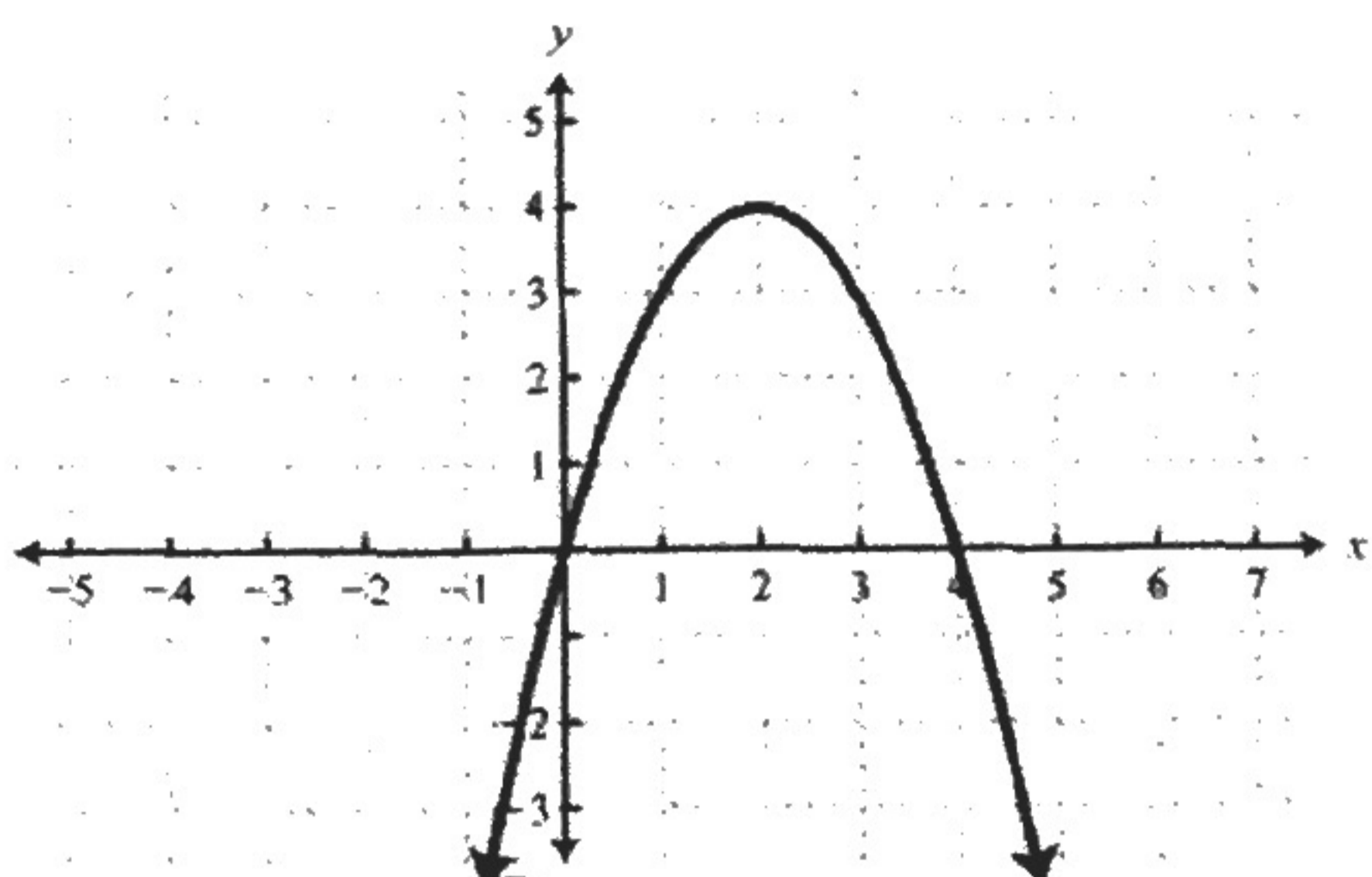


Each section below gives you what you need to study and examples.

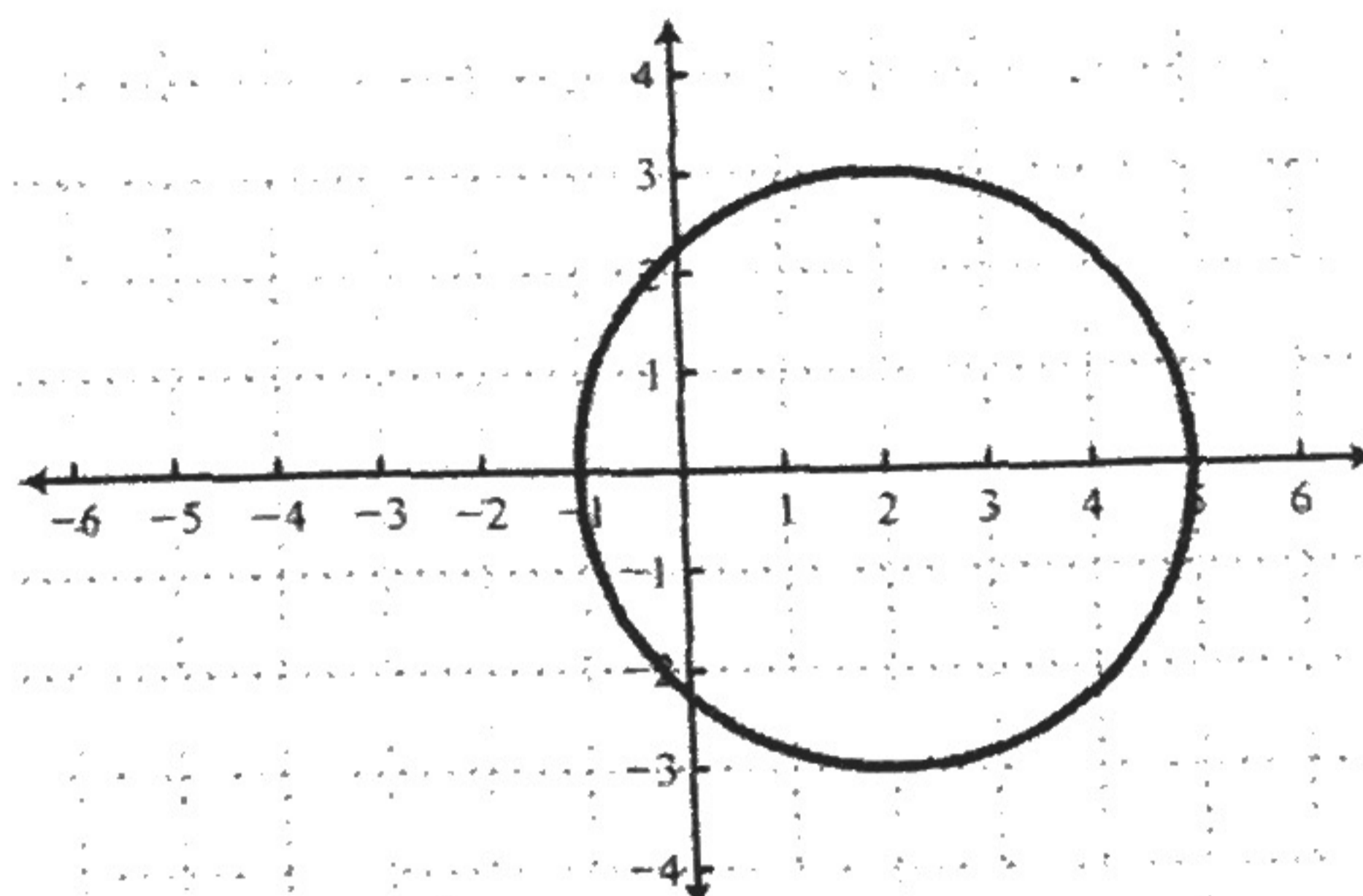
I. Key Features - List the domain, range, increasing interval, decreasing interval, and max/min for the following graphs.

1.

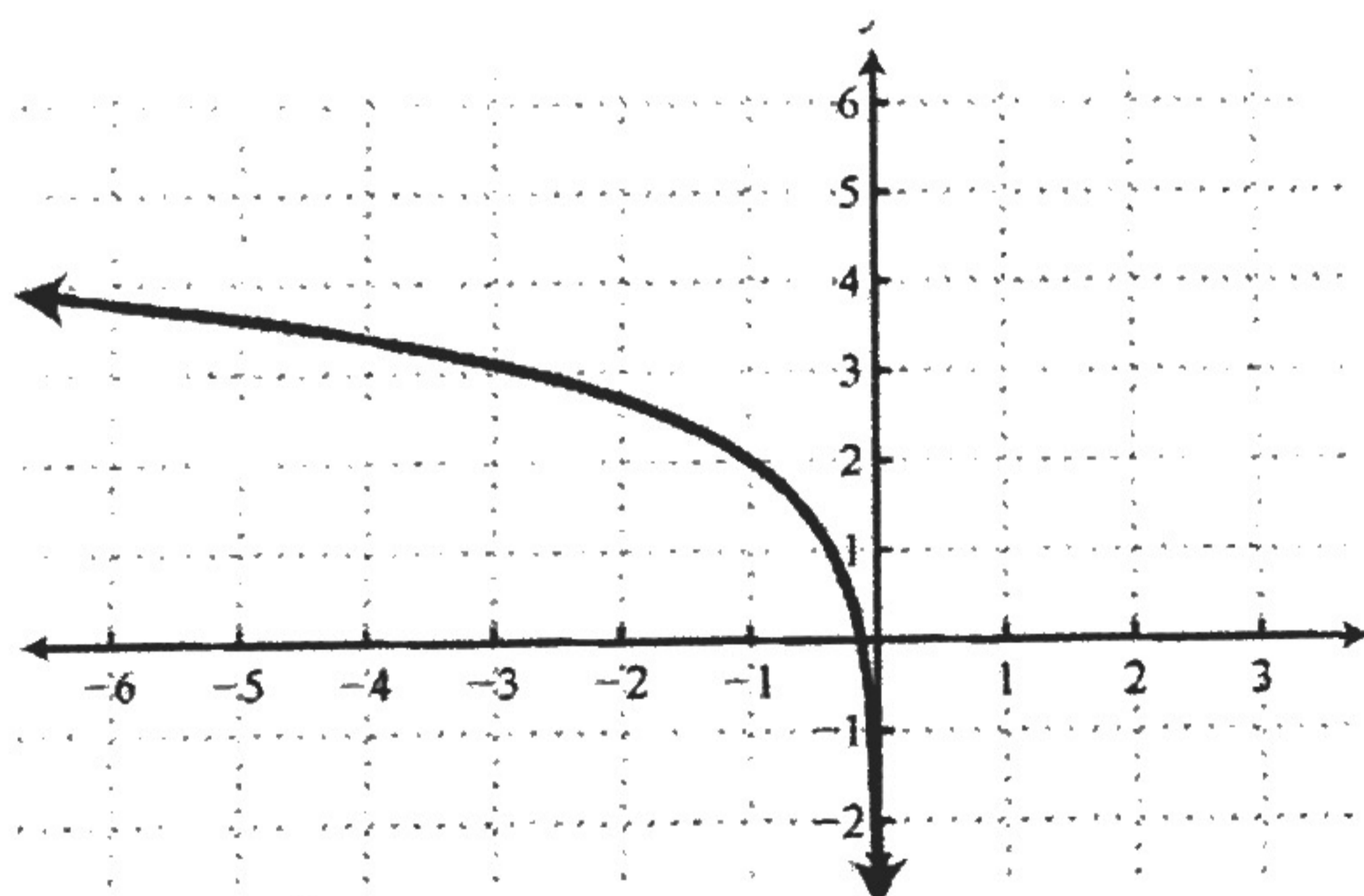


D: $(-\infty, \infty)$ R: $(-\infty, 4]$ Max: $y=4$
 3. Incr: $(-\infty, 2)$ Decr: $(2, \infty)$ 4.

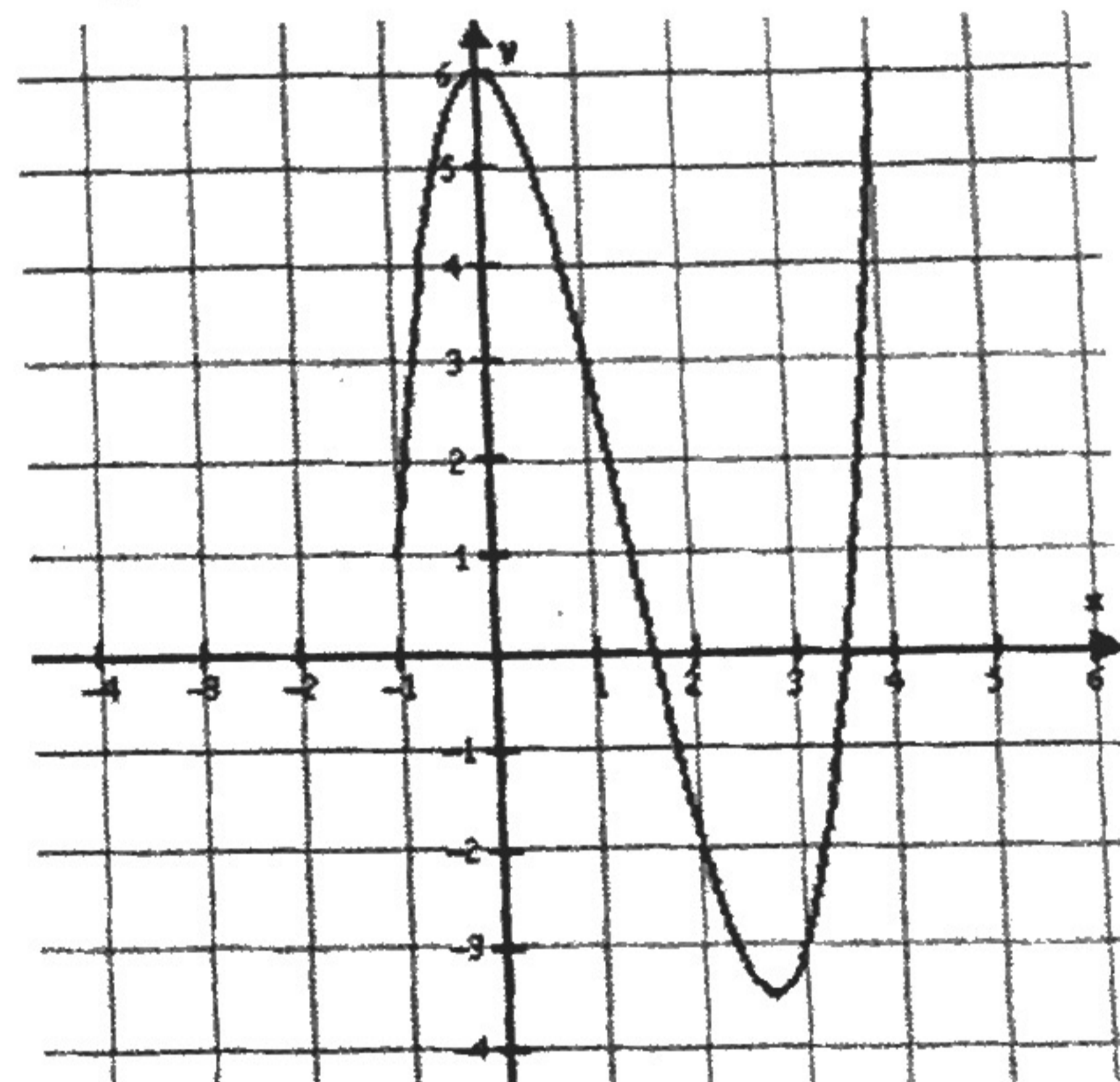
2. (no increasing or decreasing)



D: $[-1, 5]$ R: $[-3, 3]$ Max: $y=3$ Min: $y=-3$



D: $(-\infty, 0)$ R: $(-\infty, \infty)$ No max or min
 Incr: none Decr: $(-\infty, 0)$



D: $[-1, 4]$ R: $[-3.5, 6]$ Max: $y=6$
 Min: $y=-3.5$
 Incr: $(-1, 0) \cup (2.75, 4)$
 Decr: $(0, 2.75)$

II. State the transformation happening and graph.

5. $y = -|x-1| + 3$ flipped across x-axis, shifted right 1 and up 3

6. $y = \sqrt[3]{x+1} - 2$ shifted left 1 and down 2

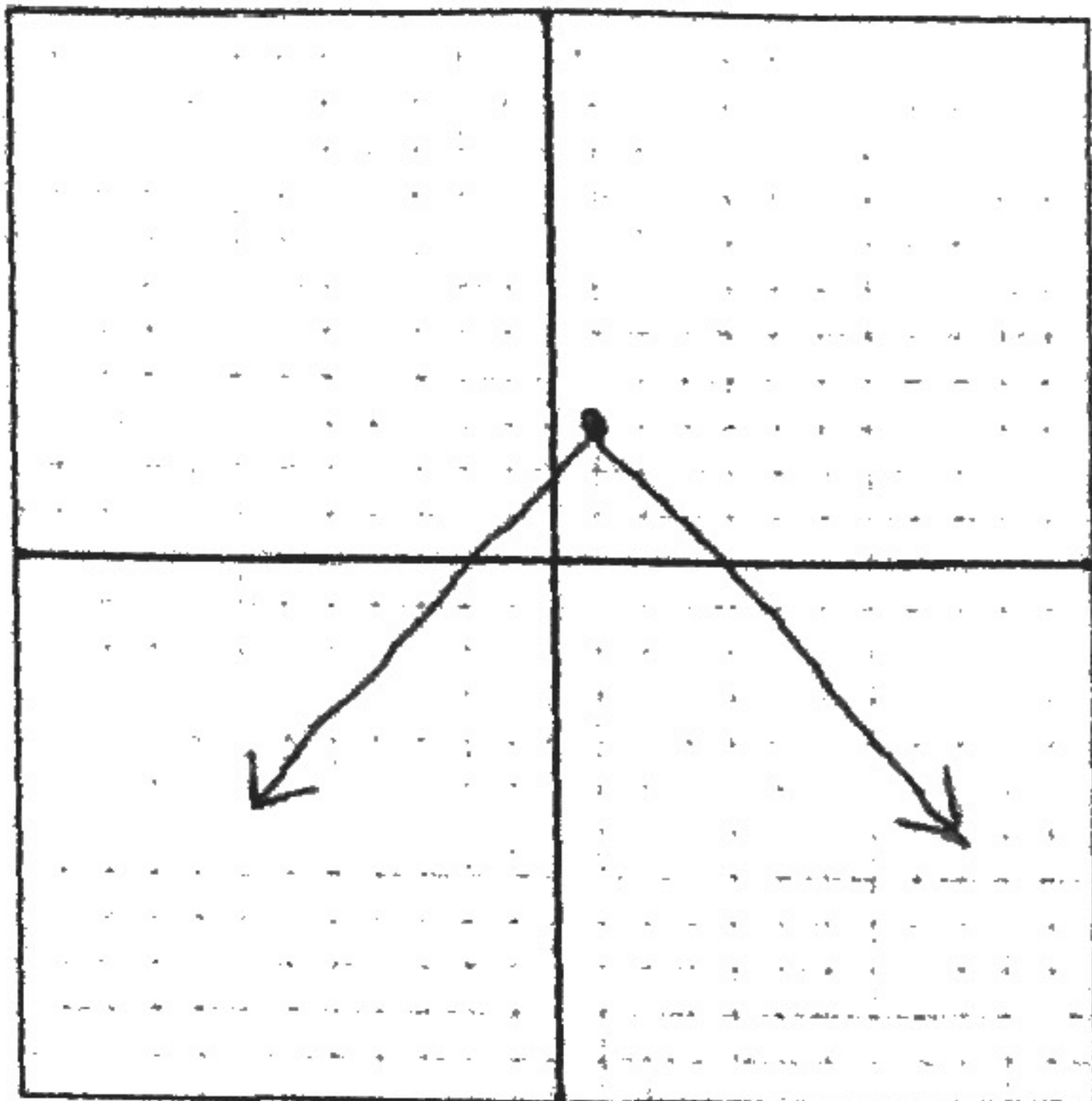
7. $y = -(x+2)^3 - 3$ flipped across x-axis, shifted left 2 and down 3

8. $y = -\sqrt{x-2} + 3$ flipped across x-axis, shifted right 2 and up 3

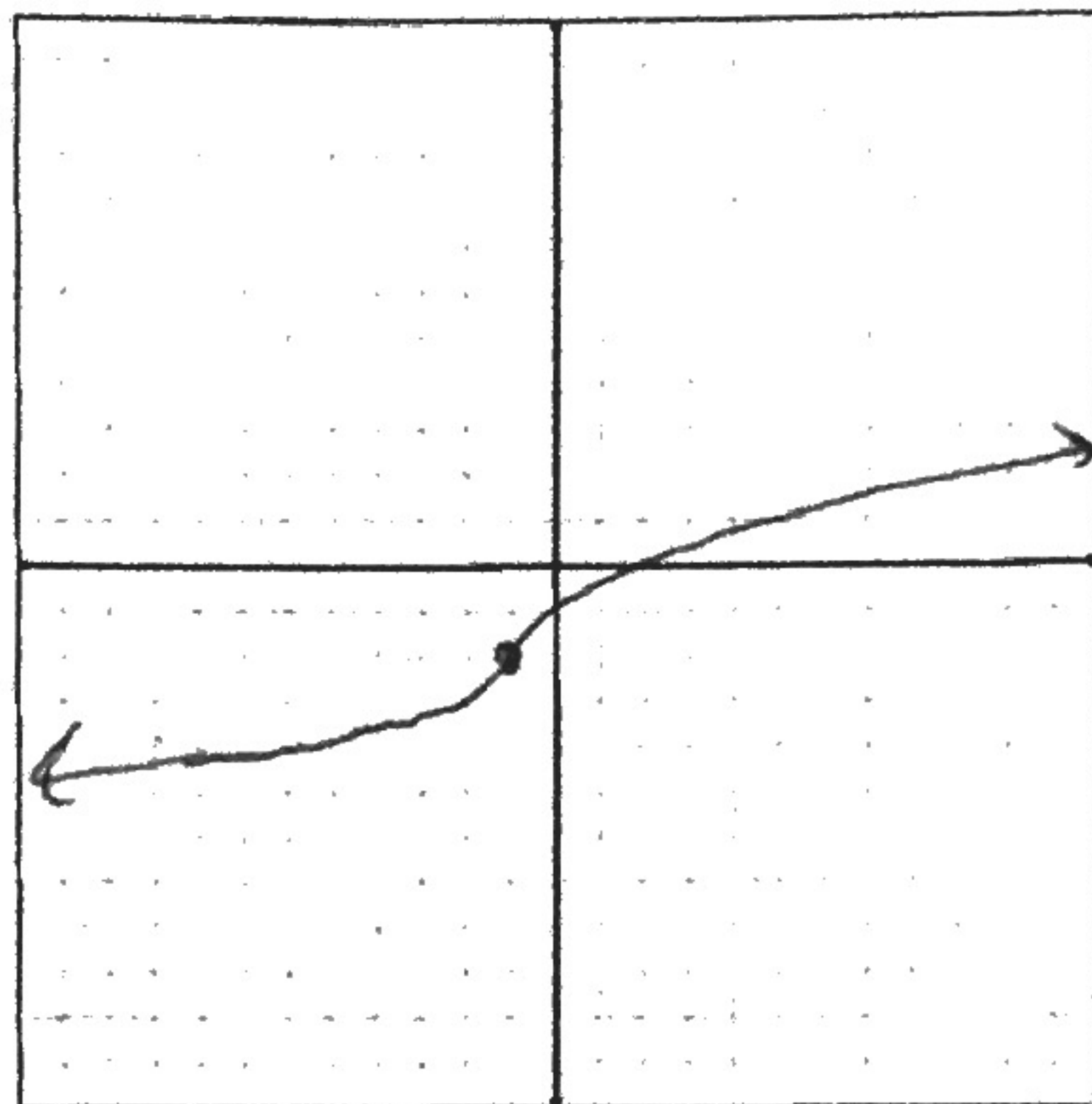
9. $y = (x-3)^2 + 1$ shifted right 3 and up 1

Graphs for section II (5-9)

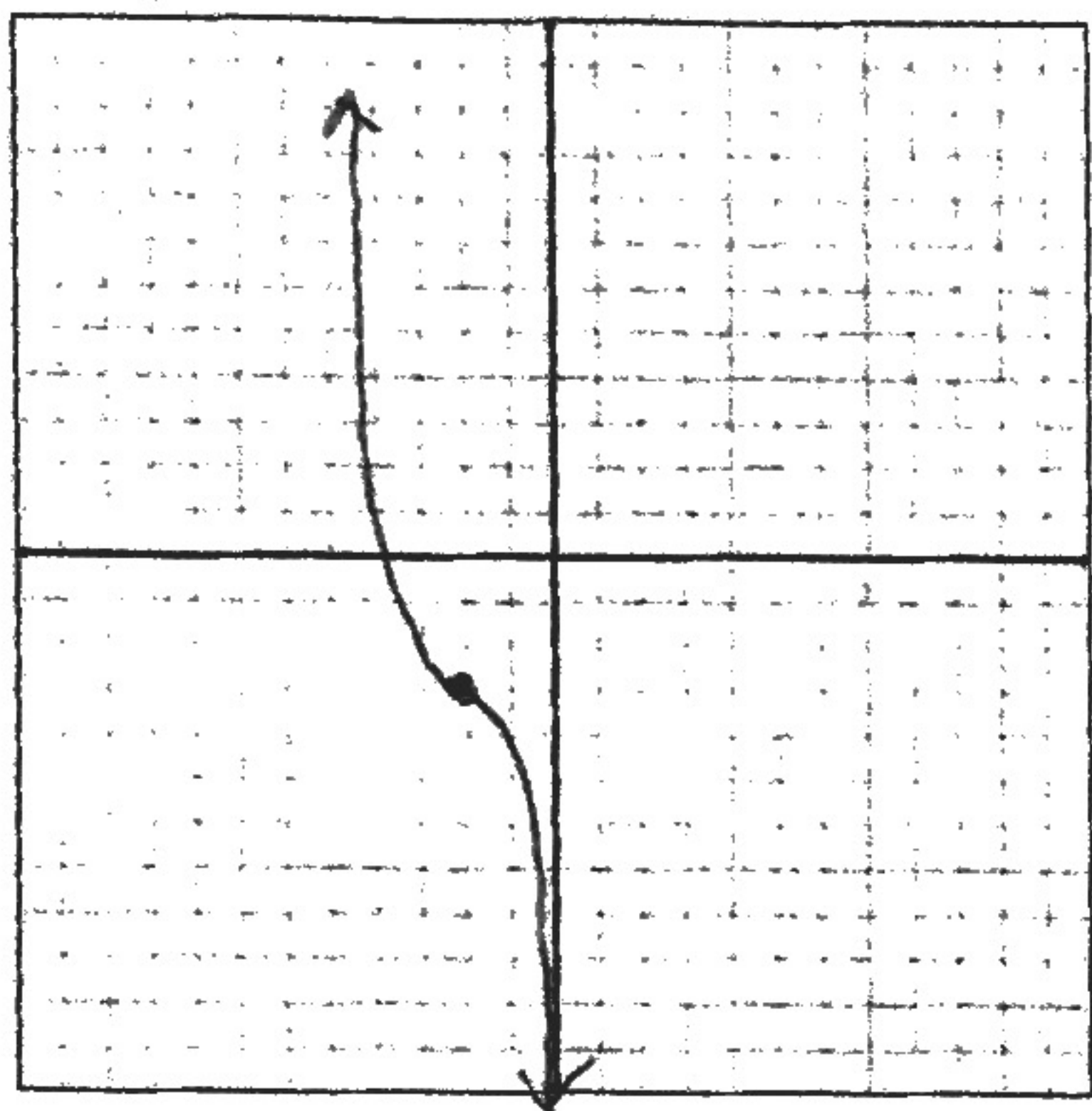
5) $y = -|x-1| + 3$



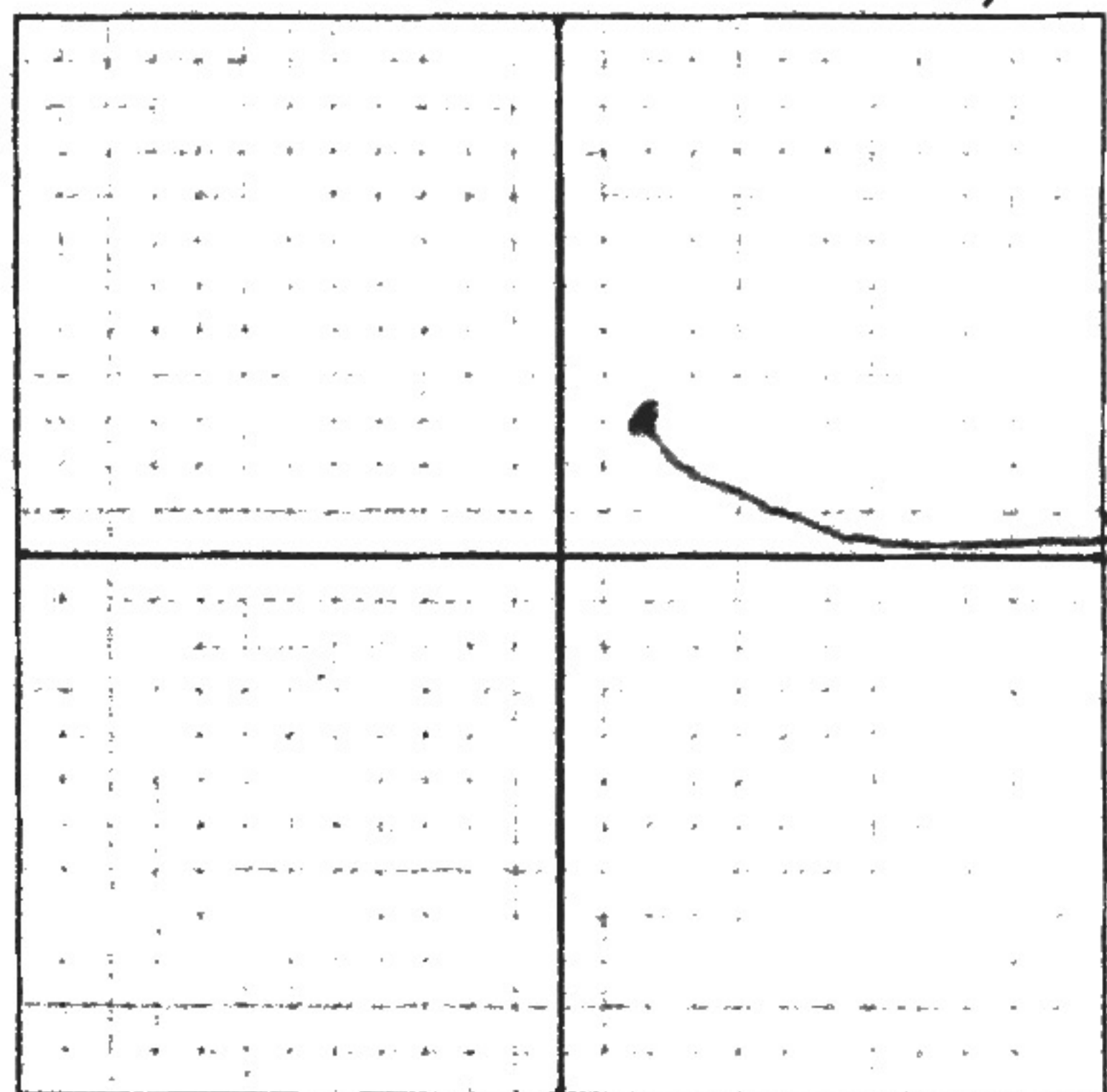
6) $y = \sqrt[3]{x+1} - 2$



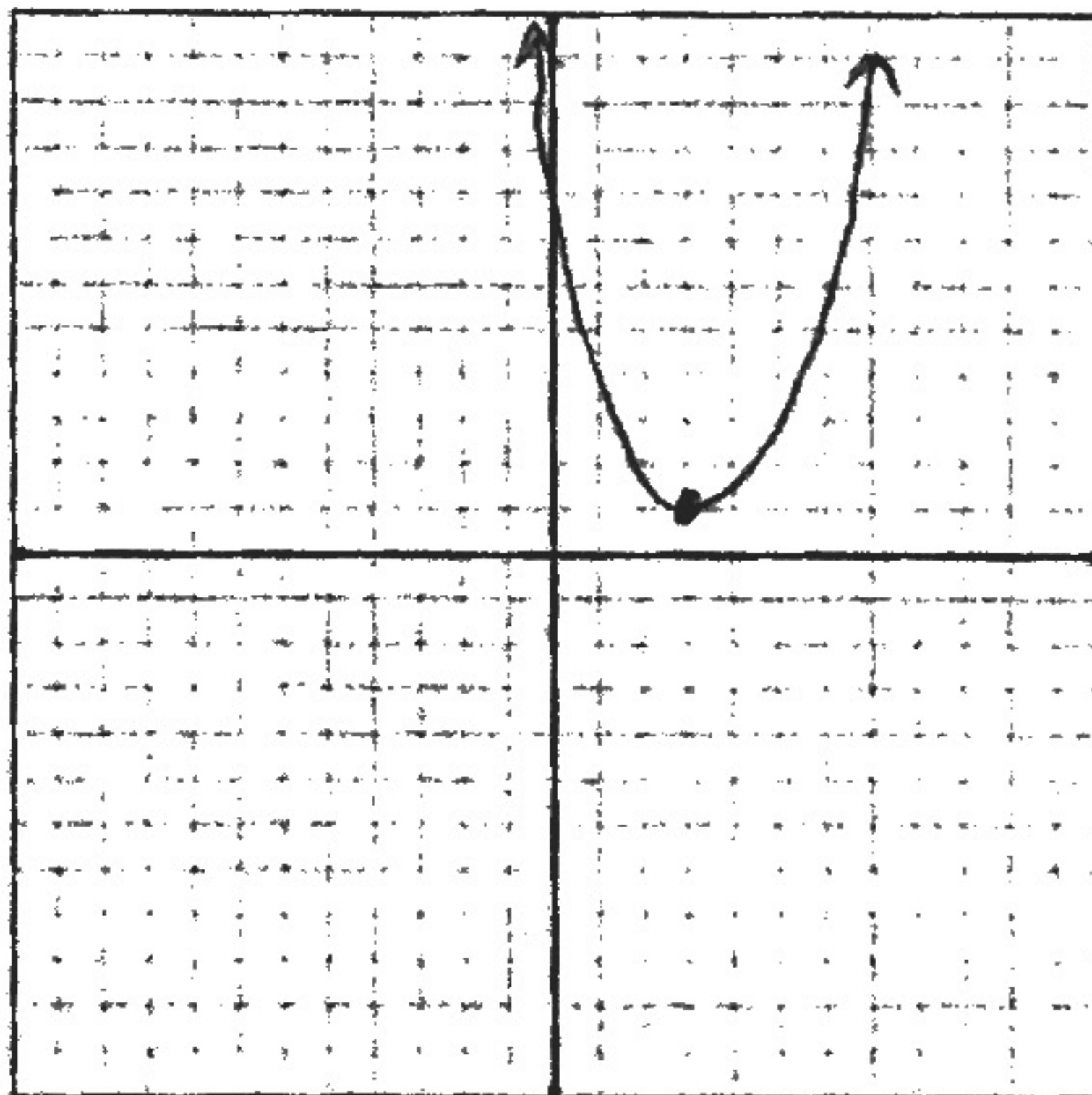
7) $y = -(x+2)^3 - 3$



8) $y = -\sqrt{x-2} + 3$



9) $y = (x-3)^2 + 1$



III. Write the equation for the following verbal expressions.

10. The graph of $f(x) = \sqrt{x}$, shifted 2 units right and 3 units down.

$$f(x) = \sqrt{x-2} - 3$$

11. The graph of $f(x) = 2^x$, reflected over the x-axis, shifted 1 unit left and 2 units up

$$f(x) = -2^{x+1} + 2$$

12. The graph of $f(x) = x^2$, shifted 3 units right.

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

IV. Using functions to evaluate and perform operations.

For the following examples use these functions:

$$f(x) = -x + 8, g(x) = x^2 + 3x - 4, h(x) = x - 1$$

13. $(g+h)(4) = 27$

14. $(f-g)(-3) = 15$

15. $(f \cdot h)(-2) = -30$

16. $\frac{g}{h}(3) = 7$

17. $(f \circ g)(-1) = 14$

18. $(g \circ f)(2) = 50$

19. $(f \cdot g)(x) = -x^3 + 5x^2 + 28x - 32$

20. $(f \circ h)(x) = -x + 9$

21. $(h \circ g)(x) = x^2 + 3x - 5$

V. Finding and verifying inverse functions

22. Find $f^{-1}(x)$ if $f(x) = -4x + 6$. $f^{-1}(x) = \frac{x-6}{-4}$

23. Find $f^{-1}(x)$ if $f(x) = 2x^2 - 3$. $f^{-1}(x) = \pm \sqrt{\frac{x+3}{2}}$

24. Find $f^{-1}(x)$ if $f(x) = \frac{2x+3}{x-1}$. $f^{-1}(x) = \frac{-x-3}{2-x}$

25. Verify that $f(x) = 2x - 4$ and $g(x) = \frac{1}{2}x + 2$ are inverses.

$$f(g(x)) = 2\left(\frac{1}{2}x + 2\right) - 4$$

$$x + 4 - 4$$

$$x$$

Since $f(g(x)) = x$, then yes they are inverses