

۱۴، ۵

۱. $x-1 \rightarrow x \neq 1$

۲. $\frac{1}{x-1} = |x-1| \rightarrow \begin{cases} x > 1 \rightarrow \frac{1}{x-1} = x-1 \rightarrow x^2 + 1 - 2x = x \rightarrow x^2 - 2x = 0 \\ x < 1 \rightarrow \frac{1}{x-1} = 1-x \rightarrow -x^2 + 1 - 2x = 0 \end{cases}$

$x(x-2) = 0 \rightarrow x = 0$ or $x = 2$ (check)

$x^2 + 2x + 2 = 0 \rightarrow \Delta < 0$

الف) $\left| \frac{x-1}{x} \right| < 2 \rightarrow -2 < \frac{x-1}{x} < 2 \rightarrow \frac{-2x < x-1 < 2x}{x} \rightarrow 0 < 1 \checkmark$

ب) $\frac{x-2}{2x+1} > 1$ and $\frac{x-2}{2x+1} < -1$

$\frac{x-2}{2x+1} > 1 \rightarrow \frac{x-2-2x-1}{2x+1} > 0 \rightarrow \frac{-x-3}{2x+1} > 0 \rightarrow \frac{-x-3}{2x+1} > 0 \rightarrow (-3, -\frac{1}{2})$

$\frac{x-2}{2x+1} < -1 \rightarrow \frac{x-2+2x+1}{2x+1} < 0 \rightarrow \frac{3x-1}{2x+1} < 0 \rightarrow (-\frac{1}{2}, \frac{1}{3})$

Union: $(-3, -\frac{1}{2}) \cup (-\frac{1}{2}, \frac{1}{3})$

$x^2 < x+4 \rightarrow x^2 - x - 4 < 0 \rightarrow (x-3)(x+2) < 0 \rightarrow (-2, 3)$

$-x^2 > x+4 \rightarrow 0 > x^2 + x + 4 \rightarrow \Delta < 0$

$-\beta < x - \alpha < \beta$

$-\beta + \alpha < x < \beta + \alpha \rightarrow \alpha - \beta = -2$

$\alpha + \beta = 3$

$2\alpha = 1 \rightarrow \alpha = \frac{1}{2}, \beta = \frac{5}{2}$

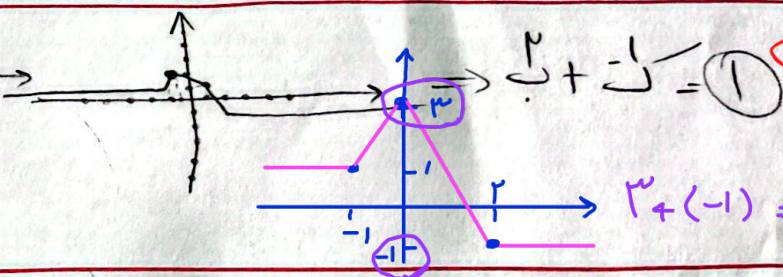
$y = 3$

$|2x+3| - 1 - 2x + 2 = 0$

$|2x+3| - 2x + 1 = 0$

$2x+3-2x+1=0 \rightarrow 4=0$ (no solution)

$-2x+3-2x+1=0 \rightarrow -4x+4=0 \rightarrow x=1$



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

به طرف ها صفت گرفته یعنی باید جمع کنی

$x^2 - 12x + 27 = 0$

$(x-3)(x-9) = 0 \rightarrow x = 3, 9$

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

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

$2 \left| \frac{1}{2}x - 2 \right| = 2x - 4 \rightarrow x - 4 = 2x - 4 \rightarrow x = 0$

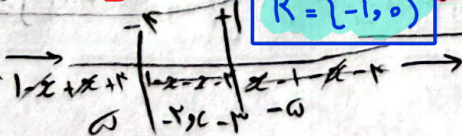
$2 \left(\frac{1}{2}x + 1 - 2x + 1 \right) = 2x - 4 \rightarrow x + 2 - 2x + 2 = 2x - 4 \rightarrow -x + 4 = 2x - 4 \rightarrow -3x = -8 \rightarrow x = \frac{8}{3}$

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

$1 \leq \frac{1}{x} - \left[\frac{1}{x} \right] + 1 < 2$

$R = [-1, 0)$

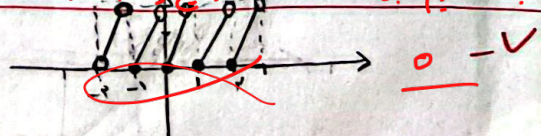
الف) $||-x| - |x+2||$

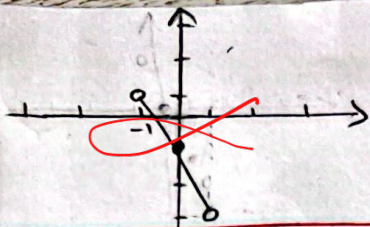


$[-a, a]$

چون مبالغ داریم، برد مقول شامل اعداد صحیح است

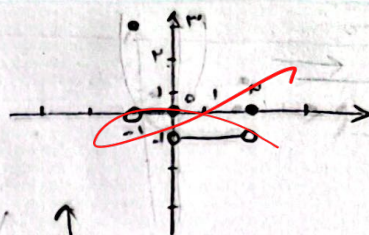
ب) $x - 2 \left[\frac{x}{2} \right] \rightarrow 2 \left(\frac{x}{2} - \left[\frac{x}{2} \right] \right) \rightarrow 0 \leq \frac{x}{2} - \left[\frac{x}{2} \right] < 2 \rightarrow$



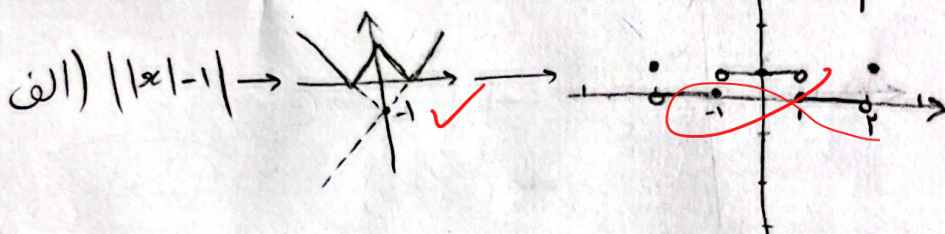


الف)

ب) $\underbrace{x^2 - 2x}_{x(x-2) \Rightarrow x=0 \vee x=2} \rightarrow \frac{-b}{2a} = \frac{2}{1} = 1 \Rightarrow x = -1 \rightarrow$



0, VZ



$$a \xrightarrow{\text{مربع}} b = 2, 1 + [a] \rightarrow a + [2, 1 + [a]] = 2, 2$$

$$a + [u, v] + [a] = v, v$$

بودن این دهی هزاره ،

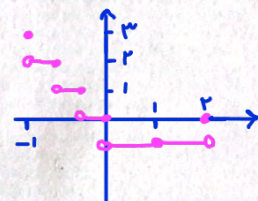
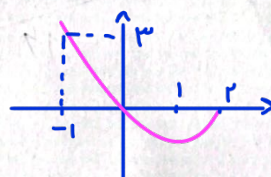
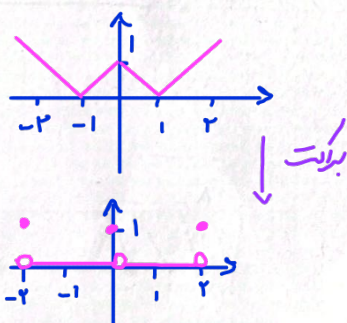
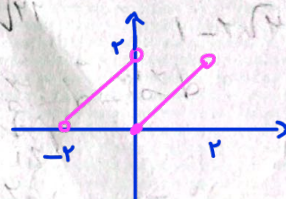
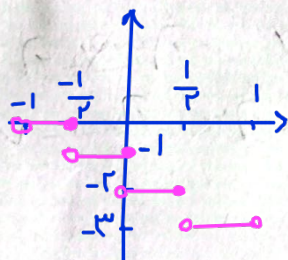
$$\xrightarrow{\text{S}} a + \lceil [a] \rceil = 2, 2 \rightarrow a + [a] = 2, 2$$

بذلک ان برائتہم تا نری ہمارے

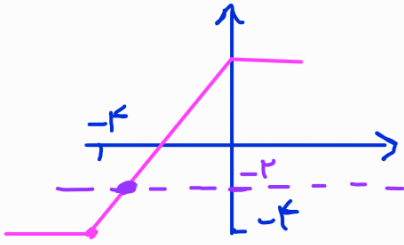
$$a+b = 5/4 \leftarrow b = 1/5 \leftarrow a = 1/4 \leftarrow$$

$$(1+\sqrt{5})^4 + (1-\sqrt{5})^4 = 194 \rightarrow \left((1+\sqrt{5})^n + (1-\sqrt{5})^n \right)^2 = (1+\sqrt{5})^4 + (1-\sqrt{5})^4 - 2$$

$(1+\sqrt{2})^3 = 1 + 3\sqrt{2} + 6 + 2\sqrt{2} = 7 + 8\sqrt{2}$
 $(1+\sqrt{2})^6 = (7+8\sqrt{2})^2 = 49 + 112\sqrt{2} + 224 = 273 + 112\sqrt{2}$
 $(1+\sqrt{2})^9 = (273+112\sqrt{2})(7+8\sqrt{2}) = 1911 + 3584\sqrt{2} + 784\sqrt{2} + 7168 = 9979 + 4368\sqrt{2}$



$$\left| \frac{1}{r}u \right| - r = \left| \frac{1}{r}u + r \right| - 1 \xrightarrow{\times r} |u+r| - |u| = -r \quad -\infty$$



$$-r < u < 0$$

$$u + r + u = -r \rightarrow \boxed{u = -3}$$