$a, ar, ar^2 \to \frac{a}{2}, \frac{ar}{2}, \frac{ar^2}{2}$ حل $\to \frac{a}{2}, \frac{a}{2}, \frac{a}{2}$

$ar = \frac{a}{2} + \frac{ar^2}{2} \xrightarrow{\times 2} 2r = 1 + r^2 \to r^2 - 2r + 1 = 0$ $\quad d = 0$

$(r-1)^2 \to r = 1$

گزینه ۲

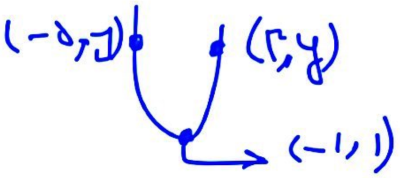
①

$a = -\frac{2}{3} \leftarrow \frac{2a+2}{a} = -1 \Leftarrow 4 - \frac{2a+2}{a} = 5$

$y = a(x+1)^2 + 1 \to y = ax^2 + 2ax + a + 1$

$y = -\frac{2}{3} + 1 = \frac{1}{3}$ $\quad \alpha + \beta = S = -2$

$P = \frac{a+1}{a}$



②

$2x^2 - 2x + 1 \to \frac{(x-1)^2 + x^2}{x^2(x-1)^2} = \frac{170}{9} \to x^2 - x = t \to \frac{2t+1}{t^2} = \frac{170}{9}$

$\underbrace{x^2(x-1)^2}_{(x^2-x)^2}$

$170t^2 - 18t - 9 = 0 \Rightarrow 170t^2 - 6t - 1 = 0$

$\to t^2 - 6t - 170 = 0 \to (t-18)(t+8)$ $\Big| \; \frac{3}{10}, \; -\frac{1}{17}$

$x^2 - x - \frac{3}{10} = 0 \xrightarrow{\Delta > 0} S = 1$

$x^2 - x + \frac{1}{17} = 0 \xrightarrow{\Delta > 0} S = 1$

④

گزینه ۲

$m = \frac{1}{4} \quad m = -4$

b $\quad (4, 0, d)$

$x - 4y - 5 = 0$ $\quad a$

$4x + y - 3 = 0$

$a = \frac{17}{\sqrt{17}} = \sqrt{17}$

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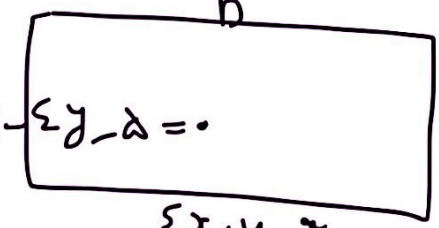


$m=\frac{1}{2}$ $m=-2$

$a=\frac{11}{\sqrt{11}}=\sqrt{11}$

$b=\frac{44}{\sqrt{11}}$

گزینه ۴ ✓

$f^{-1}(x)=11-x \rightarrow f^{-1}(7)=10 \rightarrow f(10)=7$

$7\sqrt{10m-1}=49 \leftarrow 7=\sqrt{10-2\sqrt{10m-1}}$

$10m=100 \rightarrow \boxed{m=10}$

گزینه ۱ ✓

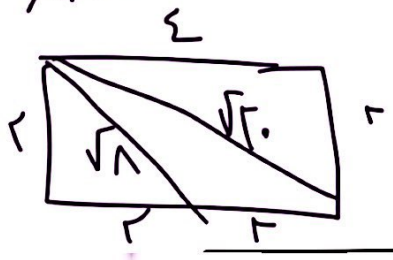
$\log_{\frac{2}{3}}^{2}=\frac{10}{12}=\frac{5}{6}$ $\log_{\frac{2}{3}}^{7}=\frac{10}{14}=\frac{5}{7}$

$F=A_1\left(\frac{4}{9}\right)^{t/1} \Rightarrow \frac{1}{7}=\left(\frac{4}{9}\right)^{t} \rightarrow 7=\left(\frac{9}{4}\right)^{t}$

$\frac{1}{4}A_1$ $\log_{\frac{3}{2}}^{7}=t\left(\log_{\frac{3}{2}}^{9}-\log_{\frac{3}{2}}^{4}\right)$

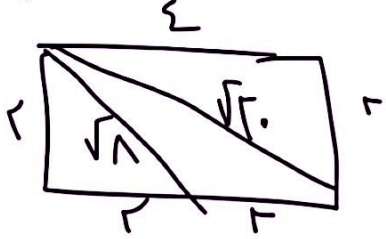
$\frac{2}{11}+\frac{1}{6}=t\left(\frac{10}{6}-\frac{18}{6}\right) \Rightarrow \frac{A}{48}=t\times\frac{12}{48}$

$t=\frac{9}{12}\times 70=52.5$ گزینه ۴ ✓



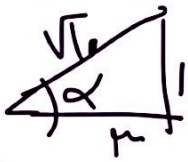
$S=8-2-2=\frac{1}{2}\times 4\times\sqrt{2}\times 2\sqrt{2}\sin\alpha$

$\sin\alpha=\frac{1}{\sqrt{10}}$



$S = 8 - 2 - 4 = \frac{1}{2} \times 2\sqrt{2} \times 2\sqrt{2} \sin\alpha$

$\sin\alpha = \frac{1}{\sqrt{10}}$

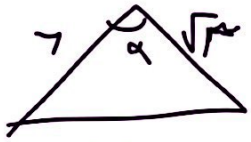


گزینه ۲ $\Rightarrow \cot\alpha = 3$

۱۰

$S = 2, \Delta = \frac{9}{2} \rightarrow \frac{1}{2} \times 4 \times \sqrt{2} \sin\alpha$

$\sin\alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = 45, 135$



گزینه ۱

۱۱

$f(x) = a + \frac{b}{2}\sin(2(x - \frac{\pi}{6}))$ $\quad c=1$

$f(x) = a + \frac{b}{2}\cos 2cx$ $\quad T = \pi = \frac{2\pi}{2c}$

$f(x) = 1 - 2\cos 2cx = 0 \Rightarrow \cos 2cx = \frac{1}{2}$

$2x = \frac{\pi}{3} \rightarrow 2x = 2\pi - \frac{\pi}{3} \rightarrow x = \frac{\pi}{6}, \frac{5\pi}{6}$

$\frac{5\pi}{6} - \frac{\pi}{6} = \frac{2\pi}{3}$ گزینه ۲

۱۲

$\cos x - \sin x = t \rightarrow t^2 = 1 - \sin 2x$

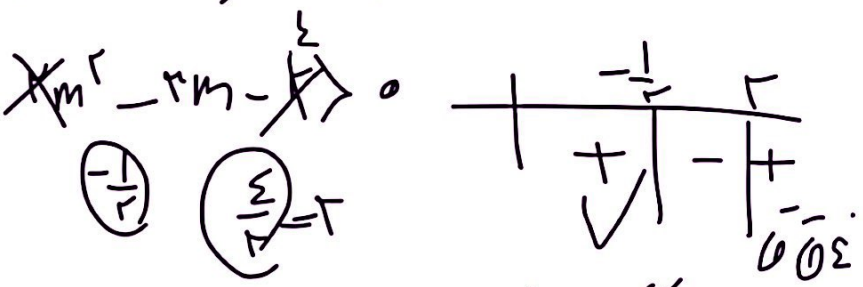
$2\sqrt{3}t^2 + mt - 2\sqrt{3} = 0 \Rightarrow 2\sqrt{3} + m\sqrt{\frac{2}{3}} + m\sqrt{\frac{2}{3}} - 2\sqrt{3} = 0$

$m\sqrt{\frac{2}{3}} = 2\sqrt{3} \Rightarrow \frac{m}{\sqrt{3}} = 2\sqrt{3} \Rightarrow m = 6$

$\frac{\sqrt{2}}{2}\cos x - \frac{\sqrt{2}}{2}\sin x = \frac{1}{\sqrt{3}} \Rightarrow \cos x - \sin x = \sqrt{\frac{2}{3}} = t$

گزینه ۳

۱۳



(۱۴)

$$\frac{\frac{a}{c}}{\frac{-b}{a}} = \frac{-\frac{b}{a}}{\frac{c}{a}} \Rightarrow a = \frac{b^2}{a} \rightarrow a^2 = b^2$$

$$\boxed{a = \pm b}$$

$$f = \frac{ax+b}{cx+d} \rightarrow \frac{-dx+b}{cx-a} \Rightarrow g = \frac{cx+d}{ax+b}$$

$$g^{-1} = \frac{bx+d}{ax-c}$$

(۱۵)

$$\text{ریشه} \rightarrow n^+ \Rightarrow |x^n - (-n-1)| = |2n+1| = 2n+1$$

$$n^- \Rightarrow x^n - (n-1) + k = 1 + k$$

$$\boxed{k = 2n}$$

$$(-n)^+ : |x^{-n} - (-n-1)| = |-n+1| = n-1$$

$$(-n)^- : x^{-n} - (-n-1) + k = k+1$$

$$5 = 1+k \rightarrow k = 4 \quad , \quad 2 = 1+k \rightarrow k = 1$$

$$k = |1+1| = 2 \quad , \quad k = |-2| = 2$$

(۱۶)

$$g(x) = \frac{f(x)-1}{x}$$

گزینه ۴

(۱۶)

$$g(x)=\frac{f(x)-1}{x}$$

$$\lim_{x\to 0} g(x)=f'(0)$$

$$2\left(\frac{2\cos x}{(1+\sin x)^2}\right)\left(\frac{-1+\sin x}{1+\sin x}\right)$$

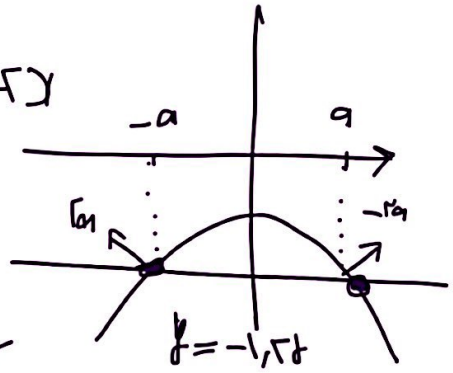
$$2\times 2\times -1=-4$$

گزینه ۲

(۱۷)

$$y=-x^2-1 \to y'=-2x$$

$$-4a^2=-1 \to a=\frac{1}{2}$$

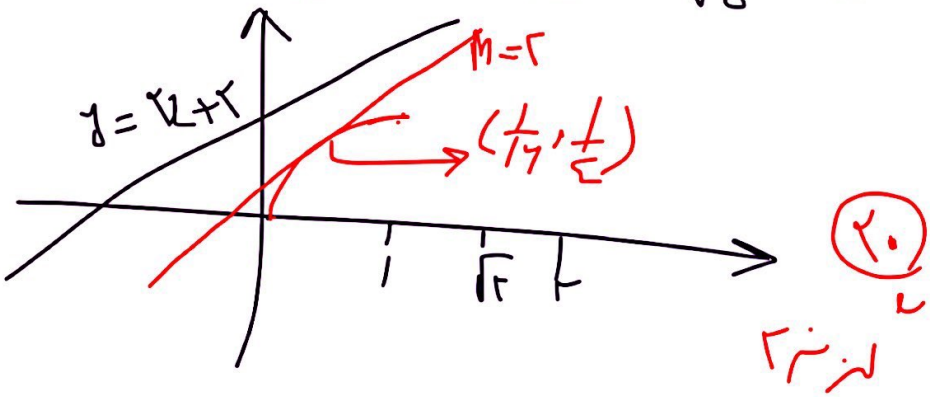


گزینه ۱

(۱۸)

$$y'=\frac{1}{2\sqrt{x}}=2 \to \sqrt{x}=\frac{1}{4} \Rightarrow x=\frac{1}{16}$$

$$d=\frac{\frac{1}{4}-\frac{1}{8}-2}{\sqrt{5}}=\frac{\frac{1}{8}-2}{\sqrt{5}}=\frac{\frac{15}{8}}{\sqrt{5}} \Rightarrow \frac{3}{8}\sqrt{5}$$



(۲۰)

گزینه ۲

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