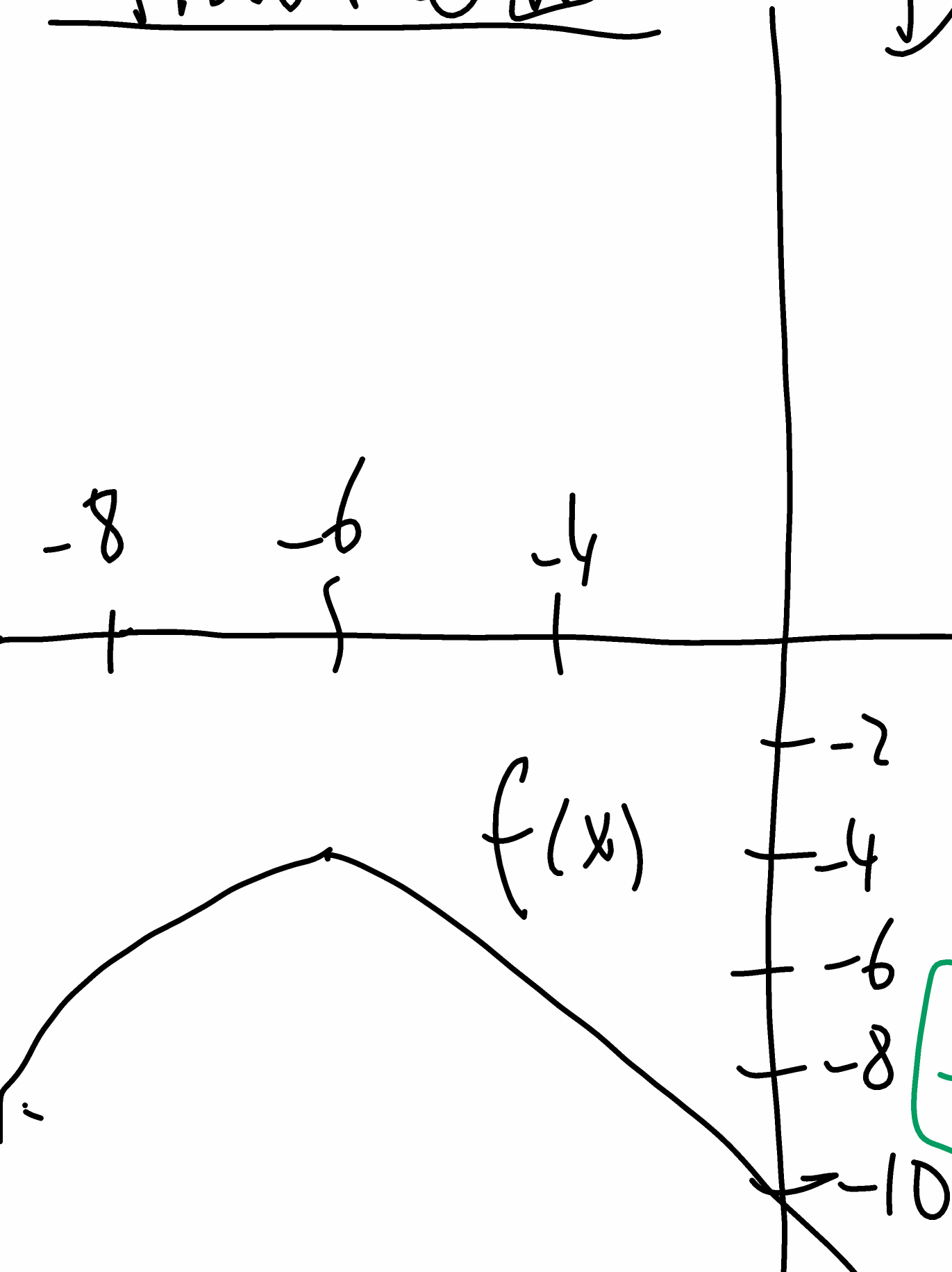
$$9a - 2 = -3$$

$$9a = -1$$

$$a = -\frac{1}{9}$$

Practice II

Determine $f(x)$ from this graph



$$f(x) = a(x-h)^2 + k$$

$$\text{vertex at } (-6, -4) \Rightarrow \begin{matrix} h = -6 \\ k = -4 \end{matrix}$$

$$\text{y-intercept } f(0) = -10$$

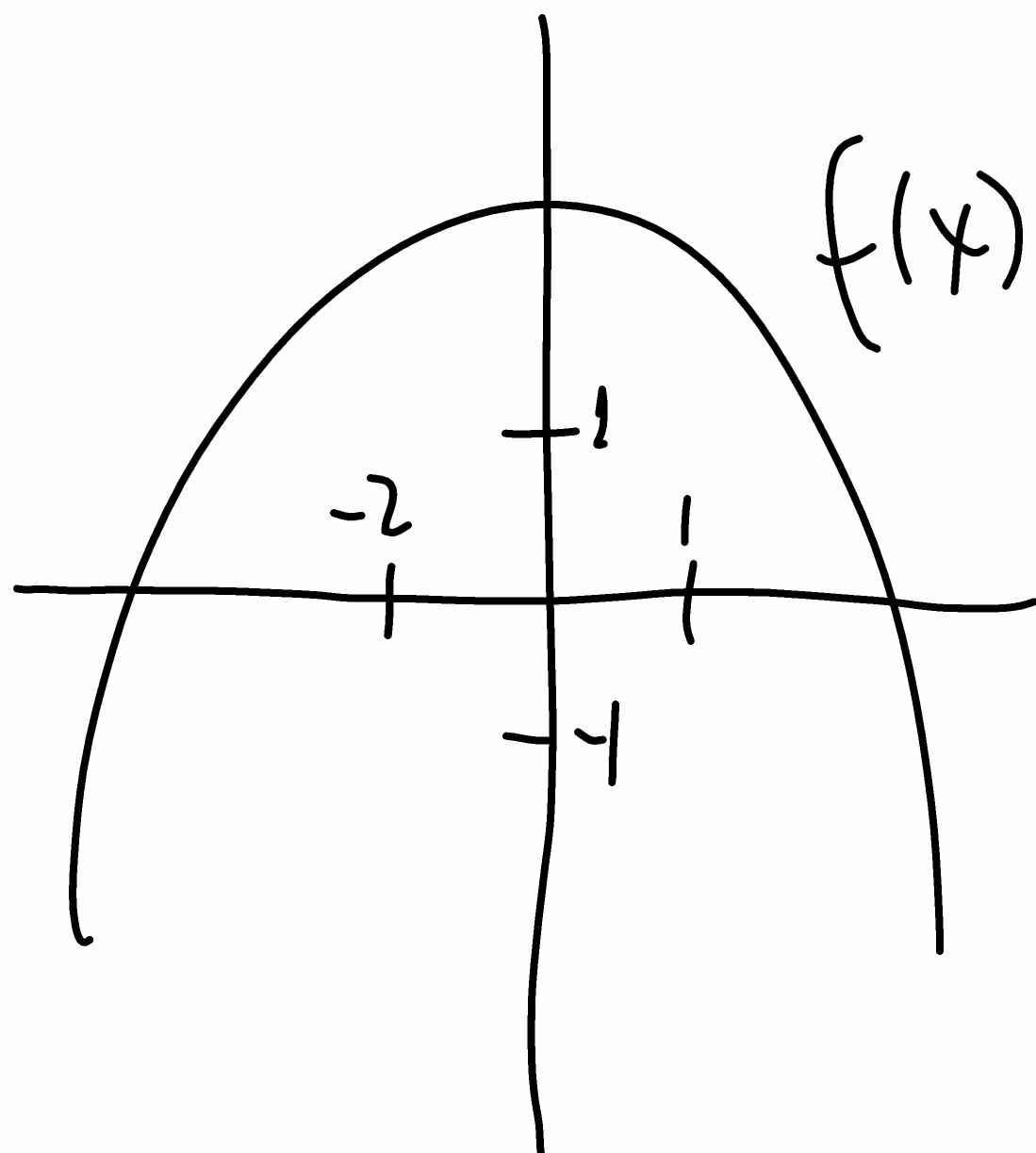
$$\text{From above expression: } a(0+6)^2 - 4 = -10$$

$$a \cdot 6^2 - 4 = -10$$

$$a \cdot 36 = -10 + 4 = -6 \quad \left| a = \frac{-6}{36} \right|$$

$$f(x) = \frac{-1}{6}(x+6)^2 - 4$$

ALL THESE METHODS WORK ONLY IF WE
CAN EASILY READ THE NECESSARY VALUES
FROM THE GRAPH



Example: This ~~case~~ cannot be
solved exactly from the graph
alone

If we had a finer division of the
x-axis maybe then we could
determine the x-intercepts exactly &
use factor form.