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1A, 2A

$$f(-x) - xf(x) = r|x|+1 \rightarrow xf(-x) - x^r f(x) = \cancel{1/x} x(r|x|+1) \quad \text{Lec (1) - 1a, 1b}$$

$$f(x) + xf(-x) = r|-x|+1 \rightarrow -f(x) - xf(-x) = -(r|x|+1) \quad (r)$$

$$f(x) = -(\cancel{x^r+1})f(x) = \frac{(x-1)(r|x|+1)}{-(x^r+1)} \Rightarrow f(x) = \frac{(x-1)(r|x|+1)}{-(x^r+1)} \quad (r)$$

$$x=0 \rightarrow rf(0) = 0 - 0 + r = r \Rightarrow f(0) = r \Rightarrow f(x) = x^r - rx + r$$

$$f(x^r) = x^r - rx^r + r \quad (r)$$

$$yx - y = x^r + x + r \Rightarrow x^r + (1-y)x + y + r = 0 \quad y^r - ry - v = (y+1)(y-v)$$

$$x = \frac{y+1 \pm \sqrt{y^2 + y + 1 - y^2 - y - 1}}{r} = \frac{y-1 \pm \sqrt{y^2 - ry - v}}{r} \quad (r)$$

$$Ry = (-\infty, -1] \cup [v, +\infty) \quad (r)$$

$$a) y = rx^r - ax + 1 \rightarrow y = \frac{rx^r}{\frac{1}{x}} - ax \frac{1}{x} + 1 = \frac{-14}{x} \quad Ry = \left[\frac{-14}{x}, +\infty \right) \quad (r)$$

$$b) y = \sqrt{-x^r + rx - a} \Rightarrow y = \sqrt{-x^r + rx - 9 + 9} \Rightarrow y = \sqrt{-(x-r)^2 + 9}$$

$$A = -(x-r)^2 + 9 \Rightarrow R_A = (-\infty, 9] \Rightarrow Ry = [0, 3] \quad (r)$$

$$c) y = \sqrt{x^v - rx^r + rx + 1} \rightarrow A = x^v - rx^r + rx + 1 \rightarrow R_A = R_r \Rightarrow Ry = [0, +\infty) \quad (r)$$

$$d) \log(x^r - 4x^r + vx + 2) = \log A \rightarrow A > 0 \quad Ry = (-\infty, +\infty) \quad (r)$$

$$e) y = \frac{rx+1}{rx-4} \Rightarrow Ry = R_r = \left\{ \frac{r}{4} \right\} \quad (r)$$

$$f) y = \sqrt{\frac{rx+1}{x-r}} = \sqrt{A} \rightarrow R_A = R_r = \{1\} \Rightarrow Ry = [0, +\infty) \quad (r)$$

$$g) y = \sqrt{x^r + r} + \frac{1}{\sqrt{x^r + r}} \Rightarrow y \geq \sqrt{r} + \frac{1}{\sqrt{r}} \Rightarrow y \geq \frac{r+1}{\sqrt{r}} \quad Ry = \left[\frac{r+1}{\sqrt{r}}, +\infty \right) \quad (r)$$

$$h) x^r + r + \frac{1}{x^r + r} \geq \frac{x^r + r + 2}{2} \Rightarrow y \geq \frac{1}{2} \quad Ry = \left[\frac{1}{2}, +\infty \right) \quad (r)$$

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$$y = \frac{rx^r + \varepsilon}{x^r - 1} \Rightarrow yx^r - y = rx^r + \varepsilon \rightarrow rx^r - yx^r + \varepsilon + y = 0$$

$$(r-y)x^r + y + \varepsilon = 0 \Rightarrow x = \frac{0 \pm \sqrt{-r(r-y)(y+\varepsilon)}}{r(r-y)} \rightarrow (-\infty, -\varepsilon] \cup [r, +\infty)$$

$$R_y = (-\infty, -\varepsilon] \cup (r, +\infty)$$

$$5. \min = -\varepsilon \quad \max = +\infty \quad \xrightarrow{+1} (-\infty, -\varepsilon] \cup (r, +\infty)$$

$$f(x) = \frac{r \sin x + \varepsilon}{\sin x - r} \quad \begin{matrix} \min -1 & -\frac{1}{r} \\ \max 1 & -r \end{matrix} \quad [-r, \frac{1}{r}]$$

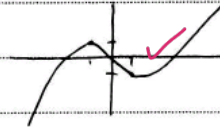
10.

$$10) y = \left| \frac{rx-1}{rx} \right| \rightarrow \frac{rx-1}{rx} \rightarrow R_1 = \left\{ \frac{r}{2} \right\} \rightarrow [0, +\infty) - \left\{ \frac{r}{2} \right\}$$

$$b) y = \sqrt{\frac{q(x-r)}{r(x-r)}} = \sqrt{\frac{q}{r}} = \frac{r}{r} \quad R_y = \left\{ \frac{r}{r} \right\}$$

صفحه بعد نوشتن عبارت

$$15. y = \begin{cases} x^r - rx & x \geq 0 \\ -x^r - rx & x < 0 \end{cases}$$

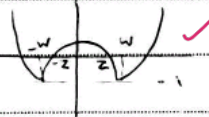


R = IR

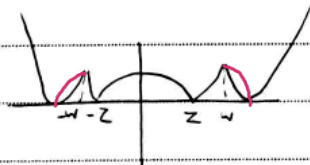
$$y = f(|x|)$$



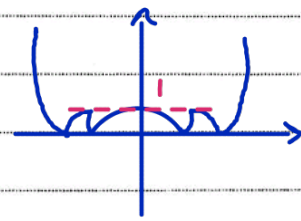
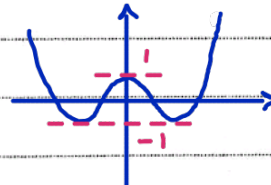
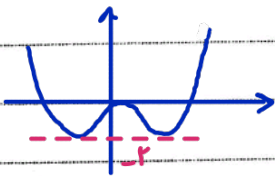
$$20. y = f(|x|) + 1$$



$$y = |f(|x|) + 1|$$



25.



$$y = f(|x|)$$

$$y = f(|x|) + 1$$

$$y = |f(|x|) + 1|$$

30.

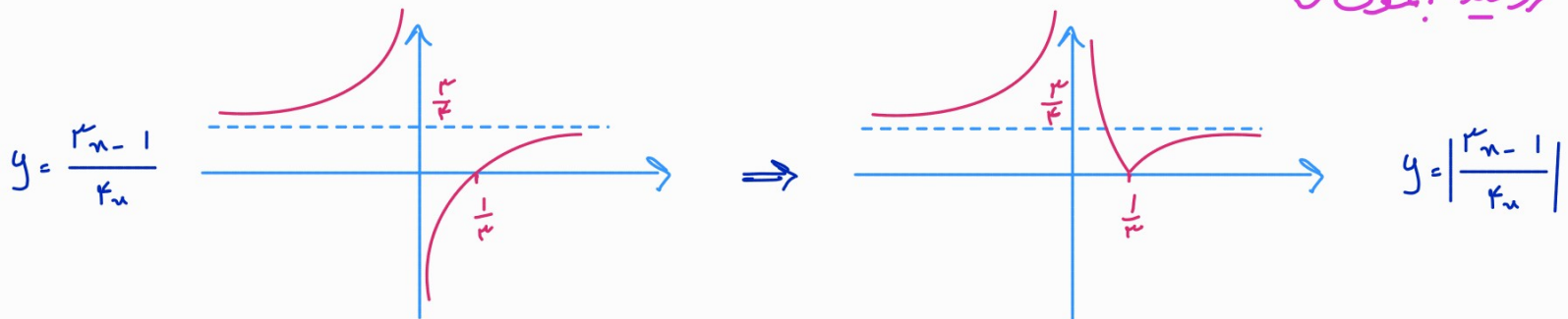
۸- اول برد عبارت داخل قدر مطلق

رد حساب می کنیم بعد قدر مطلق می گیریم

فقط خواست باشد که $y = \frac{3}{4}$ هم هست داخل برد

$y = -\frac{3}{4}$ عضو برد عبارت داخل قدر مطلق هست و وقتی قدر مطلق بگیریم $y = \frac{3}{4}$

مروید به نمودار



$$R_y = \left| 1R - \left\{ \frac{3}{4} \right\} \right| = [0 + \infty)$$

$$y = \frac{x_n - 1}{x_n}$$

$$y = \left| \frac{x_n - 1}{x_n} \right|$$