

Subject :

Year. Month. Date. ()

المعادلات التفاضلية

الف) $f(x) = 2 \sin^2(x + \frac{\pi}{2}) - 1$

$\rightarrow 2 \sin^2(x + \frac{\pi}{2}) - 1 \rightarrow -2 \sin^2(x) - 1 \rightarrow -2 \sin^2(x) - 1 \rightarrow R_f = [-1 \ 1]$

ب) $g(x) = 2 \cos^2(x) - 2$

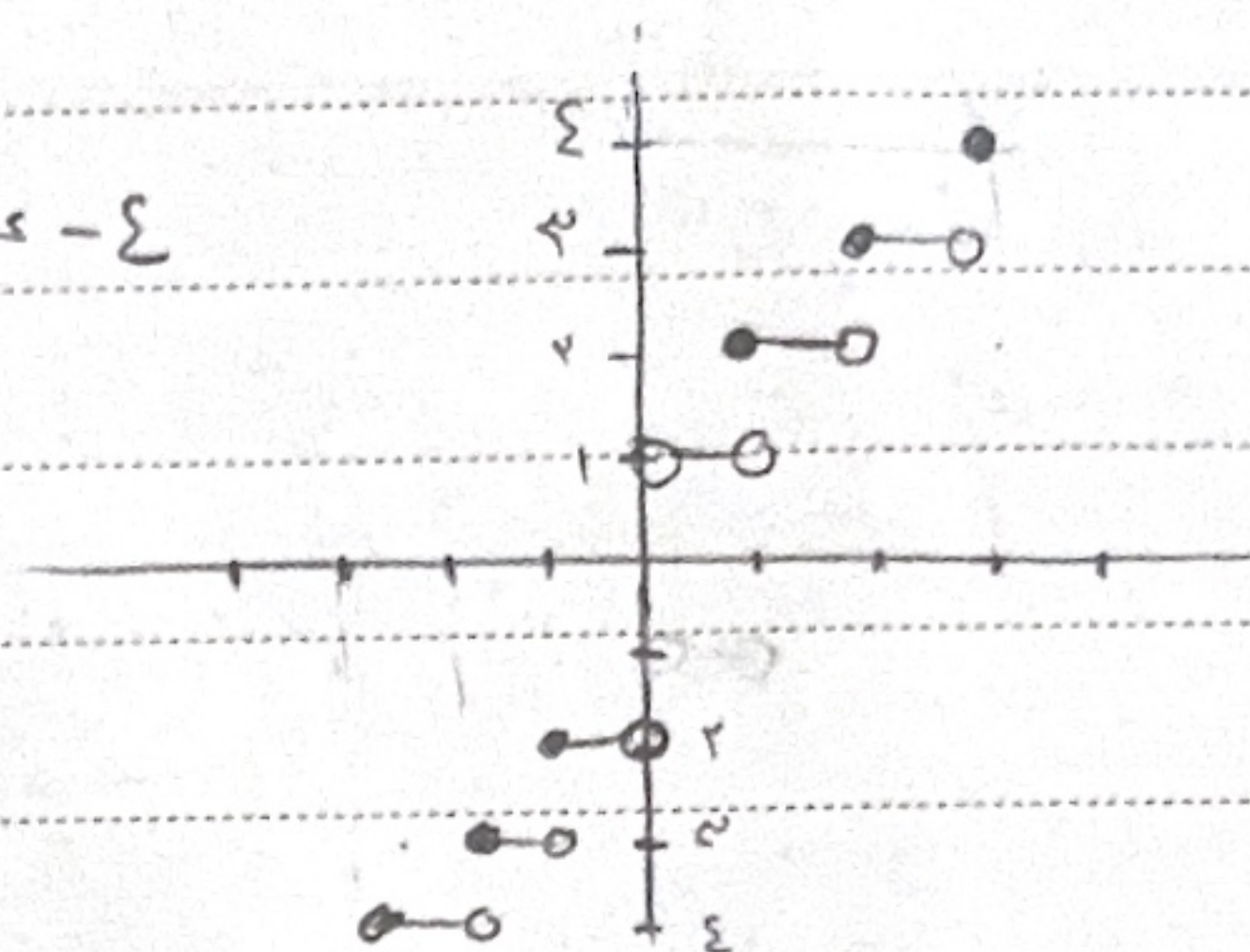
$\rightarrow 2 \cos^2(x) - 2 \rightarrow -2 \cos^2(x) - 2 \rightarrow -2 \cos^2(x) - 2 \rightarrow R_g = [-2 \ 0]$

$y = \frac{x}{|x|} + [x]$
 $x \neq 0$

$-2 < x < 2 \rightarrow -1 - 2 \leq -2$

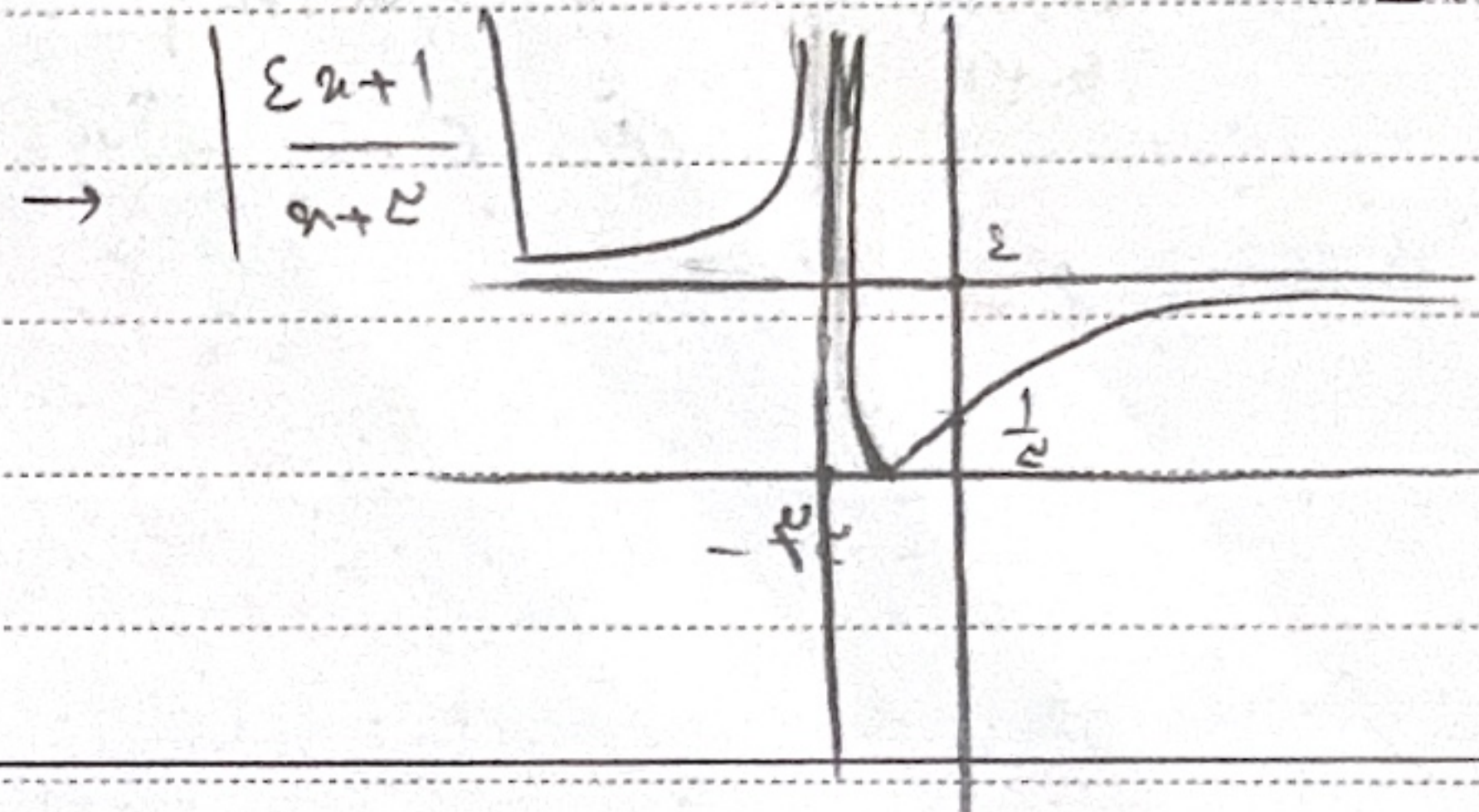
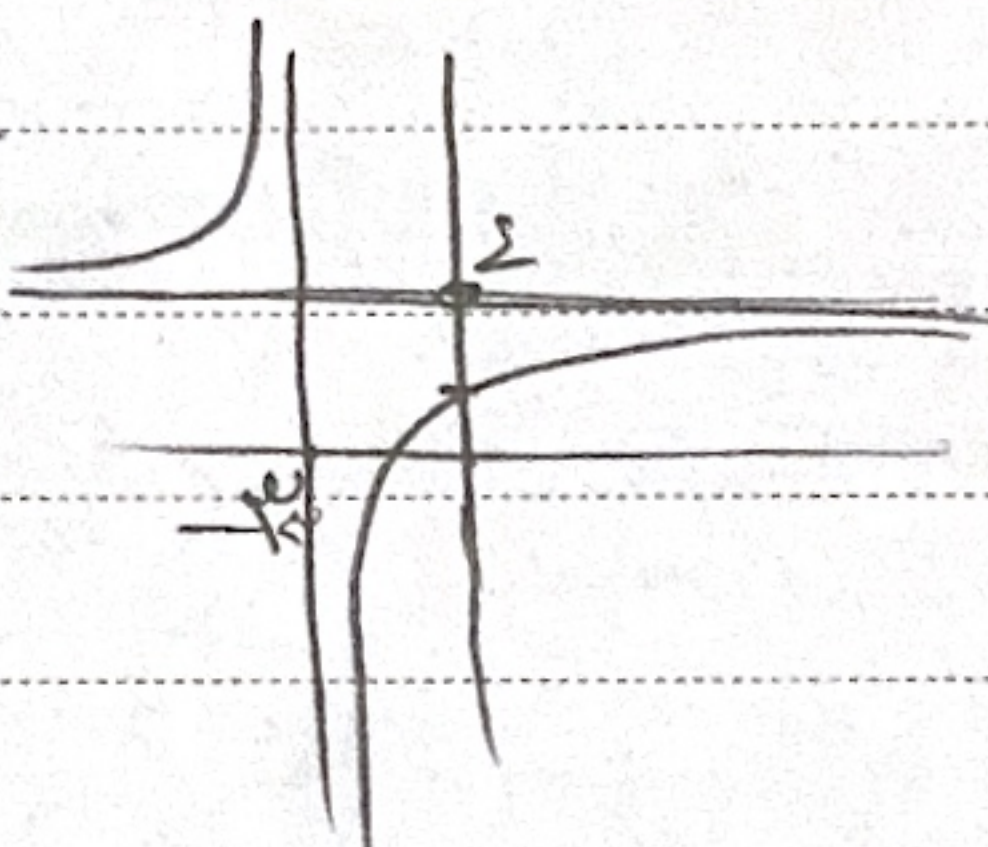
$x < -2 \rightarrow -1$

$x > 2 \rightarrow 2$

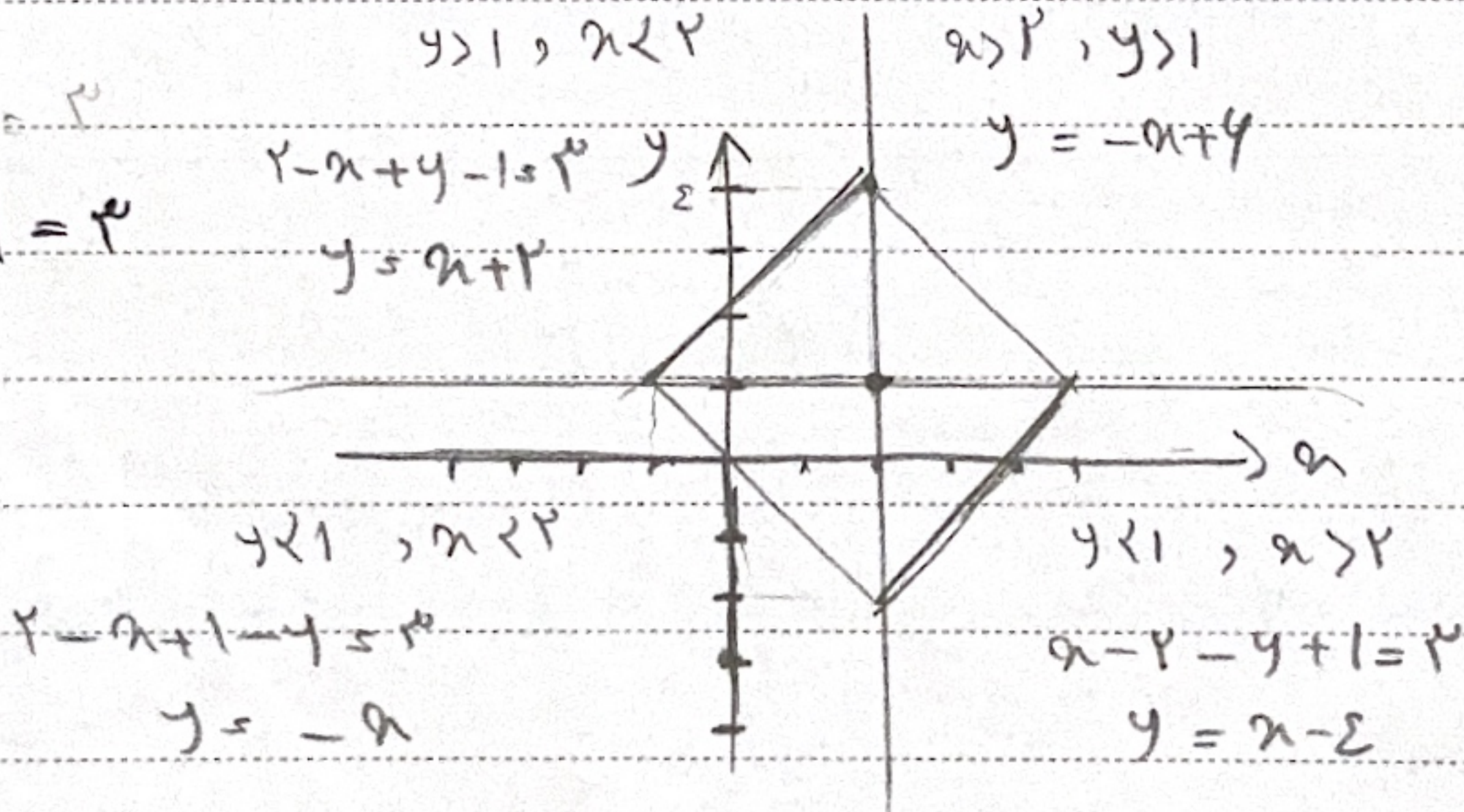


$y = \left| \frac{x+1}{x+2} \right|$

$x < -2 \rightarrow -2$
 $-2 < x < -1 \rightarrow -1$
 $-1 < x < 0 \rightarrow 0$
 $0 < x < 1 \rightarrow 1$
 $x > 1 \rightarrow 2$



$|x-2| + |y-1| = 2$
 $y-1 = -1$



الف) $f(x) = x + \frac{1}{x} + 2 \sqrt{x + \frac{1}{x}}$
 $(x + \infty)$

$\rightarrow R_f = [2 + 2\sqrt{2} \ \infty)$

ب) $y = (1 - \sin(x))(1 + \sin(x)) = 1 - \sin^2(x) = \cos^2(x)$

$\rightarrow \sin(x) = 1 \rightarrow -1 + 2 + 2 \leq 2$
 $\rightarrow \sin(x) = -1 \rightarrow -1 - 2 + 2 \leq -1$
 $\rightarrow \sin(x) = \frac{1}{2} \rightarrow \frac{1}{4} + 2 + 2 \leq 4.25$
 $\rightarrow \sin(x) = -\frac{1}{2} \rightarrow \frac{1}{4} - 2 + 2 \leq 0.25$

$R_f = [0 \ 2]$

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$$f(x) = -\frac{1}{x}x + 1 \quad D_f = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \quad -4$$

اعضای بردار (نشان داده شده)
 $-\frac{1}{x}$ فقط به x وابسته است
 $\rightarrow \left(\frac{f(x) + f(x)}{x} \right) \times 4 = \left(\frac{\frac{1}{x} + \frac{1}{x}}{x} \right) \times 4 = \frac{2}{x^2} \times 4 = \frac{8}{x^2} = \boxed{\frac{8}{x^2}}$

$$a_1 = -\frac{1}{x} \times 1 + 1 = \frac{1}{x} \quad a_9 = -\frac{1}{x} \times 9 + 1 = \frac{1}{x} = \frac{1}{9}$$

$$f(x) = \sqrt{ax^2 + bx + c} \quad -V$$

$$D_f = [x + \infty) \rightarrow a > 0 \rightarrow \sqrt{bx + c} = bx + c \rightarrow x \geq -\frac{c}{b} \quad -\frac{c}{b} \cdot 2 \rightarrow c = -2b$$

$$f(x) = \sqrt{bx + c} = 1 \rightarrow |bx + c| = 1 \rightarrow bx + c = 1 \rightarrow bx = 1 - c \rightarrow b = \frac{1 - c}{x}$$

$$g(x) = \sqrt{bx^2 + ax - 2c} = \sqrt{x^2 + 2} \rightarrow \sqrt{[2 + \infty)} = [x + \infty)$$

$$R_g = [x + \infty)$$

$$f(x) = \frac{x^2 - 2x}{x + 2} \quad D_f = \{a, b\} \quad -1$$

$$x \neq -2 \text{ و } 2$$

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

$$x^3 - 2x^2 \neq 0 \rightarrow x^2(x-2) \neq 0 \rightarrow x \neq 0, 2$$

$$(x-2)(x+2) \neq 0 \rightarrow x \neq 2, -2$$

$$x^3 - 2x^2 \rightarrow \lim_{x \rightarrow -1} \frac{x^3 - 2x^2}{x+2} = \frac{-1 - 2}{-1} = \frac{-3}{-1} = 3 \rightarrow [-1, \infty) = \{1\}$$

$$a, b = -2, 2$$

$$c = -1$$

$$f\left(\frac{a+b}{2c}\right) = f\left(\frac{-2+2}{-2}\right) = f(0) = 1 + 2 = \boxed{3}$$

$$y = \sqrt{x^2 + ax + b} - 1 \rightarrow (x-2)^2 = x^2 + 12x - 4x^2 - 1$$

$$a = -4, b = 12$$

$$[a, b] = [-4, 12]$$

$$y = \sqrt{(x-2)^2} - 1 = |x-2| - 1 \rightarrow -1 \leq x-2 \leq 1 \rightarrow -1 \leq x-2 \leq 1$$

$$R_f = [-1, 1]$$

$$y = [x] + \left[x + \frac{1}{x}\right]$$

$$\frac{1}{x} \leq x < 1 = 1$$

$$1 \leq x < \frac{1}{x} = 2$$

$$\frac{1}{x} \leq x < 2 = 2$$

$$\frac{1}{x} \leq x < 2 = 2$$

