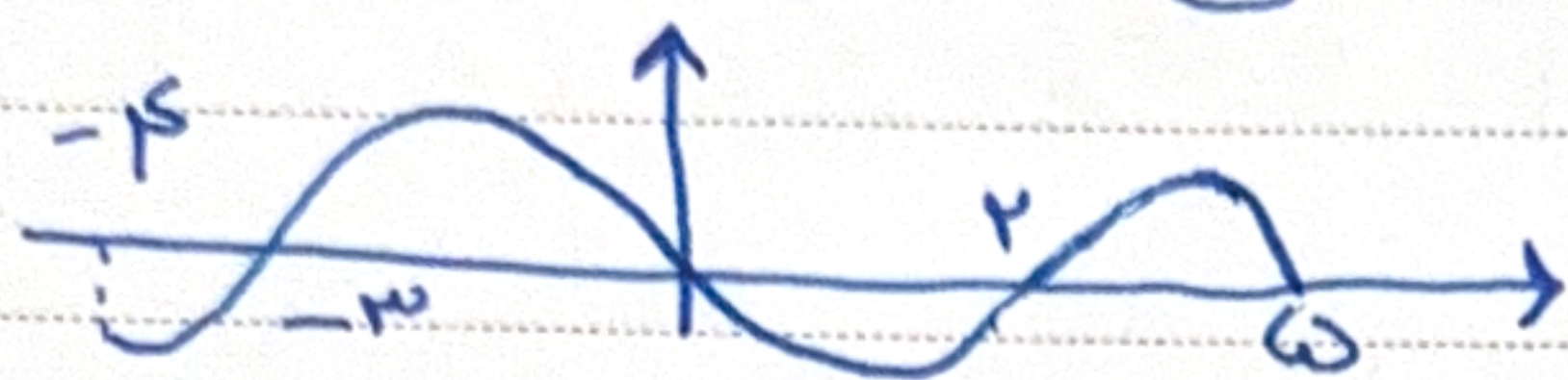


$$[-4, 0] \cup [1, \omega]$$

2. $y = \sqrt{\frac{-x}{f(x)}}$ is a function defined on $[-3, \omega]$. The graph shows a curve starting at $(-3, 0)$, passing through $(-1, 0)$, $(1, 0)$, and ending at $(\omega, 0)$. The function is non-negative on $[-3, \omega]$.



$$\frac{-x}{f(x)} \geq 0$$

$$\begin{cases} x < 0 & f(x) > 0 \\ -3 < x < 0 \\ x > 0 & f(x) < 0 \\ 0 < x < 1 \end{cases}$$

x	-3	0	1	ω
$f(x)$	+	-	+	-

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3. $f(-1) = f(x) - 1 \cdot f(1) = x^2 - 3x + 1$

$$\begin{aligned} f(-1) + 1 &= 1 + 4 + 1 = 6 & f(1) - 1 \cdot f(1) &= 1 \\ f(1) &= 6 - 1 = 5 & -f(1) &= 1 & f(1) &= -1 \end{aligned}$$

4. $f(f(1)) + f(f(1)) = 1$ and $f(x) = \begin{cases} x - \sqrt{x+1} & x > 1 \\ 1x + 1 & x \leq 1 \end{cases}$

5. $f(n-1) \cdot f(n) = 4n+1$ and $f(n) = an^2 - bn + 1$

$$f(n-1) = a(n-1)^2 - b(n-1) + 1$$

$$f(n-1) - f(n) = -2an + a + b = 4n + 1$$

6. $f(x) = x^2 - 3x + 1$

$$\frac{1 \cdot f(1) + f(-1)}{f^2(1)} = 1$$

$$\frac{1 \cdot (f(1) - 1 \cdot f(-1))}{f(1)} = \frac{1}{1}$$

7. $f(x) = \begin{cases} 3x+1 & x > 1 \\ x^2 & x \leq 1 \end{cases}$

$$\frac{f(\cancel{f(4)}) - f(\cancel{f(1)})}{\cancel{f(1)} - 1} = 0$$

8. Given $f = \{(1, 4), (2, 1), (3, 1), (1, 4)\}$ is $\checkmark$ - 8

9. $f(f(\sqrt{x-1}))$ is, $f(x) = \frac{x^2 + 1x + 9}{x^2 + 1x + 6}$ - 9

$$f(\sqrt{x-1}) = \frac{(\sqrt{x-1})^2 + 1(\sqrt{x-1}) + 9}{(\sqrt{x-1})^2 + 1(\sqrt{x-1}) + 6} = \frac{\cancel{x} + \cancel{1} - 1 + 9}{\cancel{x} + \cancel{1} - 1 + 6} = \frac{1}{1} = 1$$

$$f(1) = \frac{1 + 1 + 9}{1 + 1 + 6} = \frac{11}{8}$$

10. $f(f(\sqrt{x}))$ is, $f(x) = x^2 + \frac{1}{x^2}$ is - 10

$$f(\sqrt{x}) = x + \frac{1}{x} \quad \left(x + \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} + 2$$

$$x^2 + \frac{1}{x^2} + 2 - x^2 - \frac{1}{x^2} = 2$$