

Exam 1 statistics on Thursday

Section 2.2 - Piecewise functions

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

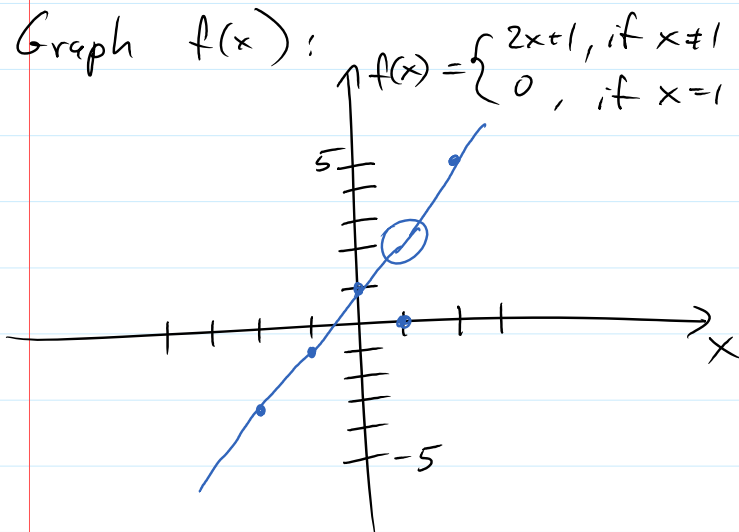
x	f(x)
-2	$2 \cdot (-2) - 3 = -7$
-1	$2 \cdot (-1) - 3 = -5$
0	$2 \cdot 0 - 3 = -3$
1	$2 \cdot 1 - 3 = -1$
2	$2 \cdot 2 - 3 = 1$

Piecewise function:

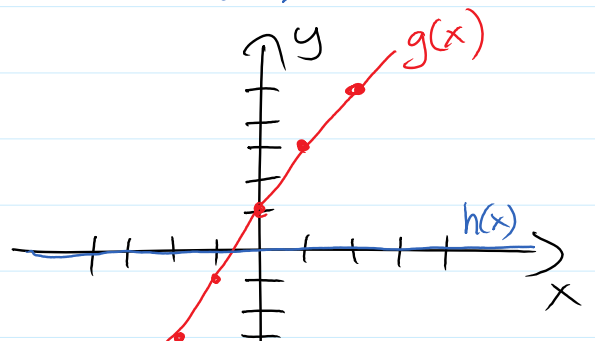
$$f(x) = \begin{cases} 2x+1, & \text{if } x \neq 1 \\ 0, & \text{if } x = 1 \end{cases}$$

x	f(x)
-2	$2 \cdot (-2) + 1 = -3$
-1	$2 \cdot (-1) + 1 = -1$
0	$2 \cdot 0 + 1 = 1$
1	0
2	$2 \cdot 2 + 1 = 5$

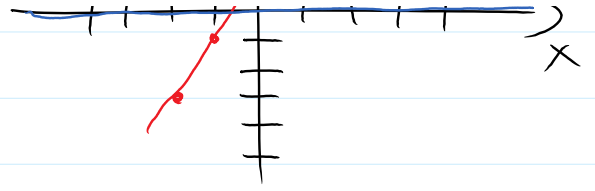
Graph $f(x)$:



Plot: $g(x) = 2x+1$ —
 $h(x) = 0$ —

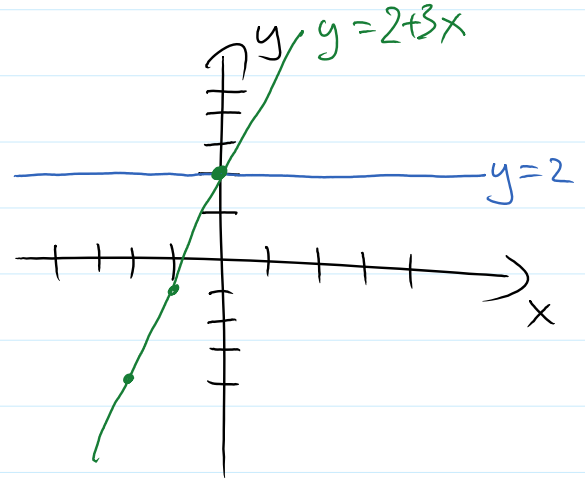
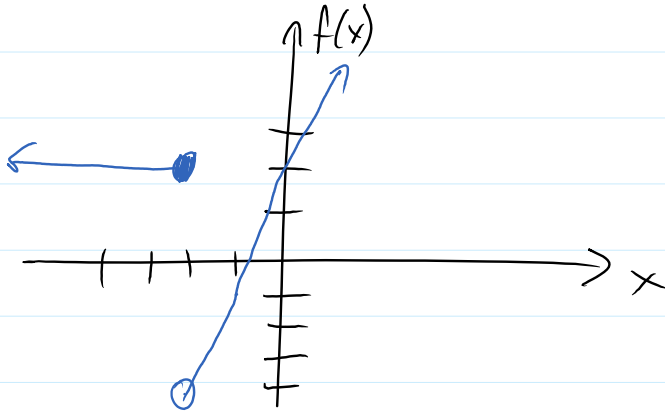


/ -5



Plot:

$$f(x) = \begin{cases} 2, & \text{if } x \leq -2 \\ 2+3x, & \text{if } x > -2 \end{cases}$$

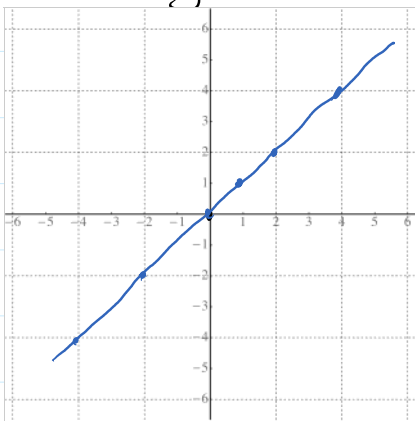


$f(-2) = 2$ b/c $-2 \leq -2 \rightarrow$ use the first piece.

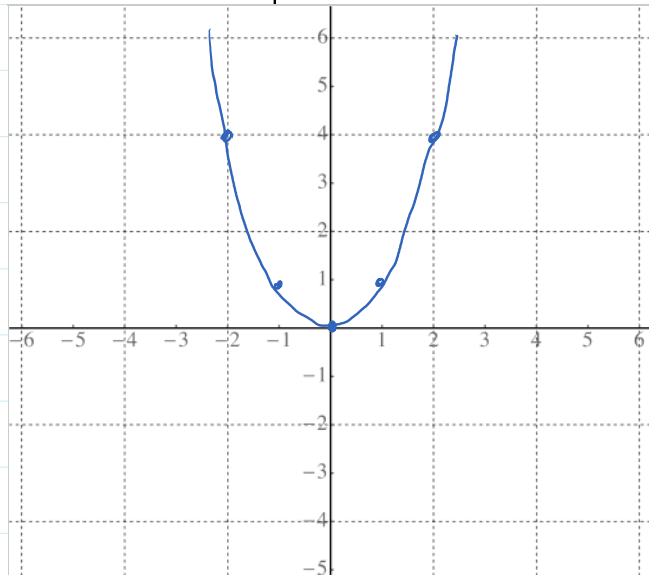
Section 2.5

Basic functions:

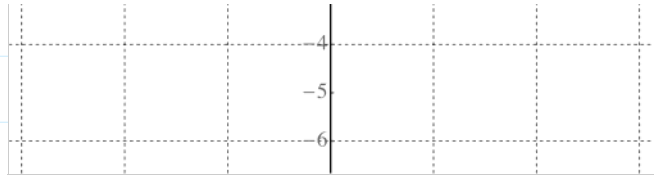
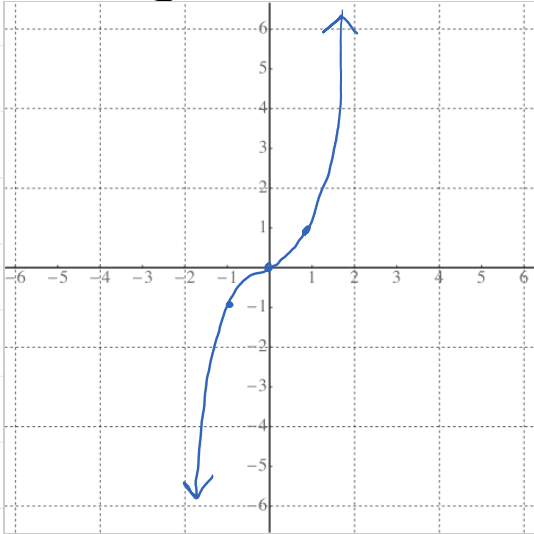
$y = x$



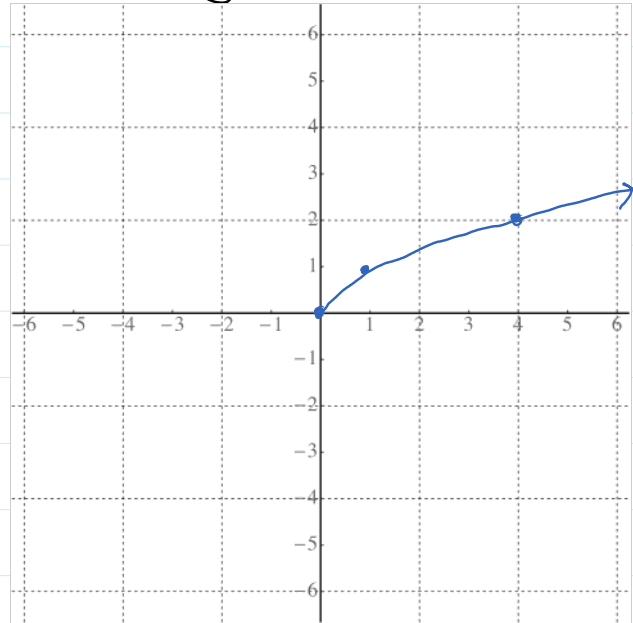
$y = x^2$ (quadratic func)



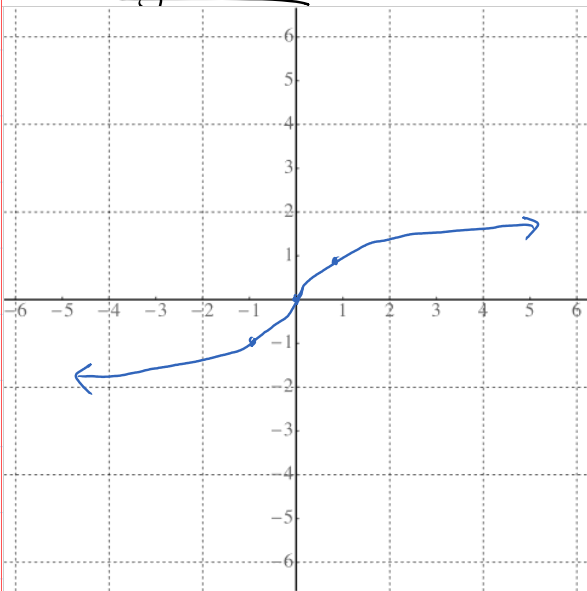
$$y = x^3$$



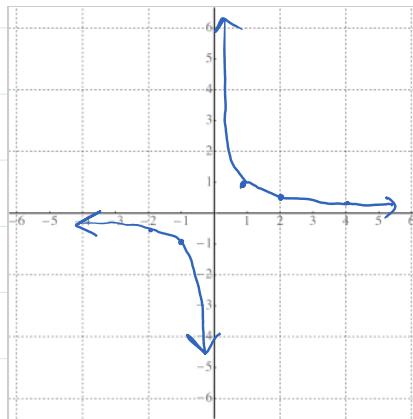
$$y = \sqrt{x}$$



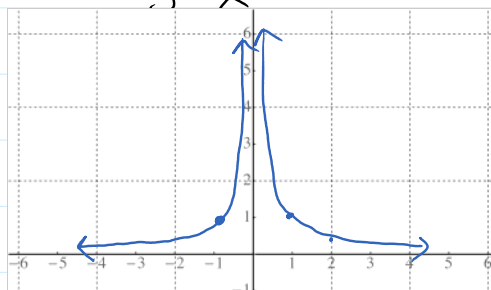
$$y = \sqrt[3]{x}$$

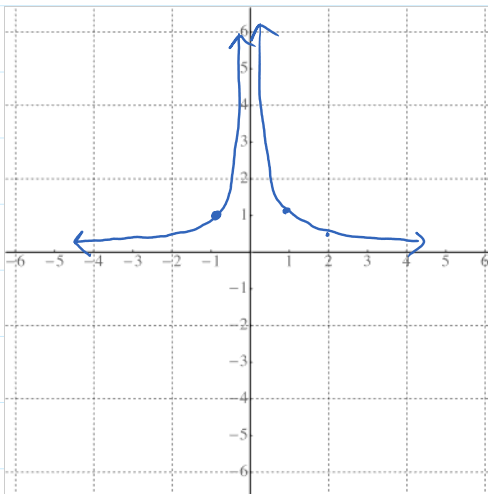


$$y = \frac{1}{x}$$



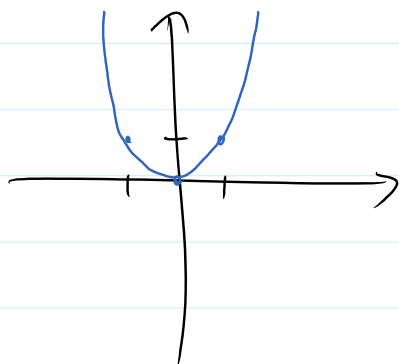
$$y = \frac{1}{x^2}$$



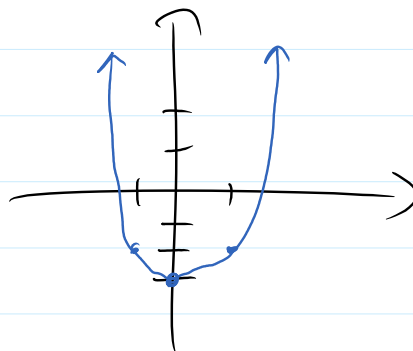


Graphing using transformations:

use $y = x^2$ to graph $y = x^2 - 3$



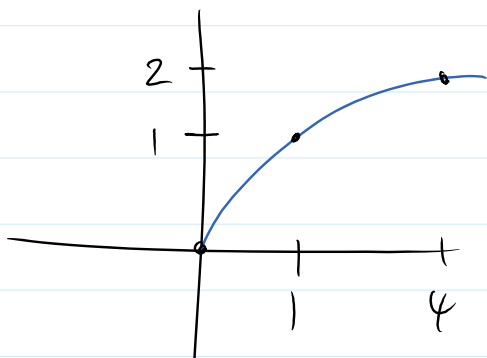
lower each
point by
3 units
→



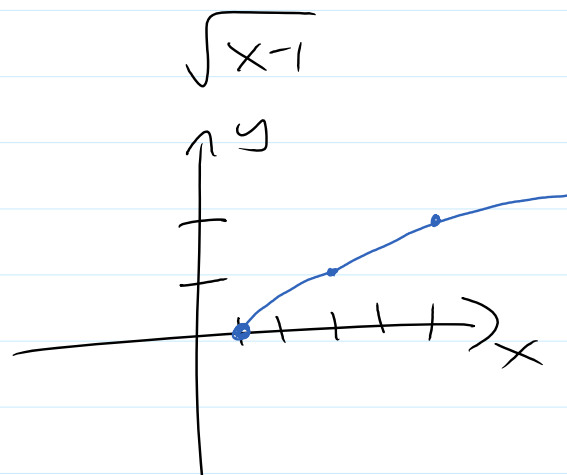
Use $f(x) = \sqrt{x}$ to graph $g(x) = \sqrt{x-1}$

$$f(x) - 1 = \sqrt{x} - 1$$

$$f(x-1) = \sqrt{x-1} = g(x)$$



→
shift
to the



| i | shift to the right by 1 unit

Worksheet ①

$y = x^3$

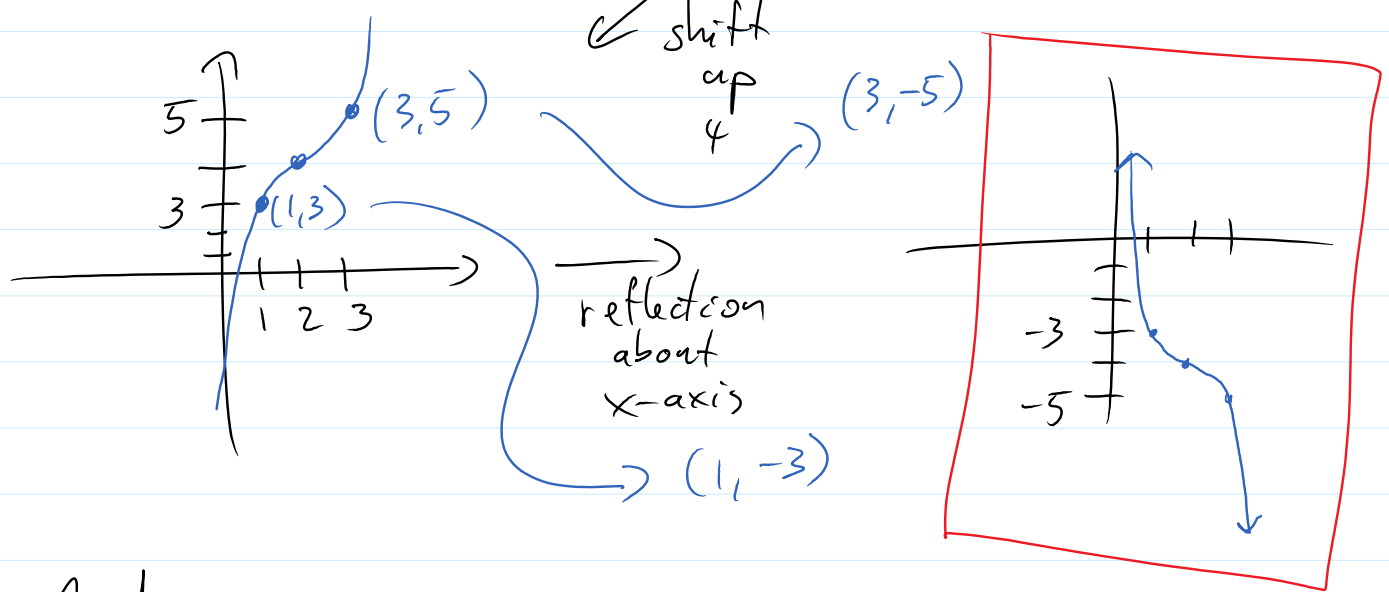
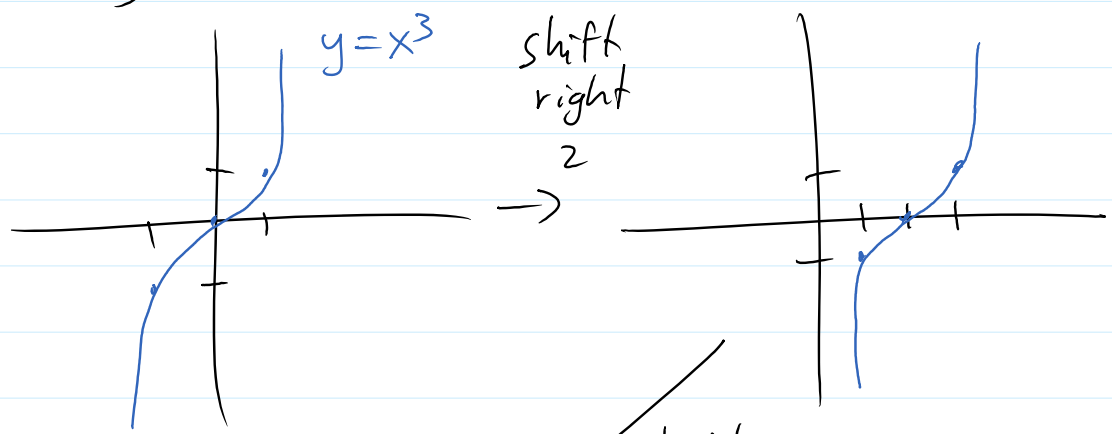
$y = -(x-2)^3 + 4$

reflection about x-axis (red circle around -)

shift right by 2 (green circle around -2)

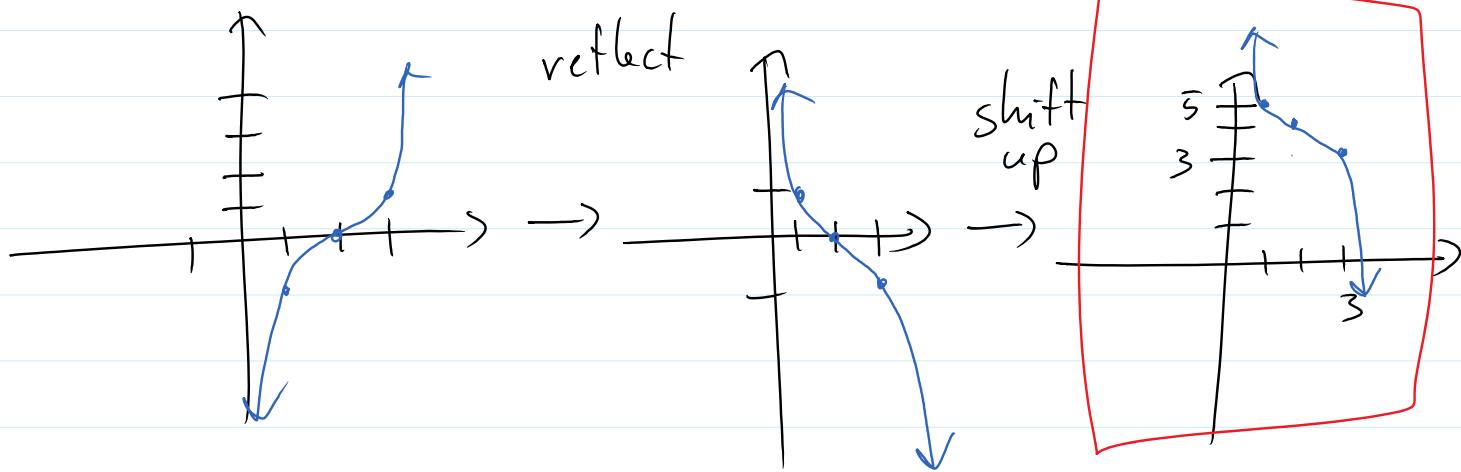
shift up by 4 (blue circle around +4)

A) Wells



A ... can

Anderson



To see who is right,
let's find $f(2)$.

$$f(2) = -(2-2)^3 + 4 = -(0)^3 + 4 = 0 + 4 = \boxed{4}$$

So Anderson is right!

The order of transformations:

- 1) horizontal shift
- 2) stretch or shrink
- 3) reflection
- 4) vertical shift

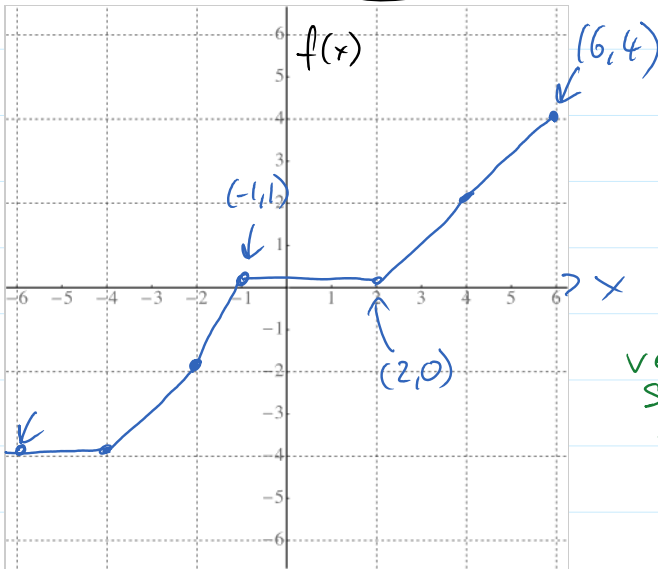
②

$(1, 3)$ is on $y = g(x)$

$$g(x+3) - 5$$

↑ left 3
← down 5

$$(1, 3) \xrightarrow{\text{left 3}} (1-3, 3) = (-2, 3) \xrightarrow{\text{down 5}} (-2, 3-5) = \boxed{(-2, -2)}$$



Plot: reflection y-axis down 1

$$\frac{1}{2} f(-x+2) - 1$$

↑ vertical shrink 1/2
↑ left 2

Order:

- 1) left 2
- 2) vertical shrink $\frac{1}{2}$
- 3) reflection y-axis
- 4) down 1

$$(-1, 1) \xrightarrow{①} (-1-2, 1) = (-3, 1) \xrightarrow{②} (-3, 1 \cdot \frac{1}{2}) = (-3, \frac{1}{2}) \xrightarrow{③} (-(-3), \frac{1}{2}) = (3, \frac{1}{2}) \xrightarrow{④} (3, \frac{1}{2} - 1) = \boxed{(3, -\frac{1}{2})}$$

$$(2, 0) \xrightarrow{①} (2-2, 0) = (0, 0) \xrightarrow{②} (0, 0 \cdot \frac{1}{2}) = (0, 0) \xrightarrow{③} (-0, 0) = (0, 0) \xrightarrow{④} (0, 0 - 1) = \boxed{(0, -1)}$$

$$(6, 4) \xrightarrow{①} (6-2, 4) = (4, 4) \xrightarrow{②} (4, 4 \cdot \frac{1}{2}) = (4, 2) \xrightarrow{③} (-4, 2) \xrightarrow{④} (-4, 2 - 1) = \boxed{(-4, 1)}$$

