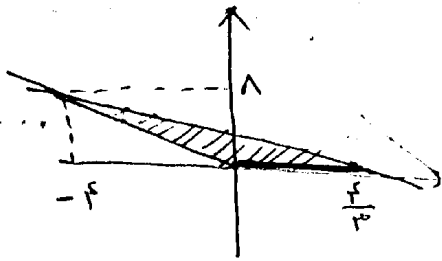


۳, ۴, ۶, ۱۰, ۱۸, ۳۴, ۶۶, ۱۳۰ → $a_n - a_v = 914$

(۴) - ۱۲۶



$r - \frac{r}{r}u = -ru \rightarrow u = -r$

(۳) - ۱۲۷

$r - \frac{r}{r}u = 0 \rightarrow u = \frac{r}{r}$

$S = \lambda \times \left(\frac{r}{r} \right) = \frac{19}{r}$

$\log \frac{(u^r - u - r)}{(u - r)(u + r)} = \log (ru - a)$

(۲) - ۱۲۸

→ $\log \frac{(u - r)(u + r)}{(u + r)} = \log (ru - a) \rightarrow u + r = ru - a \rightarrow u = r$

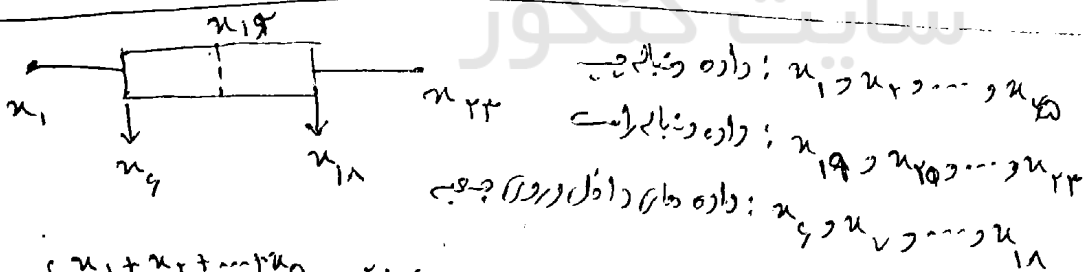
→ $\log_r \sqrt[r]{u+1} = \log_r \sqrt[r]{\lambda} = \log_r r = \frac{1}{r}$

$A + rB = \begin{bmatrix} a-r & r \\ 9 & a+r \end{bmatrix}$ وارون ناپذیر، $|A + rB| = 0$

(۱) - ۱۲۹

→ $(a-r)(a+r) - 9 \times r = 0 \rightarrow a^2 + ra - ra - 9r = 0 \rightarrow (a-r)(a+r) = 0$

→ $\begin{cases} a = a \\ a = -r \end{cases}$



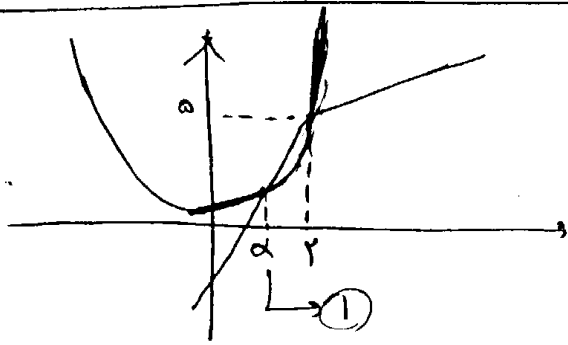
(۲) - ۱۳۰

→ $\begin{cases} \frac{x_1 + x_2 + \dots + x_{10}}{a} = 119 \rightarrow x_1 + x_2 + \dots + x_{10} = 10a \\ \frac{x_{11} + x_{12} + \dots + x_{29}}{a} = 22 \rightarrow x_{11} + x_{12} + \dots + x_{29} = 19a \\ \frac{x_3 + x_4 + \dots + x_{11}}{13} = 20 \rightarrow x_3 + x_4 + \dots + x_{11} = 260 \end{cases} \rightarrow \bar{x} = \frac{10a + 19a + 260}{23} = 129$

c.v = $\frac{\sigma}{\bar{x}} \rightarrow \begin{cases} \sigma^2 = \frac{\sum x_i^2}{n} - \bar{x}^2 = \frac{2190}{20} - 9^2 = 9 \\ \bar{x} = \frac{210}{20} = 10 \end{cases} \Rightarrow c.v = \frac{\sqrt{9}}{10} = \frac{3}{10} = 0,3$

(۴) - ۱۳۱

$$\{ (1, 2), (2, 2), (2, 3), (2, 0), (0, 2) \} \Rightarrow \rho(A) = \frac{2 \times 0}{4 \times 4} = \frac{0}{16}$$



$$y = 2x + 1 - |x - 2| = \begin{cases} 2x - 1 & x < 2 \\ x + 3 & x > 2 \end{cases}$$

$$x < 2 \rightarrow 2x - 1 = |x^2 + 1| = x^2 + 1$$

$$\rightarrow x^2 - 2x + 2 = 0 \rightarrow (x - 1)(x - 2) = 0$$

$$\begin{cases} x = 1 \\ x = 2 \end{cases} \rightarrow (1, 2)$$

$$\frac{\sin \alpha}{1 + \cos \alpha} = \frac{x \sin \frac{\alpha}{r} \cos \frac{\alpha}{r}}{x \cos \frac{\alpha}{r}} = \frac{\sin \frac{\alpha}{r}}{\cos \frac{\alpha}{r}} = \operatorname{tg} \frac{\alpha}{r} = \frac{1}{r}$$

(1) - ۱۳۴

$$\operatorname{tg} \left(\frac{\pi}{r} + \frac{\alpha}{r} \right) = -\cot \frac{\alpha}{r} = -\frac{1}{\operatorname{tg} \frac{\alpha}{r}} = \frac{-1}{\frac{1}{r}} = -r$$

$$\begin{cases} f(g(x)) = \Lambda x^2 + 9x + 0 \\ g(x) = 2x + 1 \end{cases} \rightarrow f\left(\frac{2x+1}{2}\right) = \Lambda x^2 + 9x + 0$$

(۳) - ۱۳۵

$$\begin{aligned} \frac{2x+1}{2} &= z \\ x &= \frac{z-1}{2} \\ f(z) &= \Lambda \left(\frac{z-1}{2}\right)^2 + 9\left(\frac{z-1}{2}\right) + 0 = 2(z-1)^2 + 9(z-1) + 0 = \\ &= f(z) = 2z^2 - 8z + 2 + 9z - 9 + 0 \end{aligned}$$

$$\Rightarrow f(x) = 2x^2 - x + 2$$

$$\lim_{x \rightarrow r} \frac{x - \sqrt{2x - 2}}{ax + b} = \frac{1}{r} \rightarrow \text{کسر صفر بر صفر (صفر بر صفر) = صفر}$$

$$\rightarrow \frac{1 - \frac{r}{\sqrt{2x-2}}}{ra} = \frac{1}{r} \rightarrow \frac{1 - \frac{r}{\sqrt{2x-2}}}{ra} = \frac{1}{r}$$

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

$$\lim_{x \rightarrow 0} \frac{\sin 2x - \sin x}{x^2} = \lim_{x \rightarrow 0} \frac{2x - x}{x^2} = \frac{x}{x^2} = \frac{1}{x} \rightarrow \text{وجود ندارد}$$

← (زاویه صفر، صفر، صفر) = صفر

$$\lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h} = f'(1) \rightarrow f'(u) = \frac{\sqrt{u}}{(u+r)^2}$$

① - 128

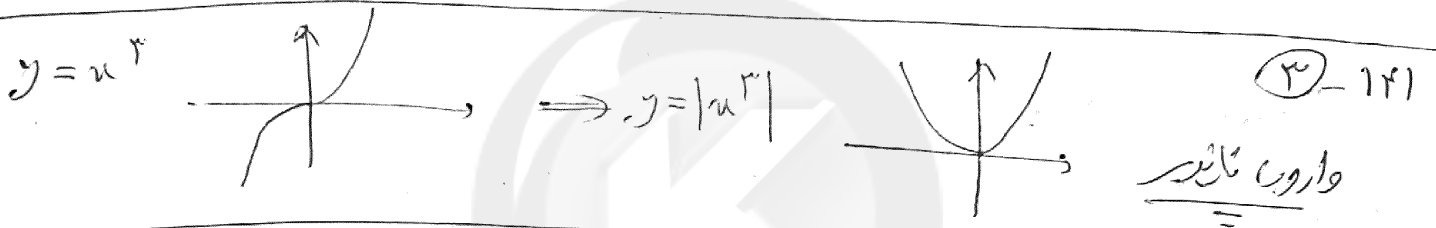
$$\rightarrow f'(1) = \frac{\sqrt{19}}{1 \times \frac{19}{1}} = \frac{\sqrt{19}}{19}$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{\binom{15}{1} \binom{10}{2}}{\binom{25}{3}} = \frac{15 \times 10}{25 \times 24 \times 23} = \frac{10}{21}$$

③ - 129

$$P\left(\frac{1}{11} \leq x \leq \frac{1}{10}\right) = P(x=3) + P(x=4) = \binom{15}{3} \left(\frac{1}{11}\right)^3 \left(\frac{10}{11}\right)^{12} + \binom{15}{4} \left(\frac{1}{11}\right)^4 \left(\frac{10}{11}\right)^{11}$$

$$= 15 \times \frac{1}{11} + \frac{15}{11} = \frac{30}{11} = \frac{15}{11}$$



مجموع جبراً : $a^r + a^r q + a^r q^2 + \dots \Rightarrow S_1 = \frac{a^r}{1-q}$ ① - 122

مجموع جبراً : $(a + aq + aq^2 + \dots)^r \Rightarrow S_2 = \left(\frac{a}{1-q}\right)^r \rightarrow \frac{a^r}{1-q^r} = \frac{a^r}{1-q} \cdot \frac{1}{(1-q)^{r-1}}$

$$\rightarrow \frac{1}{(1-q)(1+q)} = \frac{1}{1-q} \times \frac{1}{(1+q)} \rightarrow q = \frac{1}{2} = 0,5$$

$$\cos\left(u + \frac{\pi}{r}\right) \cos\left(u - \frac{\pi}{r}\right) = \frac{1}{r} \rightarrow \frac{\sqrt{r}}{r} (\cos u - \sin u) \times \frac{\sqrt{r}}{r} (\cos u + \sin u) = \frac{1}{r}$$

$$\rightarrow \frac{1}{r} (\underbrace{\cos^2 u - \sin^2 u}_{\cos 2u}) = \frac{1}{r} \rightarrow \cos 2u = \frac{1}{r} \rightarrow 2u = 2k\pi \pm \frac{\pi}{r}$$

$$\Rightarrow u = k\pi \pm \frac{\pi}{2r}$$

① - 123

$$f(u) = \begin{cases} \frac{\sin u}{1 + \cos u} = 2 \tan \frac{u}{2} & u > 0 \\ \sin u & u < 0 \end{cases} \rightarrow f'(u) = \begin{cases} \frac{1}{r} (1 + 2 \tan^2 \frac{u}{2}) & u > 0 \\ r \cos u & u < 0 \end{cases}$$

⑤ - 124

$$f'_-(0) = r$$

$$f'_+(0) = \frac{1}{r}$$

$$\rightarrow f'_-(0) - f'_+(0) = r - \frac{1}{r} = \frac{1}{\omega}$$

$$x^2 - rxy + y^2 + 1 = 0 \rightarrow rx - ry - rxy' + 2yy' = 0 \quad (2) - 145$$

در این معادله
 $\frac{dy}{dx} = 0 \Rightarrow rx - ry = 0 \rightarrow y = \frac{x}{r}$

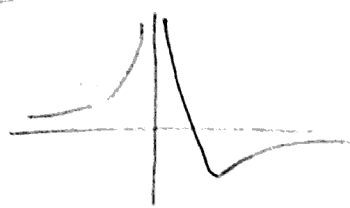
در این معادله
 $x^2 - r x \left(\frac{x}{r}\right) + \left(\frac{x}{r}\right)^2 + 1 = 0 \rightarrow x^2 = r \rightarrow x = \pm r$

(3) - 146

در این معادله
 $x = -\frac{b}{ra} \Rightarrow -\frac{a}{r} = 1 \rightarrow a = -r$

$y = ax^r + bx + c$
 $\Rightarrow y = x^r - rx^r + bx \xrightarrow{A|1} 1 - r + b = -1 \rightarrow b = -9$

$\rightarrow y = x^r - rx^r - 9x \rightarrow f(-1) = -1 - r + 9 = 0$



$f(x) = \frac{ax+r}{x^2+b} \rightarrow \begin{cases} f(r) = 0 \rightarrow ra+r = 0 \rightarrow a = -1 \\ \text{در } x=0, \text{ } \rightarrow b=0 \end{cases} \quad (4) - 147$

$\Rightarrow f(x) = \frac{-x+r}{x^2} \rightarrow f'(x) = \frac{x^2 - 2x}{x^3} = 0 \rightarrow x = r \Rightarrow f(r) = \frac{-r+r}{r^2} = \frac{-1}{r}$

در این معادله
 $(x-\alpha)^2 + (y-\alpha)^2 = R^2 \rightarrow \begin{cases} A|0 \\ B|0 \end{cases} \quad (5) - 148$

$\rightarrow \begin{cases} (1-\alpha)^2 + \alpha^2 = R^2 \\ (r-\alpha)^2 + \alpha^2 = R^2 \end{cases} \rightarrow (1-\alpha)^2 = (r-\alpha)^2 \rightarrow \begin{cases} 1-\alpha = r-\alpha \\ 1-\alpha = \alpha-r \rightarrow \alpha = r \end{cases}$

$\Rightarrow (1-r)^2 + r^2 = R^2 \rightarrow R^2 = 0 \rightarrow R = \sqrt{0}$

در این معادله
 $\frac{b}{a} = r \rightarrow ra = b \rightarrow c = \sqrt{a^2 + b^2} = \sqrt{a^2 + r^2 a^2} = a\sqrt{1+r^2}$

$\rightarrow e = \frac{c}{a} = \frac{a\sqrt{1+r^2}}{a} = \sqrt{1+r^2}$

$\int_{-1}^r [x] |x| dx = \int_{-1}^0 (-1) \frac{(-x)}{x} dx + \int_0^1 0 \times x dx + \int_1^r (1) x dx$
 $= \left[\frac{x^2}{r} \right]_{-1}^0 + \left[\frac{x^2}{r} \right]_1^r = -\frac{1}{r} + \frac{r}{r} - \frac{1}{r} = 1$ (2) - 149

$$\int \frac{2u^2 + 3u}{\sqrt{u}} du = \int (2u^{\frac{3}{2}} + 3u^{\frac{1}{2}}) du = \frac{2}{1+\frac{3}{2}} u^{\frac{5}{2}} + \frac{3}{1+\frac{1}{2}} u^{\frac{3}{2}} + c$$

$$= 2u^{\frac{5}{2}} + 2u^{\frac{3}{2}} + c = 2u^{\frac{3}{2}}(u+1) + c$$

1) - 125

مساحت مثلث: $\frac{a \times h_a}{2} = \frac{b \times h_b}{2} = \frac{c \times h_c}{2} \rightarrow 10h_a = 10h_b = h_c \times c$

$\rightarrow \begin{cases} 10h_a = 10h_b \rightarrow h_b = \frac{10}{10} h_a \\ h_a + h_b = h_c \rightarrow \frac{10}{10} h_a = h_c \end{cases} \Rightarrow 10h_a = \frac{10}{10} h_a \times c \rightarrow c = 10$

2) - 125

اگرچه قطر کوچک در مثلث قائم الزامی نیست

مساحت مثلث قائم $9 \left(\frac{a^2 \sqrt{2}}{2} \right)$ برابر $\frac{a^2 \sqrt{2}}{2}$ مساحت مربع 9×9 است

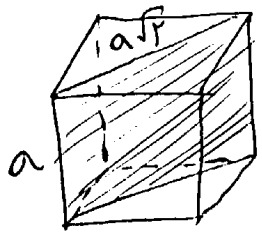
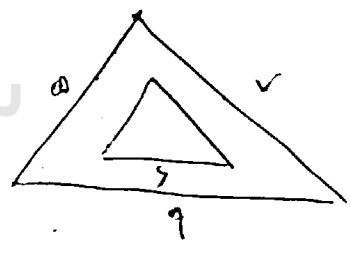
$\frac{a^2 \sqrt{2}}{2} \times 9 = 9 \times 9 \rightarrow a^2 \sqrt{2} = 18 \rightarrow a^2 = \frac{18}{\sqrt{2}} \rightarrow a = \sqrt{9\sqrt{2}}$

قطر: $a\sqrt{2} = \sqrt{9\sqrt{2}} \times \sqrt{2} = 3\sqrt{2}$

3) - 125

$\frac{S_2}{S_1} = \left(\frac{9}{6} \right)^2 = 2.25$

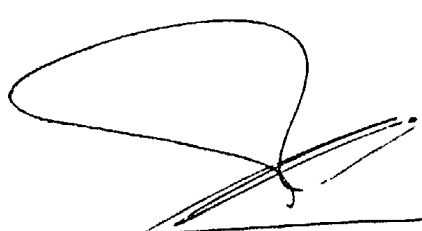
$\frac{S_2 - S_1}{S_1} = \frac{S_2}{S_1} - 1 = 1.25$



مساحت مربع: $a^2 \sqrt{2} = 9\sqrt{2} \rightarrow a = 3$

4) - 125

مساحت مربع: $a\sqrt{2} = 3\sqrt{2}$



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