

Subject:

Year. Month. Date. ()

يأزرهم دفتراخ

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زهرا آفاني

$$\frac{1}{n-1} = -n+1 \quad \frac{1}{n-1} = n-1 \quad (1)$$

$$-n^2 + 2n - 2 = 0 \quad n^2 - 2n + 1 = 1$$

$$\Delta < 0 \quad n^2 - 2n = 0$$

$$n^2 = 0 \quad n = 2 \quad \checkmark$$

ریشه ندارد

$$(الف) \quad \left| \frac{2n-1}{n} \right| < 2 \quad |2n-1| < 2|n| \quad (2)$$

$$(2n-1)^2 < 4n^2$$

$$\left(\frac{1}{2}, +\infty \right)$$

$$4n^2 - 4n + 1 < 4n^2$$

$$-4n + 1 < 0 \rightarrow n > \frac{1}{4} \quad n \neq 0$$

$$(ب) \quad \left| \frac{n-2}{2n+1} \right| > 1 \quad |n-2| > |2n+1| \quad (3)$$

$$(n-2)^2 > (2n+1)^2$$

$$n^2 - 4n + 4 > 4n^2 + 4n + 1$$

$$2n+1=0 \quad n \neq -\frac{1}{2} \quad 2n^2 + 4n - 3 < 0 \rightarrow n = \frac{-4 \pm \sqrt{16+24}}{4} = \frac{-4 \pm \sqrt{40}}{4} = \frac{-4 \pm 2\sqrt{10}}{4} = \frac{-2 \pm \sqrt{10}}{2}$$

$$\left(-\frac{3}{2}, -\frac{1}{2} \right) \cup \left(-\frac{1}{2}, \frac{1}{2} \right)$$

$$|n-2| < 3 \quad (3)$$

$$n+2 > n^2 \rightarrow n^2 - n - 2 < 0 \rightarrow n = 2, n = -1$$

$$n+2 < -n^2 \rightarrow n^2 + n + 2 < 0 \rightarrow \Delta < 0 \quad \text{ریشه ندارد}$$

$$-2 < n < 2 \quad -\frac{5}{2} < n - \frac{1}{2} < \frac{5}{2} \rightarrow |n - \frac{1}{2}| < \frac{5}{2}$$

$$\boxed{n = \frac{1}{2}}$$

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Subject:

Year. Month. Date. ()

$$y = |x+1| - |x| + |x-2| \quad \text{max, min}$$

(ع)

$$x < -1 \rightarrow y = -(x+1) - x - (x-2) = -1 \quad y = -1$$

$$-1 < x < 0 \rightarrow y = (x+1) - x - (x-2) = 2x+3 \quad y = 3$$

$$0 < x < 2 \rightarrow y = (x+1) - x - (x-2) = -x+3 \quad y = 3$$

$$x > 2 \rightarrow y = (x+1) - x + (x-2) = x-1 \quad y = -1$$

$$\text{max} + \text{min} = 3 - 1 = 2$$

$$y = \left| \frac{x}{p} \right| - x \rightarrow y = \left| \frac{x+\epsilon}{p} \right| - x \quad (و)$$

$$\left| \frac{x}{p} \right| - x = \left| \frac{x+\epsilon}{p} \right| - 1$$

$$\left| \frac{x}{p} \right| = \left| \frac{x+\epsilon}{p} \right| + 1 \Rightarrow |x| = |x+\epsilon| + 1 \quad x \geq 0$$

$$x = x + \epsilon + 1 \rightarrow 0 = \epsilon + 1 \quad (5)$$

$$-\epsilon \leq x < 0 \rightarrow -x = x + \epsilon + 1 = x = -1 \quad \checkmark$$

$$x < -\epsilon \rightarrow -x = -(x + \epsilon) + 1 \Rightarrow 0 = -\epsilon \quad \checkmark$$

$$\boxed{x = -1}$$

$$\text{الف) } f(x) = [|1-x| - |x+\epsilon|] \quad (4)$$

$$|1-x| - |x+\epsilon|$$



$$P_1 = \{0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -50, -51, -52, -53, -54, -55, -56, -57, -58, -59, -60, -61, -62, -63, -64, -65, -66, -67, -68, -69, -70, -71, -72, -73, -74, -75, -76, -77, -78, -79, -80, -81, -82, -83, -84, -85, -86, -87, -88, -89, -90, -91, -92, -93, -94, -95, -96, -97, -98, -99, -100\}$$

$$P_2 = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100\}$$

Subject:

Year. Month. Date. ()

$$ب) f(x) = \frac{1}{x} - \left[\frac{x+1}{x} \right] \quad (4)$$

$$\frac{1}{x} - \left[1 + \frac{1}{x} \right] \Rightarrow \frac{1}{x} - \underbrace{\left[\frac{1}{x} \right]}_{[0,1)} \cdot 1 \quad R_f = [-1, 0)$$

$$أ) y = [-x] - 1 \quad x \in (-1, 1) \quad (4)$$

$$-1 < x \leq -\frac{1}{2} \rightarrow y = 1 - 1 = 0$$

$$-\frac{1}{2} < x \leq 0 \rightarrow y = 0 - 1 = -1$$

$$0 < x \leq \frac{1}{2} \rightarrow y = -1 - 1 = -2$$

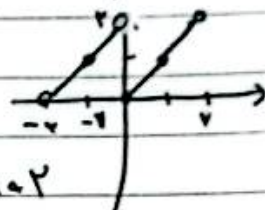
$$\frac{1}{2} < x < 1 \rightarrow y = -2 - 1 = -3$$



$$ب) y = x - [-\frac{x}{2}]$$

$$-2 \leq x < 0 \rightarrow y = x - (-1) = x + 1$$

$$0 \leq x < 2 \rightarrow y = x - (0) = x$$



$$أ) [||x| - 1|] \quad x \in [-2, 2]$$

$$x = -2 \rightarrow y = 1$$

$$-2 < x \leq -1 \rightarrow y = 0$$

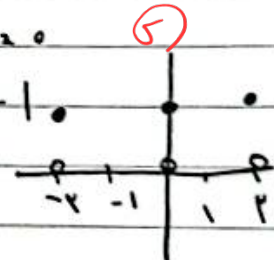
$$-1 < x < 0 \Rightarrow y = 1$$

$$x = 0 \Rightarrow y = 1$$

$$0 < x \leq 1 \rightarrow y = 0$$

$$1 \leq x < 2 \rightarrow y = 0$$

$$x = 2 \rightarrow y = 1$$



$$ب) y = [x^2 - 2x] \quad x \in [-1, 2]$$



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$$1 \quad a + [b] = \epsilon/4 \quad a = \epsilon/4 - [b] \quad (4)$$

$$2 \quad b - [a] = 4/\epsilon \rightarrow b = 4/\epsilon + [a] \quad b = 4/\epsilon + [\epsilon/4 - [b]]$$

$$3 \quad a = 1/4 \quad b = 3/4 \rightarrow a + b = 1/4 + 3/4 = \epsilon/4$$

$$4 \quad (1 + \sqrt{2})^4 + (1 - \sqrt{2})^4 = 194 \quad (10)$$

$$5 \quad (1 + \sqrt{2})^4 = [194 - (1 - \sqrt{2})^4] = [194 - 0.1...] = 194$$