

1401 خارج

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باسم ریاضی تجربی

$$\frac{\sqrt{2} + \sqrt{5}}{\sqrt{2}(\sqrt{2} + \sqrt{5})} \times \left[ \sqrt{\frac{2+2}{2}} - \sqrt{\frac{2-2}{2}} - \left( \sqrt{\frac{2+2}{2}} + \sqrt{\frac{2-2}{2}} \right) \right]$$

101/

$$\frac{1}{\sqrt{2}} \times (-\sqrt{2}) = -1$$

بازگشت به اصل  $\sqrt{a \pm \sqrt{b}} = \sqrt{\frac{a + \sqrt{a^2 - b}}{2}} \pm \sqrt{\frac{a - \sqrt{a^2 - b}}{2}}$

102/

$$a_n = an^2 + bn + c$$

$$a_0 = 14 \Rightarrow \begin{cases} 2a + b + c = 14 \\ 4a + 2b + c = 14 \end{cases} \Rightarrow 2a + b = 14$$

$$a = \frac{1}{2}(-a_0) = \frac{1}{2}(-14) = -7$$

$$2(-7) + b = 14 \Rightarrow b = 14 + 14 = 28$$

$$2(-7) + 28 + c = 14 \Rightarrow -14 + 28 + c = 14 \Rightarrow c = 14 - 14 = 0$$

$$a_n = -\frac{1}{2}n^2 + 28n - 1$$

$$a_1 = -\frac{1}{2} + 28 - 1 = 26.5$$

$$a_{10} = -\frac{1}{2}(10)^2 + 28(10) - 1 = 100 - 1 = 99$$

$$\frac{a_{10}}{a_1} = \frac{99}{26.5} = \frac{99}{\frac{53}{2}} = \frac{198}{53} = \frac{10}{1} = 10$$

103/

$$S = \left( x = -\frac{b}{2a}, y = -\frac{\Delta}{4a} \right)$$

$$y_1 = -ax^2 + ax + 2 \quad S_1 \left( \frac{1}{2}, \frac{a}{2} + 2 \right)$$

$$y_2 = 2bx^2 - bx - 1 \quad S_2 \left( \frac{1}{2}, -\frac{b}{2} - 1 \right)$$

$$\begin{aligned} \hookrightarrow \frac{a}{2} + 2 &= 2b \left( \frac{1}{2} \right)^2 - b \left( \frac{1}{2} \right) - 1 \Rightarrow \frac{a}{2} + 2 = -1 \Rightarrow \frac{a}{2} = -3 \Rightarrow a = -6 \\ -\frac{b}{2} - 1 &= 2 \left( \frac{1}{2} \right)^2 - 2 \left( \frac{1}{2} \right) + 2 \Rightarrow -\frac{b}{2} = -1 + 2 \Rightarrow b = -2 \end{aligned}$$

$$\frac{1-\sqrt{2}x}{3+1} = -\sqrt{2} \Rightarrow 1-\sqrt{2}x = -\sqrt{2} - \sqrt{2} \Rightarrow x = \sqrt{2}$$

$$\frac{1-\sqrt{2}x}{3+1} = 0 \Rightarrow 1-\sqrt{2}x = 0 \Rightarrow x = \frac{1}{\sqrt{2}}$$

$$\frac{1}{\sqrt{2}} < \frac{3}{\sqrt{2}} < \frac{1}{\sqrt{2}} \Rightarrow \begin{bmatrix} \frac{3}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} \end{bmatrix} = 0, 1$$

100/

دو تابع زوج ضرب و ضرب زوج و زوج زوج

$$f(x) = \underline{abx} - \underline{ax^2} + \underline{2b} - \underline{2x} - \underline{vx^2} = -(a+v)x^2 + (ab-2)x + 2b$$

$$a+v=0 \Rightarrow a=-v$$

$$ab-2=0 \Rightarrow -vb=2 \Rightarrow b=-\frac{2}{v}$$

$$S_0 = 2b = 2\left(-\frac{2}{v}\right) = -\frac{4}{v}$$

100/

$$\textcircled{1} \rightarrow \frac{1}{x-1} \textcircled{2} \rightarrow \frac{-1}{x-1} \textcircled{3} \rightarrow \frac{-1}{x-1} - 2$$

$$\frac{-1}{x-1} - 2 = \frac{1}{x} \Rightarrow \left(\frac{1}{x} + \frac{1}{x-1} = -2\right) \times x(x-1)$$

$$x-1 + x = -2x^2 + 2x \Rightarrow 2x^2 = 1 \Rightarrow x^2 = \frac{1}{2} \Rightarrow x = \pm \frac{1}{\sqrt{2}}$$

$$y = \frac{1}{x} = \frac{1}{\pm \frac{1}{\sqrt{2}}} = \pm \sqrt{2}$$

$$OA = \sqrt{\left(\frac{1}{\sqrt{2}}\right)^2 + \sqrt{2}^2} = OB = \sqrt{\frac{1}{2} + 2} = \sqrt{\frac{5}{2}} = \frac{\sqrt{10}}{2}$$

$$P = \frac{c}{a} \Rightarrow a+b-1=ab \Rightarrow a-1=ab-b=b(a-1) \Rightarrow b = \frac{a-1}{a-1} = 1$$

$$S = -\frac{b}{a} \Rightarrow a^2 + b^2 - 1 = a + b \xrightarrow{b=1} a^2 + 1 - 1 = a + 1$$

$$a^2 - a - 1 = 0 \Rightarrow (a-2)(a+1) = 0 \Rightarrow \begin{cases} a=2 \in \mathbb{N} \\ a=-1 \notin \mathbb{N} \end{cases}$$

$$a+b = 2+1 = 3$$

$$\sqrt{x-2} = t \Rightarrow \frac{1}{t+2} + \frac{1}{t-2} = \frac{t}{5}$$

$$\frac{t-2+t+2}{(t+2)(t-2)} = \frac{t}{5} \Rightarrow t^2 - 4 = 10 \Rightarrow t^2 - 9 = 14 \Rightarrow t = -12$$

فقط یک ریشه منفی دارد

منطق تابع ۲ ر ۲ دارد پس تابع یک به یک نیست و وارون پذیر نیست

منطق (سوال محاط است) گزینه‌ها را عوض منظر ر طوع سوال این جور جای ورودی گزینه‌ها را عوض کن و در تابع قرار بده هر کدام صدق کرد جواب است

$$(-2, 9) \Rightarrow 9 = -3(-2)^3 + 2(-2) - 11 \Rightarrow 9 = 24 - 4 - 11 = 9 = 9$$

گزینه طوع سوال = یک

$$g(0) = g(2) = 3$$

ف (۲) و (۰) مقدار x مشخص نیست باید معادله خط را بنویسیم

$$m = \frac{0+3}{2-0} = \frac{3}{2} \Rightarrow y = \frac{3}{2}x - 3$$

به نقاط A(۰, ۳) و B(۲, ۰) بنویسیم

$$\frac{3}{2}x = 1 \Rightarrow x = \frac{2}{3}$$

g(۲/۳) باید معادله خطش را با توجه به نقاط A(۰, ۳) و B(۲, ۰) بنویسیم

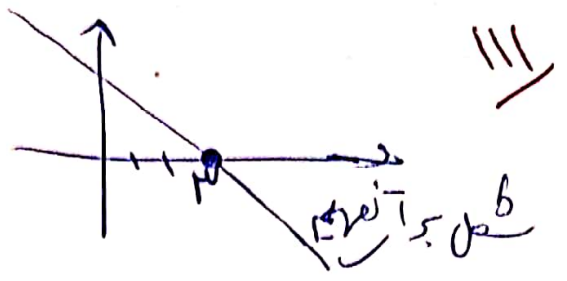
$$m' = \frac{2-1}{0-1} = -1 \Rightarrow g = -x + 2$$

$$g\left(\frac{2}{3}\right) = -\frac{2}{3} + 2 = \frac{4}{3}$$

$$g \circ f^{-1}(-2) \times g(0) = \frac{4}{3} \times 3 = 4$$

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$$a^2 f'(m) \geq 0$$

$$a = 0, 1, 2, 3$$

$$-\frac{\pi}{4} < x < \frac{\pi}{4}$$

$$\sin\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}} \rightarrow \text{Min}$$

$$\sin 0 = 0$$

$$\sin\left(\frac{\pi}{2}\right) = 1 \rightarrow \text{Max}$$

$$\sin\left(\frac{\pi}{4}\right) = \sin\left(\pi - \frac{\pi}{4}\right) = \sin\left(\frac{3\pi}{4}\right) = \frac{1}{\sqrt{2}}$$

$$-\frac{1}{\sqrt{2}} \left( \sin x \sqrt{r} \right) \Rightarrow -\frac{1}{\sqrt{2}} \frac{m-1}{r} \Rightarrow -\frac{1}{\sqrt{2}} (m-1) \sqrt{r}$$

$$\xrightarrow{+1} -1 \left( m \sqrt{a} \leq (-1, a) \right)$$

$$(\sin \alpha + \cos \alpha)^2 = \left( \frac{r\sqrt{a}}{a} \right)^2 = \left( \frac{r}{\sqrt{a}} \right)^2$$

$$1 + \sin 2\alpha = \frac{r}{a} \Rightarrow \sin 2\alpha = \frac{r}{a} - 1$$

$$\sin 2\alpha = \frac{r \tan \alpha}{1 + \tan^2 \alpha} = \frac{r}{a} \Rightarrow r \tan^2 \alpha - 1 \cdot \tan \alpha + r = 0$$

$$r \tan^2 \alpha - \tan \alpha + r = 0 \Rightarrow \tan \alpha = \frac{a \pm \sqrt{r a - 1}}{r(r)}$$

$$C = \frac{y_{\min} + y_{\max}}{r} = \frac{-\frac{1}{r} + \frac{a}{r}}{r} = \frac{r}{r} = 1$$

اعداد و جداول و مسائل و تمرینات

$$C + |a| = r, a \Rightarrow 1 + |a| = r, a \Rightarrow |a| = \frac{r}{2} \Rightarrow a = \pm \frac{r}{2} \Rightarrow ac = 1 \times \frac{r}{2} = \frac{r}{2}$$

$$\sin\left(\alpha + \frac{\pi}{4}\right) \cos\left(\frac{\pi}{4} - \alpha\right) = 1 \quad \text{113}$$

$$\alpha + \frac{\pi}{4} + \frac{\pi}{4} - \alpha = \frac{\pi}{2} \quad \left( \text{چون } \alpha + \beta = \frac{\pi}{2} \Rightarrow \sin \alpha = \cos \beta \right)$$

$$\sin\left(\alpha + \frac{\pi}{4}\right) \sin\left(\alpha + \frac{\pi}{4}\right) = 1 \Rightarrow \sin\left(\alpha + \frac{\pi}{4}\right) = 1$$

$$\sin\left(\alpha + \frac{\pi}{4}\right) = \pm 1$$

برای  $+1$  در  $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$  یکجا  
برای  $-1$  در  $\left[\frac{3\pi}{2}, \frac{5\pi}{2}\right]$  یکجا

$$\log_{\frac{1}{2}} b = \log_{\frac{1}{2}^2} b = \frac{1}{2} \log_{\frac{1}{2}} b = \frac{2}{3} (1+a) \Rightarrow \log_{\frac{1}{2}} b = 2(1+a) = 2 + 2 \log_{\frac{1}{2}} 2 \quad \text{114}$$

$$\log_{\frac{1}{2}} b = \log_{\frac{1}{2}} 4 + \log_{\frac{1}{2}} 2 = \log_{\frac{1}{2}} 8 \Rightarrow b = 8$$

$$\log_{\frac{1}{2}} b - N = \log_{\frac{1}{2}} [2(39) - 1] = \log_{\frac{1}{2}} (78 - 1) = \log_{\frac{1}{2}} 77 = \log_{\frac{1}{2}} 77 = \log_{\frac{1}{2}} 77 = 2 \quad \text{115}$$

$$\left(\frac{1}{2}\right)^a = 1 \Rightarrow 1 = 2^{\frac{a}{2} + b} \Rightarrow 2^{\frac{a}{2} + b} = 2^0 \Rightarrow \frac{a}{2} + b = 0 \Rightarrow a = -2b \quad \text{116}$$

$$f'(1) = a \Rightarrow f(a) = 1 \Rightarrow 1 = 2^{a + b} \Rightarrow a + b = 0 \Rightarrow a = -b$$

$$a(-2b) + b = -9b = 9 \Rightarrow b = -1 \Rightarrow a = -2b = -2(-1) = 2$$

$$a - b = 2 - (-1) = 3$$

تفاوت اعداد زوج و فرد در مجموع اعداد زوج و فرد  
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$$\begin{cases} a=1 \\ b=2 \end{cases} \Rightarrow 9 + 1 + 6 + 1 + 0 + 1 = 18 \neq 24$$

$$\begin{cases} a=2 \\ b=3 \end{cases} \Rightarrow 9 + 1 + 9 + 1 + 0 + 2 = 22 \neq 24$$

مجموع  $n$  داده اول  $= n \bar{x}_1$   
 مجموع  $n$  داده دوم  $= n \bar{x}_2$

$$-\bar{x}_1 = \bar{x}_2 - 4 \Rightarrow \bar{x}_1 + \bar{x}_2 = 4$$

$$\bar{x} = \frac{n\bar{x}_1 + n\bar{x}_2}{2n} = \frac{n}{n} \left( \frac{\bar{x}_1 + \bar{x}_2}{2} \right) = 1 \times \frac{4}{2} = 2$$

اول کتف برکت و قدر مطلق را در  $x \rightarrow -1^+$  می بینیم

$$\lim_{x \rightarrow -1^+} \frac{(x+1)H(-1)}{x-0} = \frac{0}{0} = 1$$

$$\lim_{x \rightarrow +\infty} \frac{\sqrt{ax}}{x} = \frac{1}{\sqrt{a}} \Rightarrow a = \frac{1}{4}$$

$$x \rightarrow -1^- \Rightarrow \frac{1}{x} \rightarrow -1^+ \Rightarrow \left[ \frac{1}{x} \right] = -1$$

$$\lim_{x \rightarrow -1^-} \left[ \frac{1}{x} \right] f(x) = -1 \times \sqrt{\frac{1}{4}(-1)^2 + (-1) + 1} = -1 \times \frac{1}{2} = -\frac{1}{2}$$

$$f(1) = \frac{1\sqrt{1}}{1+1-1} = \frac{1}{1} \Rightarrow \lim_{x \rightarrow 1} \frac{f(x)-1}{x-1} = \frac{f'(1)-1}{f'(1)-1} = \frac{0}{0} \xrightarrow{\text{HOP}}$$

$$\lim_{x \rightarrow 1} \frac{f'(x)}{1} = f'(1)$$

$$f'(x) = \frac{\frac{1}{2} (x+1)^{-1/2} - (x+1)(1/\sqrt{1})}{[x(x+1)]^2} = \frac{\frac{1}{2} - 2}{4} = -\frac{1}{4}$$

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$$f(1) = \frac{1+a}{a(1)+1} = \frac{a+1}{a+1} = 1$$

$$1 = r(1) + b \Rightarrow b = -1$$

$$f'(n) = \frac{1(n) - a^n}{(a(n)+1)^2} \Rightarrow \frac{1-a^n}{(a+1)^2} = r$$

$$\frac{(1-a)(1+a)}{(a+1)(a+1)} = r \Rightarrow \frac{1-a}{1+a} = r \Rightarrow r+ra = 1-a$$

$$r a = -1 \Rightarrow a = -\frac{1}{r}$$

$$a-b = -\frac{1}{r} + 1 = \frac{r-1}{r}$$

فرض کنیم که  $f(x) = ax^2 + bx + c$  و  $f(1) = 1$  و  $f'(1) = r$

$$f(x) = ax^2 + bx + c = 0$$

$$a = 0 \Rightarrow 0 + 0 - 2b = 0 \Rightarrow b = 0$$

$$a = -2 \Rightarrow 12 - 4a - 0 = 0 \Rightarrow a = 2$$

$$y = ax^2 + bx + c$$

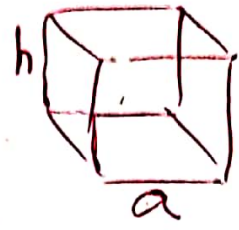
$$a = 0 \Rightarrow y = 0 + 0 - 1 = -1$$

$$a = -2 \Rightarrow y = (-2)^2 + 3(-2) - 1 = -1 + 12 - 1 = 10$$

$$A \begin{vmatrix} 1 \\ -1 \end{vmatrix} B \begin{vmatrix} 1 \\ 10 \end{vmatrix} \Rightarrow AB = \sqrt{1^2 + 10^2} = \sqrt{101} = 10\sqrt{1.01}$$

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$$V = \text{مساحت مربع} \times \text{ارتفاع} = a^2 \cdot h = F \Rightarrow h = \frac{F}{a^2}$$



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$$S = \text{مساحت مربع} = a^2 + \text{مساحت جدار} = a^2 + 4ah$$

$$S = a^2 + 4ah = a^2 + 4a \left( \frac{F}{a^2} \right) = a^2 + \frac{4F}{a}$$

$$S' = 2a + 17 \left( -\frac{1}{a^2} \right) = 0 \Rightarrow 2a = \frac{17}{a^2} \Rightarrow a^3 = 17 \Rightarrow a = \sqrt[3]{17}$$

$$h = \frac{F}{a^2} = \frac{F}{(\sqrt[3]{17})^2} = 1$$

$$S = a^2 + 4ah = 17 + 4(1)(1) = 17 + 4 = 21$$

الف)  $\text{دسته اول} : RRARAR \Rightarrow 4! \cdot 2! = 24 \times 2 = 48$

ب)  $\text{دسته دوم} : RARARR \Rightarrow 4! \cdot 2! = 24 \times 2 \times 2 \times 2 \times 2 \times 2 = 24 \times 8 = 192$

$48 + 192 = 240$

۱۲۶

۱۲۷

$$\begin{matrix} (3-3)-(1-1) \\ \swarrow \\ \frac{1}{3} \Rightarrow (3-3-1) \Rightarrow \frac{1}{1} \end{matrix}$$

$$\begin{matrix} (1-3)-(3-1) \\ \swarrow \\ \begin{matrix} 1-3 \Rightarrow (1-3-3) - (3-1-1-3) \Rightarrow 2 \times \frac{1}{12} \\ 1-1 \\ 3-1 \\ 3-3 \end{matrix} \end{matrix}$$

$$\frac{1}{1} + \frac{1}{1} + \frac{1}{1} = \frac{3}{1}$$

مساحت مربع  $BC$  برابر طول  $AH$  است.  $BC$  نیز برابر  $A$  است.  $BC$  نیز برابر  $A$  است.

$BC$   $\text{مساحت} \Rightarrow m_{BC} = \frac{11-3}{\sqrt{1-3}} = \frac{8}{\sqrt{-2}} = \frac{8}{\sqrt{2}} = 4\sqrt{2} \Rightarrow y = 2m - 3 \Rightarrow 2m - y - 3 = 0$

$A$   $\text{مساحت} \Rightarrow 2m - y - 3 = 0 \Rightarrow AH = \frac{|2(1) + 9(-1) - 3|}{\sqrt{2+1}} = \frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{3} = 2\sqrt{3}$

۱۲۸



۱۲۹ در دو مثلث  $CDE$  و  $BDE$  قاعده‌ها یعنی  $DE$  و ارتفاع  $h$  (فاصله بین دو خط موازی) با هم برابرند

$$S_{BDE} = S_{CDE} \Rightarrow \frac{S_{CDE}}{S_{BDE}} = 1 \quad \text{رشته}$$

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$$(x-1)^2 + (y+1)^2 - 4 = 0 \Rightarrow (x-2)^2 + (y+1)^2 = 4$$

$$C \begin{pmatrix} 2 \\ -1 \end{pmatrix} \quad R = \sqrt{4}$$

$$x^2 + (y-1)^2 - 1 = 4 \Rightarrow x^2 + (y-1)^2 = 5$$

$$C' = \begin{pmatrix} 0 \\ 1 \end{pmatrix} \quad R' = \sqrt{5}$$

$$d = CC' = \sqrt{2^2 + (1+1)^2} = 2\sqrt{2}$$

$$R - R' < d < R + R'$$

$$2, 2 - 1, 2 < 2(1, 2) < 2, 2 + 1, 2$$

$$0, 5 < 2, 1 < 3, 9$$

دو دایره متقاطع هستند

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موفق باشید!