

نام خانوادگی: ترنم بیانی

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$$f_g = \{(-1, 2), (0, 1), (2, 0), (1, 4)\}$$

$$f(-1) = 0, f(0) = 1, f(2) = 0, f(1) = 4 \Rightarrow f_g = \{(-1, 0), (0, 1), (1, 4)\}$$

$$\Rightarrow A = f_g - f_g = \{(-1, 2), (0, 1), (1, 4)\} \Rightarrow R_A = \{2, 1, 4\}$$

$$f(2) = 0 \Rightarrow R_f = [0, +\infty), g(1) = 4 \Rightarrow R_g = (-\infty, 4]$$

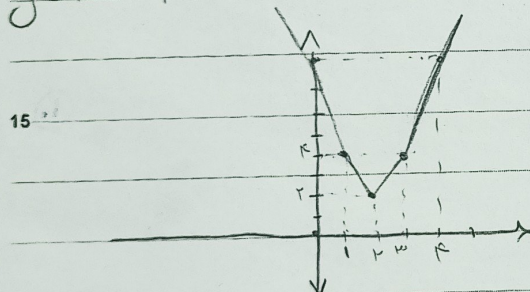
$$\Rightarrow R_f \cup R_g = (-\infty, 4] \cup [0, +\infty)$$

$$g = \frac{-x^2}{2} + x + 3 \rightarrow \text{concave} \begin{cases} -\frac{b}{2a} = \frac{-1}{-1} = 1 \\ y = -\frac{1}{2} + 1 + 3 = \frac{5}{2} \end{cases} \Rightarrow$$

$$10 \quad g = \frac{3}{2} \Rightarrow -x^2 = -x^2 + 2x \Rightarrow x^2 - 2x - 3 = 0 \Rightarrow x = -1, x = 3$$

$$b = 3, a = -1, a = 3 \Rightarrow \sqrt{b-a} \max = \sqrt{3} = 2$$

$$y = |x-1| + |x-3| + |2x-4|$$

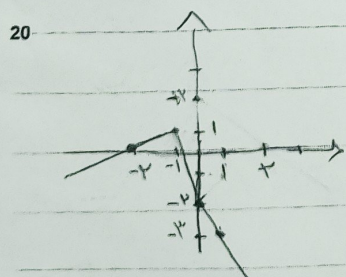


$$\begin{array}{c|c|c|c} & 1 & 2 & 3 \\ \hline x-1-x+3-2x+4 & x-1-x+3-2x+4 & x-1-x+3-2x+4 & x-1-x+3-2x+4 \\ \hline -x+1-x+3-2x+4 & -2x+6 & 2x-2 & 4x-1 \\ \hline -x+1 & -2x+6 & 2x-2 & 4x-1 \end{array}$$

$$x=0 \Rightarrow y=4, x=4 \Rightarrow y=4$$

$$\Rightarrow y_{\min} = 2$$

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



$$\begin{array}{c|c|c} -1 & 0 & \\ \hline -x+1-x-1 & x-1-x-1 & x-1-x-1 \\ \hline -2x & -2 & -2x-2 \end{array}$$

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

$$x=-1 \rightarrow y=0$$

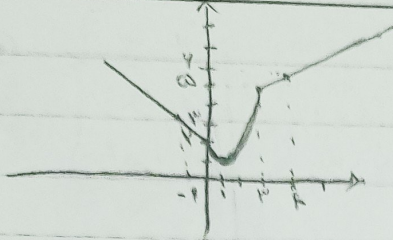
$$\Rightarrow R_y = [1, +\infty)$$

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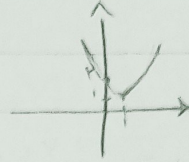
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$$x^2 - 2x + 1 \rightarrow$$

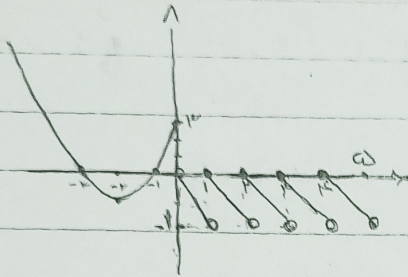
$$-\frac{b}{2a} = \frac{1}{1} = 1$$

$$\Rightarrow R_f = [1, +\infty)$$



⑤

⑤



$$x^2 + 2x + 1$$

$$-\frac{b}{2a} = \frac{-2}{2} = -1$$

$$\begin{aligned} [2m] - 2m &\xrightarrow{(0,1)} -2m, [2m] - 2m \xrightarrow{(1,2)} 2 - 2m \\ [2, 2) &\xrightarrow{} 2 - 2m \Rightarrow R_f = [-1, +\infty) \end{aligned}$$

⑤

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$$2m + 2 > 0 \Rightarrow 2m > -2 \Rightarrow m > -\frac{2}{2} \Rightarrow b = -\frac{2}{2}$$

$$(-\infty, a] \rightarrow a = a + 1 - \sqrt{0} \Rightarrow a = a + 1 \Rightarrow a = 1 \Rightarrow ab - 1 \cdot \frac{2}{2} = -4$$

⑤

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$$f(m) + g(m) = 2\sqrt{2+2\sqrt{1-m}} \Rightarrow \sqrt{2+2\sqrt{1-m}} = \sqrt{\underbrace{(1+m)}_{a^2} + \underbrace{(1-m)}_{b^2} + \underbrace{2\sqrt{1-m}}_{2ab}}$$

⑤

$$\Rightarrow \sqrt{(1+m) + (1-m) + 2\sqrt{1-m}} \Rightarrow \sqrt{2+2\sqrt{1-m}} \Rightarrow$$

⑤

$$f(m) + g(m) = 2(\sqrt{1+m} + \sqrt{1-m}) \Rightarrow \frac{f(m)}{2} + \frac{g(m)}{2} = \sqrt{1+m} + \sqrt{1-m}$$

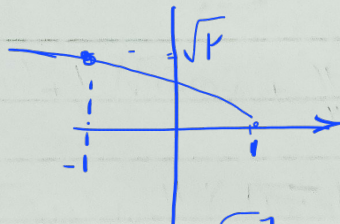
$$\Rightarrow \frac{f(m)}{2} = \sqrt{1+m} + \sqrt{1-m} - \frac{g(m)}{2} \quad \frac{2f(m)}{4} = \frac{2}{4}(\sqrt{1+m} + \sqrt{1-m})$$

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$$\frac{2f(m)}{4} - \frac{2}{4} \frac{g(m)}{2} = \sqrt{1+m} + \sqrt{1-m} - \frac{g(m)}{2} = (\sqrt{1+m} + \sqrt{1-m})$$

$$\frac{f(m)}{2} - \frac{g(m)}{2} = (\sqrt{1+m} + \sqrt{1-m}) - \sqrt{1+m} - \sqrt{1-m}$$

$$\Rightarrow \frac{f(m)}{2} - \frac{g(m)}{2} = \sqrt{1-m}$$



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$$R [-1, \sqrt{2}]$$

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$$y = \frac{x^r + \omega x + m}{n+1} \Rightarrow y = \frac{(m+k)(n+1)(m-k)}{(n+1)}$$

(4)

(5)

$$\rightarrow \textcircled{1}: m = k \Rightarrow y = n+k \Rightarrow n \neq -1 \Rightarrow y \neq k \Rightarrow m \neq k$$

$$\textcircled{2} \quad yx + y = x^r + \omega x + m \Rightarrow x^r + (-y + \omega)x + m - y = 0$$

$$\Rightarrow b^r - 4ac = (\omega - y)^r - k(m - y) \geq 0 \Rightarrow y^r - \omega y + k\omega - km + ky \geq 0$$

$$(y - \omega)^r - k(m - k) \geq 0 \xrightarrow{y \leq k} f(m - k) \geq 0 \Rightarrow m \leq k \xrightarrow{\textcircled{1} \cap \textcircled{2}} m = \{-1, k, k\}$$