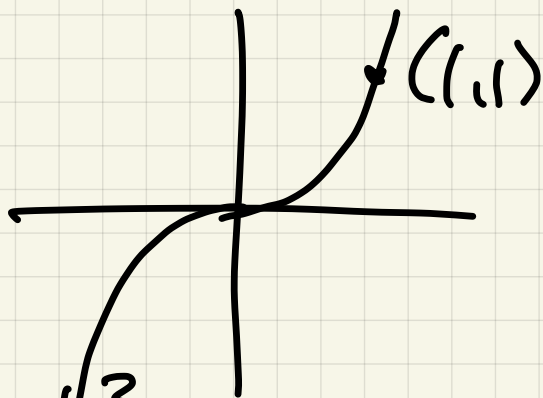
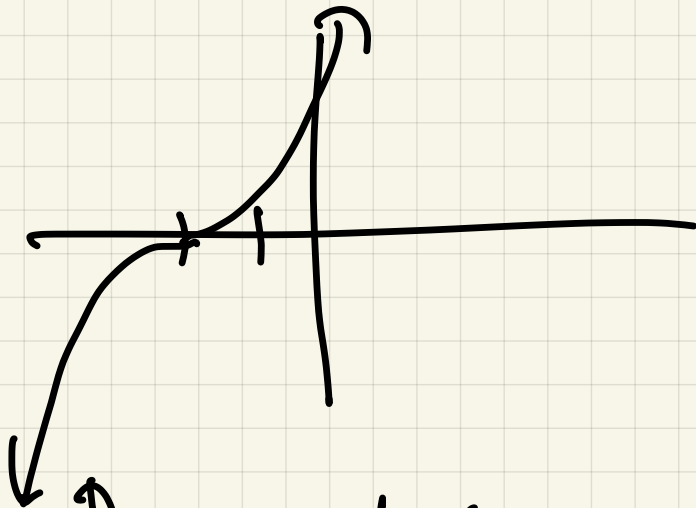


10/19 (Precalc)

1 (a) $y = x^3$



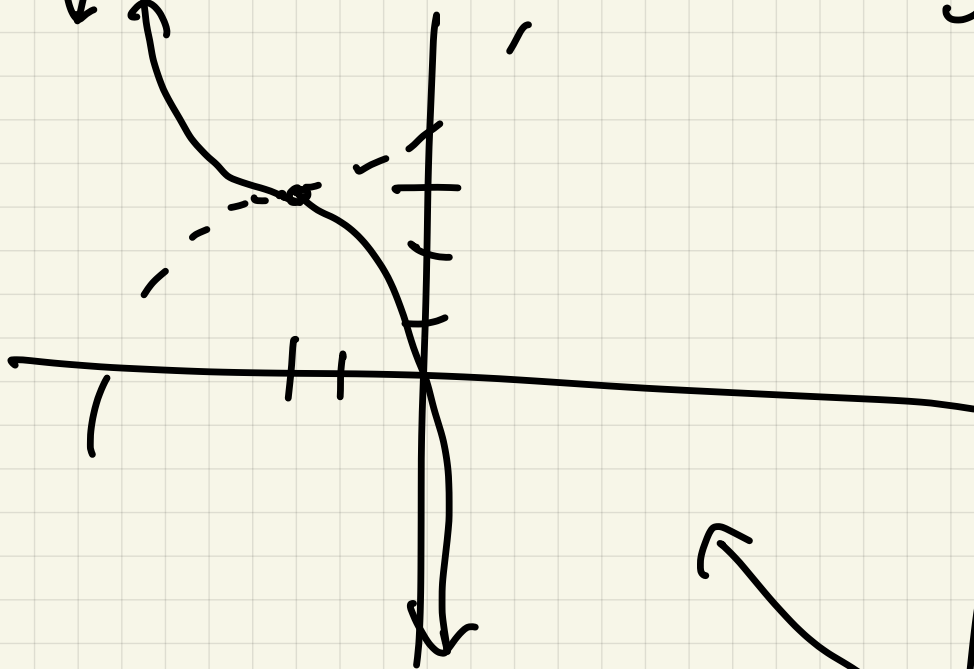
(b) $y = (x+2)^3$



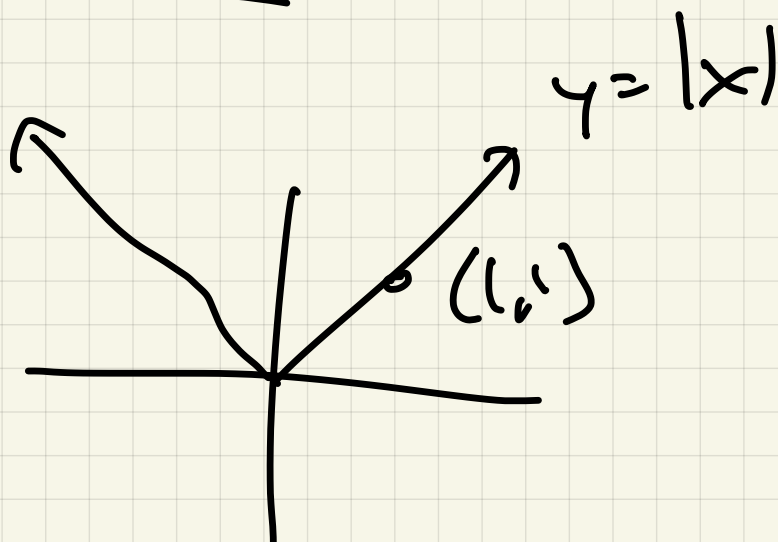
(c)

$y = 3 - (x+2)^3$

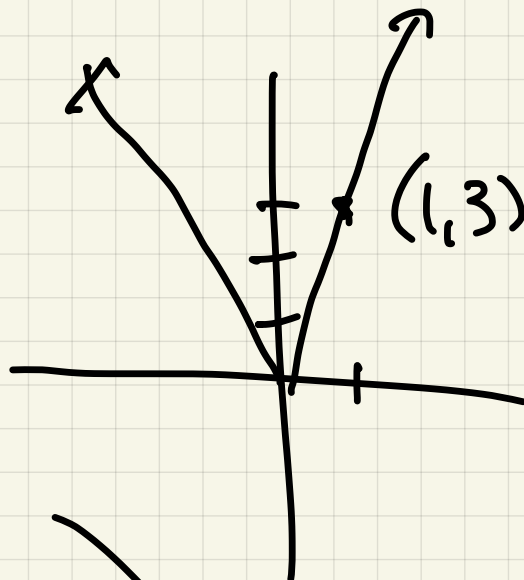
↑ reflect
↑ up shift



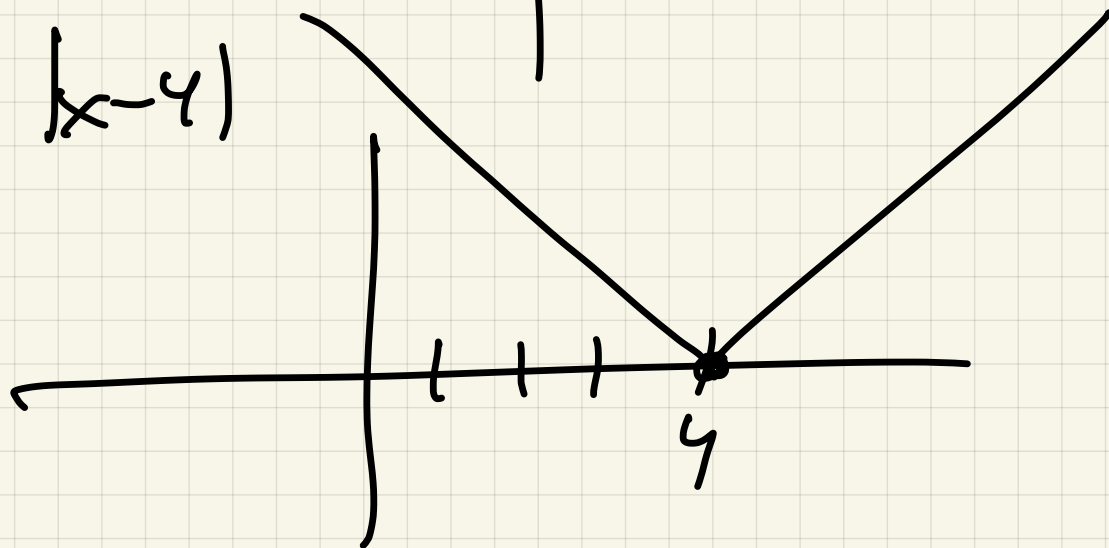
2



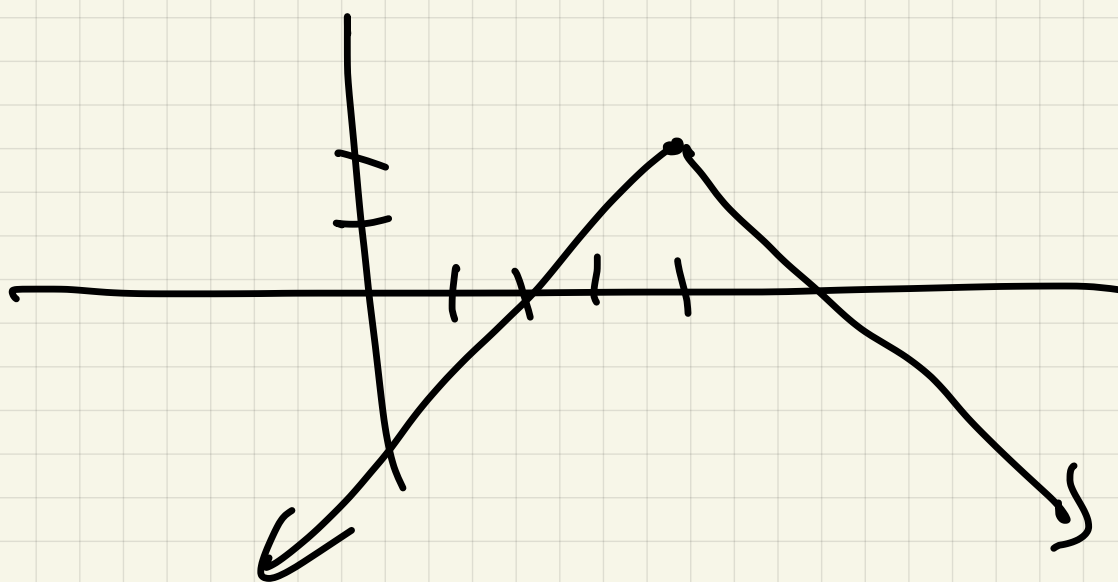
(a) $y = 3|x|$



(b) $y = |x - 4|$



(c) $y = 2 - |x - 4|$



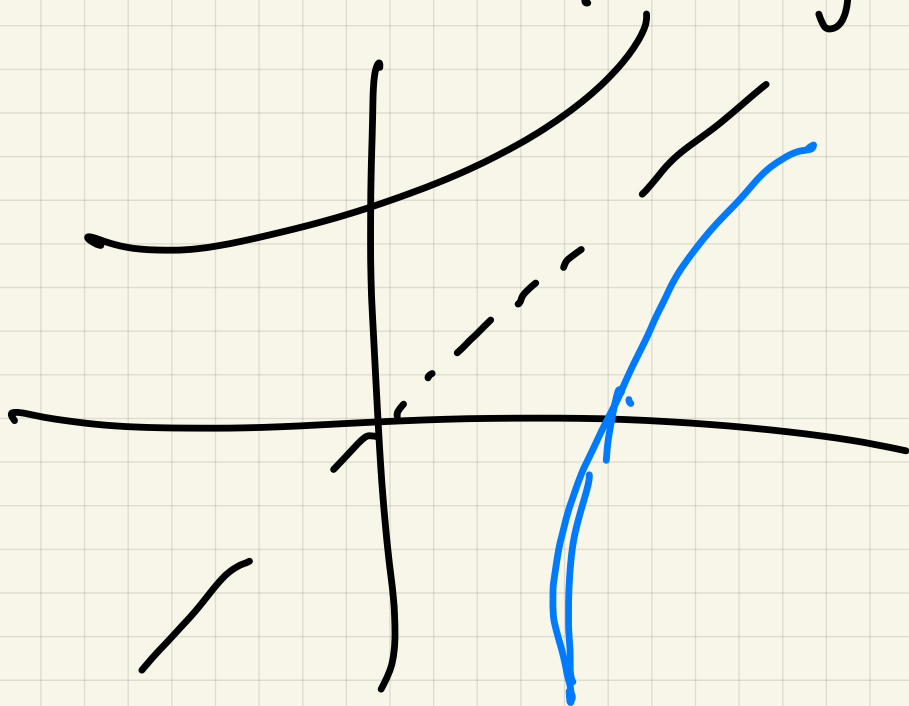
Last time

Inverse functions

f, g are inverses

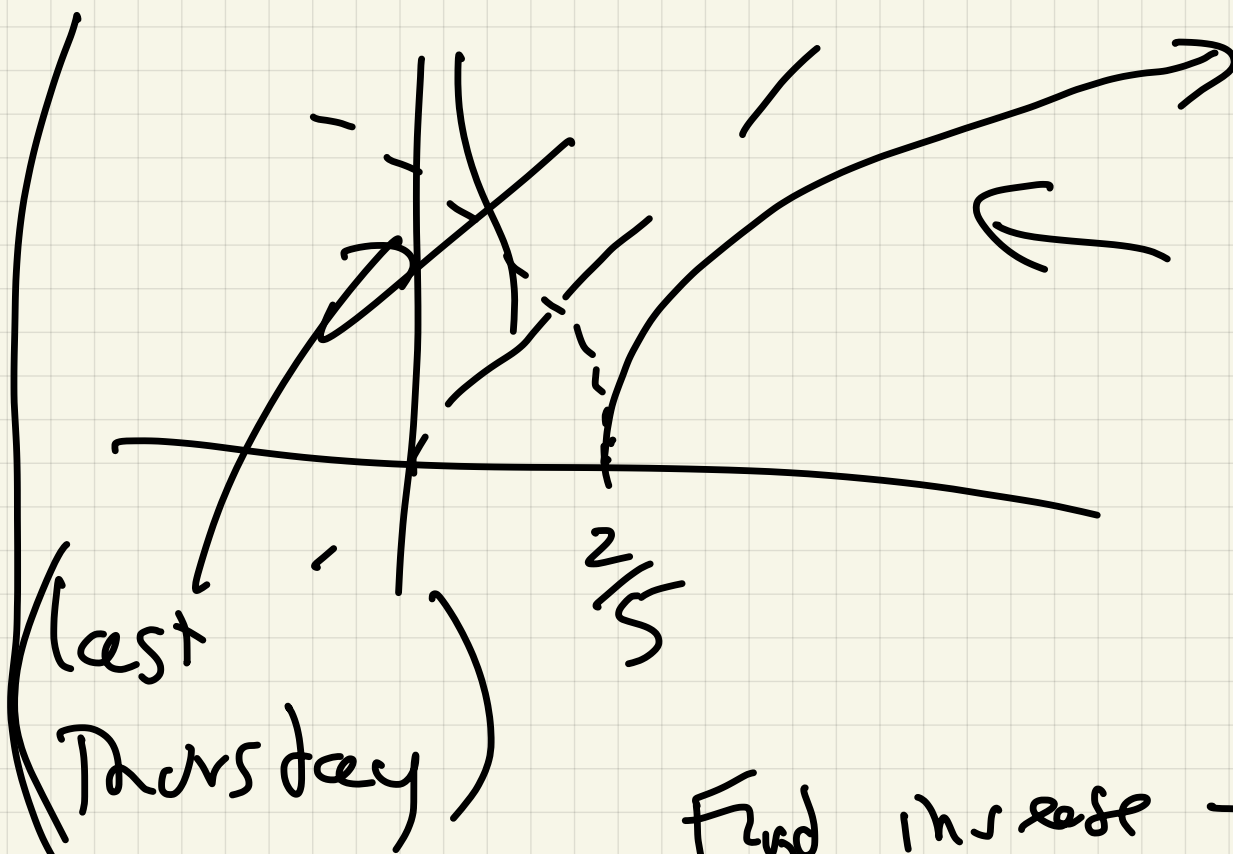
$$\begin{cases} f(g(x)) = x & x \text{ in dom } g \\ g(f(x)) = x & \text{all } x \text{ in dom } f \end{cases}$$

Graphs: related by reflection
through line $y=x$



Ex 0

$$\begin{aligned} y = f(x) &= \sqrt{5x-2} \\ &= \sqrt{5\left(x-\frac{2}{5}\right)} \\ &= \sqrt{5} \sqrt{x-\frac{2}{5}} \end{aligned}$$



Find inverse function

$$y = \sqrt{5x-2} \rightarrow \text{inverse}$$

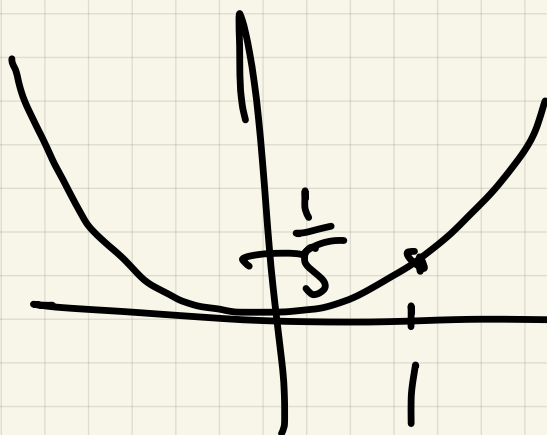
$$x = \sqrt{5y-2}$$

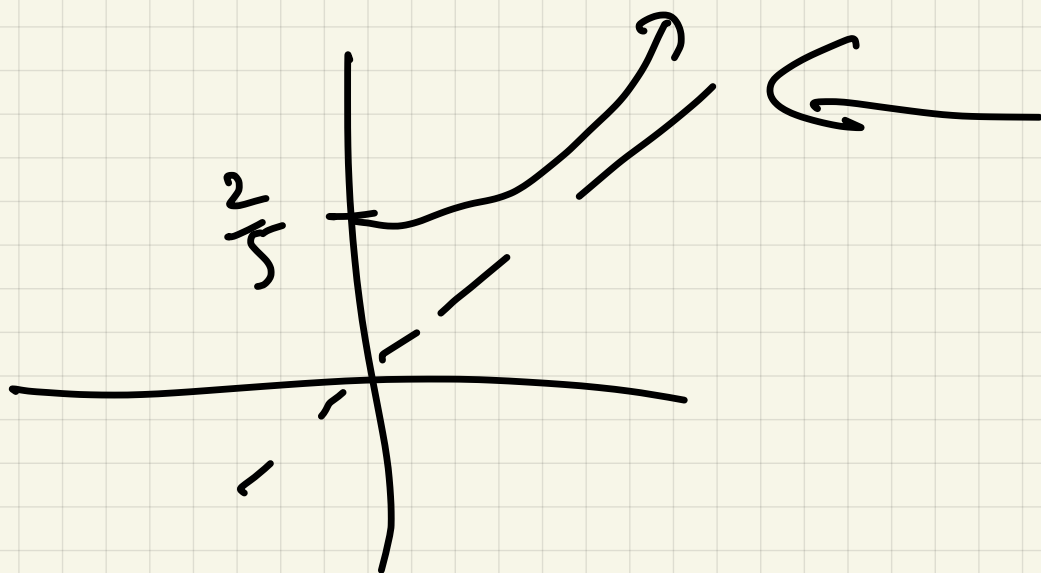
$$x^2 = 5y-2$$

$$x^2 + 2 = 5y$$

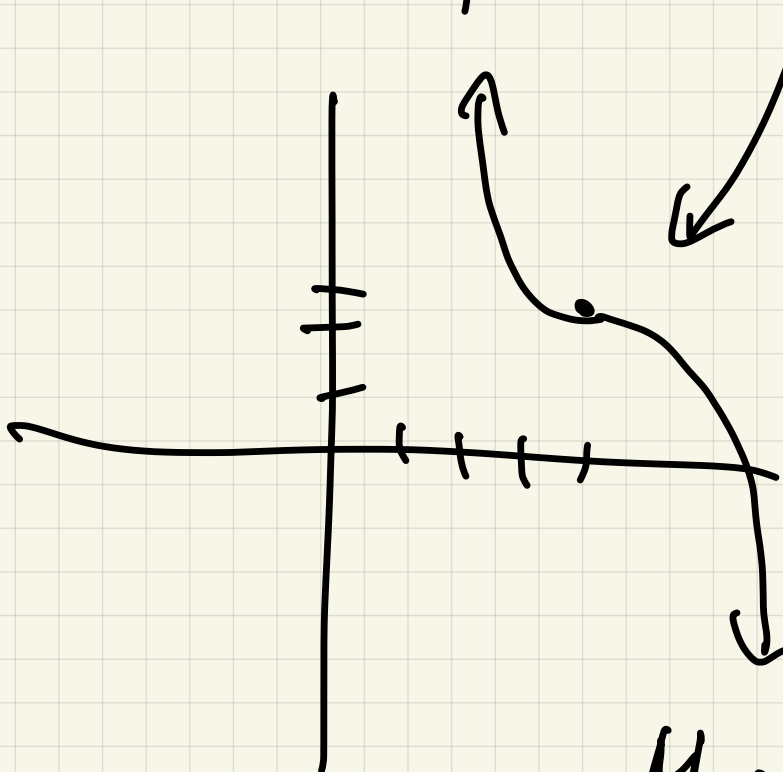
$$y = \frac{x^2 + 2}{5}$$

$$y = \frac{1}{5}x^2 + \frac{2}{5}$$





Ex $y = f(x) = 3 - (x-4)^3$
 sketch, find inverse:



$$x = 3 - (y-4)^3$$

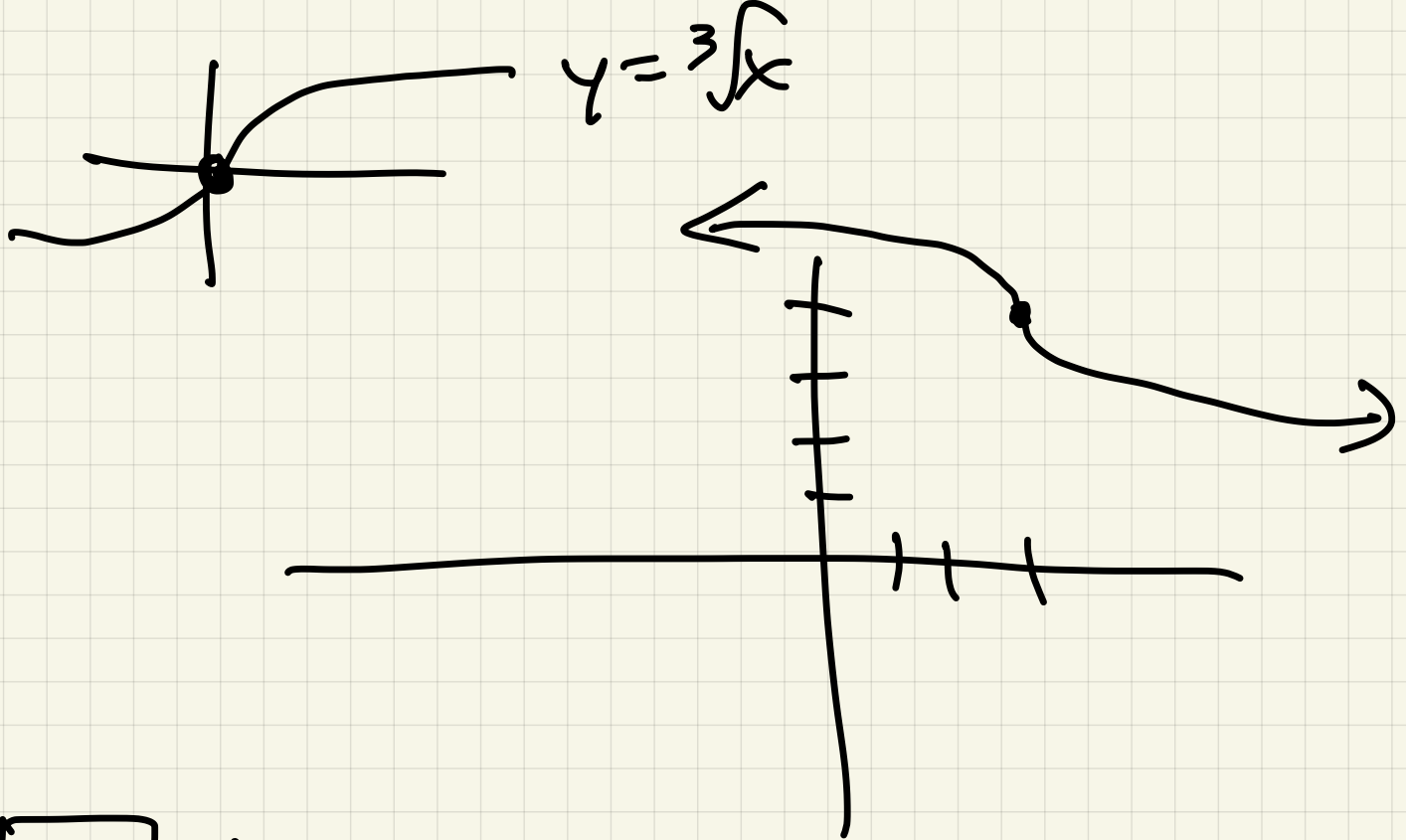
$$x-3 = -(y-4)^3$$

$$3-x = (y-4)^3$$

$$\sqrt[3]{3-x} = y-4$$

$$4 + \sqrt[3]{3-x} = y$$

$$y = 4 + \sqrt[3]{-(x-3)}$$



3.1 Defn:

A polynomial function has form

$$y = f(x) = a_d x^d + a_{d-1} x^{d-1} + \dots + a_0$$

$a_d \neq 0$, $d = \text{degree } f$

A quadratic function has form

$$y = f(x) = ax^2 + bx + c$$

In §2.1: Can accurately sketch

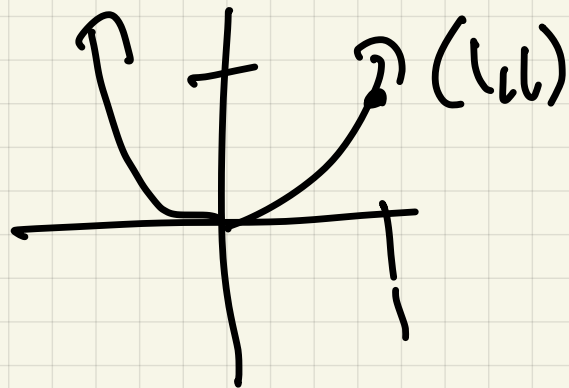
any $y = ax + b$

In §3.1: Can accurately sketch

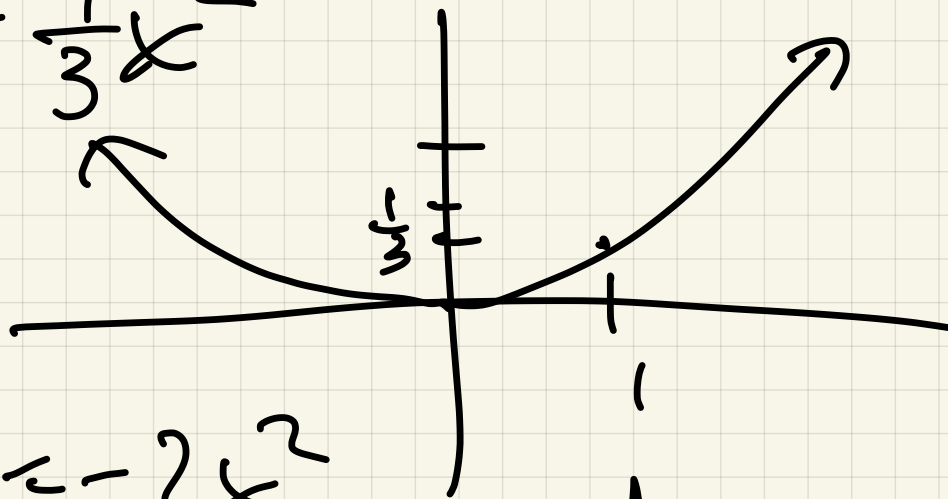
$$y = \underline{ax^2} + \underline{bx} + \underline{c}$$

(ex) $y = x^2$ Sketch graphs

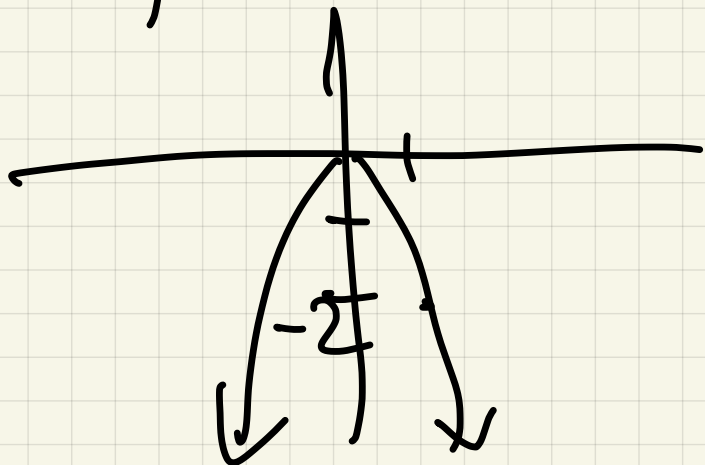
(a) $y = x^2$



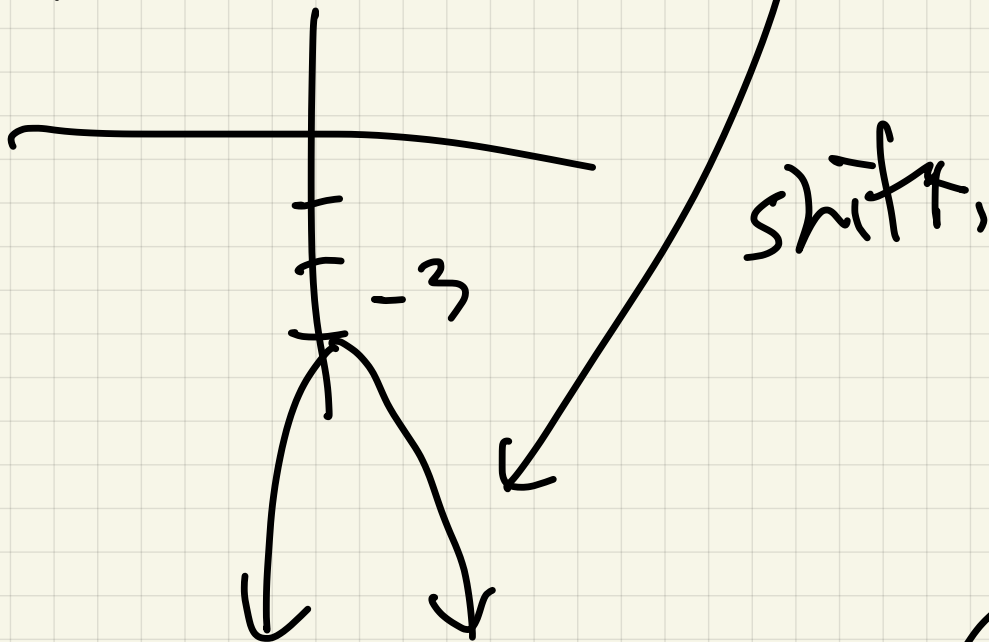
(b) $y = \frac{1}{3}x^2$



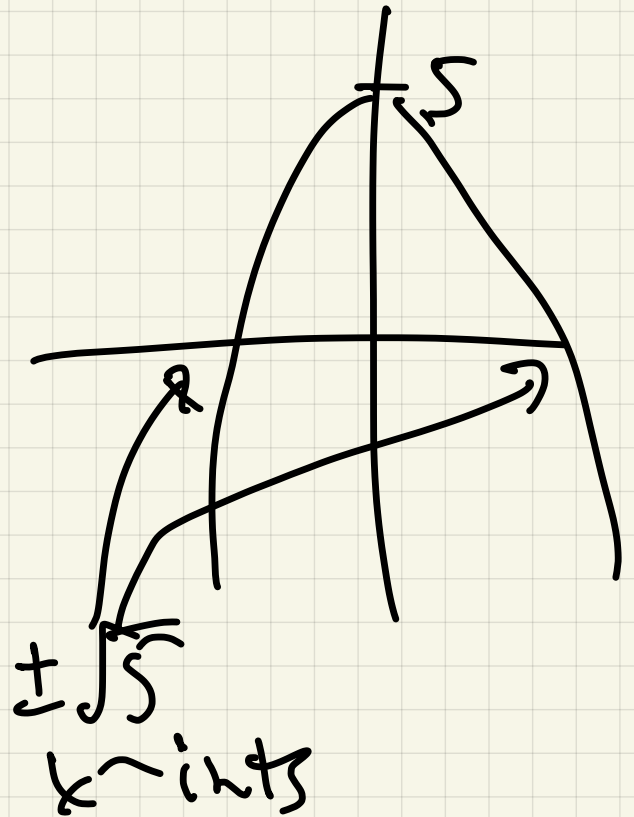
(c) $y = -2x^2$



$$(d) y = -2x^2 - 3$$



$$(e) y = -x^2 + 5$$



What if $b \neq 0$?

Ex 2 (a) $y = x^2 - 4x$

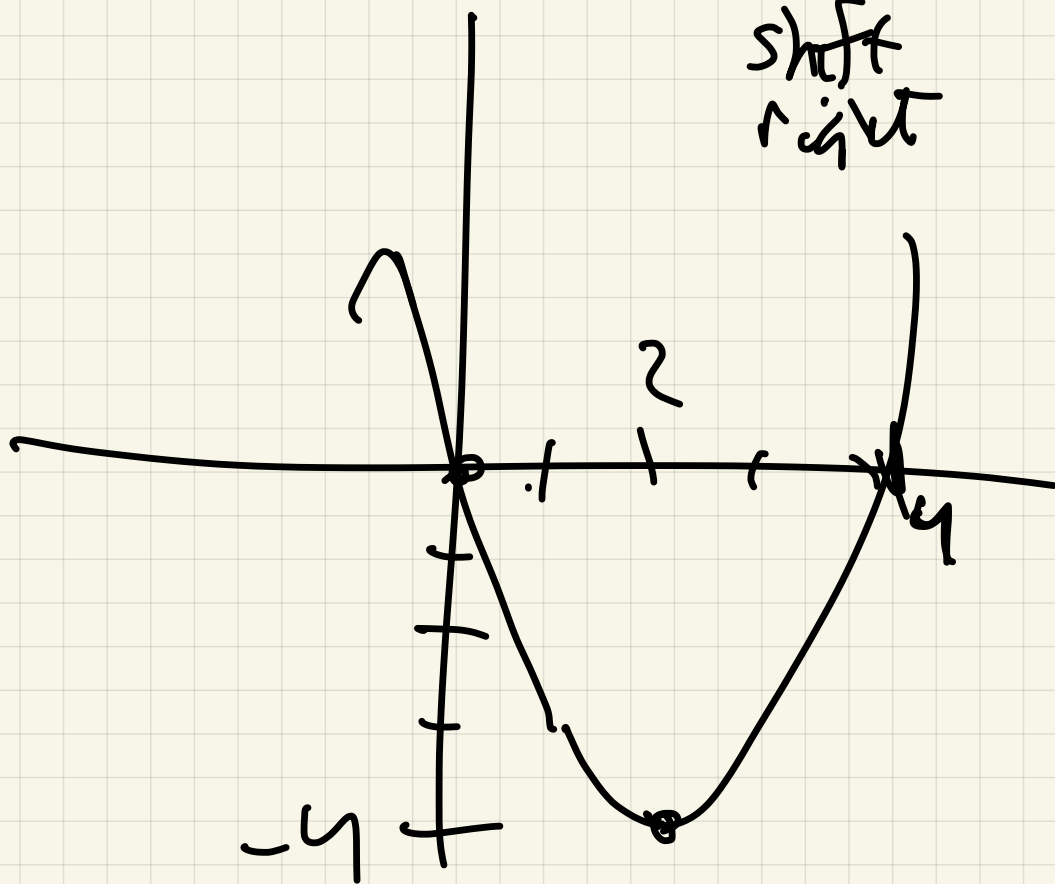
complete $\rightarrow = x^2 - 4x + \underline{4} - 4$

square

$$y = (x-2)^2 - 4$$

shift
right

shift
down



y-int: $x = 0 \Rightarrow y = 0$

x-int: $x^2 - 4x = 0$

$$x(x-4) = 0$$

$$x = 4$$