Date

# نام و نام خانوادگی — تکلیف شب ۲۴ — دهم رشته A

**سوال ۱:**

الف) $y = 2x^2 - 4x + 1$ $\quad a > 0 \rightarrow \min$

ext: $-\frac{b}{2a} = \frac{4}{4} = 1$

$2(1)^2 - 4(1) + 1 = -1$

ب) $y = -2x^2 + 3x - 5$ $\quad a < 0 \rightarrow \max$

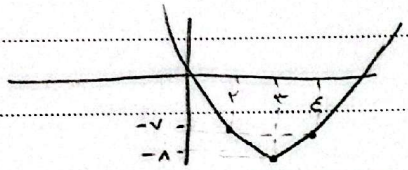
ext: $-\frac{b}{2a} = \frac{-3}{-4} = \frac{3}{4}$

$-\frac{\Delta}{4a} = +\frac{9-40}{8} = -\frac{31}{8}$

**سوال ۲:**

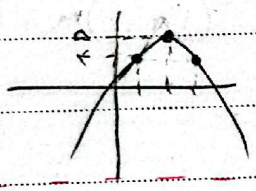
الف) $y = x^2 - 4x + 1$ $\quad$ راس سهمی $= -\frac{b}{2a} = 2 \rightarrow y = -3$

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




ب) $y = -x^2 + 4x - 1$ $\quad$ راس سهمی $= 2 \rightarrow y = 3$

| $x$ | $1$ | $2$ | $3$ |
|---|---|---|---|
| $y$ | $2$ | $3$ | $2$ |




**سوال ۳:**

$4x^3 + kx^2 - 9x - 2 = 0 \quad ax^3 + bx^2 + cx + d = 0$

$\alpha + \beta = 1 \quad \alpha\beta = -2$ $\quad$ مجموع ریشه‌ها $= \alpha + \beta + \gamma = -\frac{b}{a} \Rightarrow \gamma = -\frac{k}{4} - 1$

$\alpha\beta + \beta\gamma + \alpha\gamma = \frac{c}{a} \Rightarrow \gamma(\alpha + \beta) = -\frac{9}{4} + 2 \Rightarrow \gamma = -\frac{1}{4}$

$-2$ $\quad 1$

$-\frac{1}{4} = -\frac{k}{4} - 1 \Rightarrow \frac{3}{4} = -\frac{k}{4} \Rightarrow \boxed{k = -3}$

**سوال ۴:**

$x^2 - 3mx + m = 0 \quad \alpha + \beta = 3m \quad \alpha\beta = m$

$|\sqrt{\alpha} - \sqrt{\beta}| = 1 \xrightarrow{\text{به توان ۲}} \alpha + \beta - 2\sqrt{\alpha\beta} = 1 \rightarrow 3m - 2\sqrt{m} = 1$

$(3m-1)^2 = (2\sqrt{m})^2 \rightarrow 9m^2 + 1 - 6m = 4m \rightarrow 9m^2 + 1 - 10m = 0 \rightarrow m^2 - 1.m + 9 = 0$

$(9m-1)(m-\frac{9}{9}) \Rightarrow (9m-1)(m-1) \rightarrow m = \frac{1}{9}, m = 1$

حالتی $\rightarrow 3m - 2\sqrt{m} = 1 \xrightarrow{m=1} 3 - 2 = 1$ ✓ $\quad m = 1 \rightarrow 2x^2 - x - 1 = 0$

$\alpha\beta = \frac{c}{a} = \boxed{-\frac{1}{2}}$

$m = \frac{1}{9} \quad \frac{1}{3} - \frac{2}{3} = -\frac{1}{3}\alpha$

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$y = 2x^2 - (m+2)x + m$

تقاطع با محور عرض‌ها $\xrightarrow{x=0}$ $y = m$ $\quad (0, m)$

مساحت مثلث $= \frac{x_A(y_B - y_C) + x_B(y_C - y_A) + x_C(y_A - y_B)}{2}$ ①

$\rightarrow \frac{2(-m) + \beta(m)}{2} = \frac{4}{4} \rightarrow m(\beta - \alpha) = \frac{4}{2} \rightarrow m|m-2| = 4$

① دلتا مثبت $\rightarrow$ دو ریشه حقیقی متمایز

$4m - m^2 = 4 \rightarrow m^2 - 4m + 4 = 0 \quad \Delta < 0$ $\alpha$

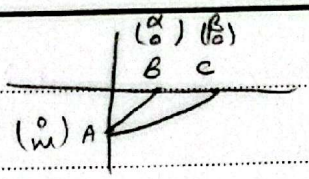
$m^2 - 2m - 3 = 0 \rightarrow (m-3)(m+1) = 0 \rightarrow m = 3 \quad m = -1$ ②

② $m=3 \rightarrow 3|3-2| = 3$ ✓ $\quad m=3$

$m=-1 \rightarrow -1|-1-2| = 3$ $\alpha$

$y = x^2 - 3m + 1 \rightarrow$ طول رأس $= -\frac{b}{2a} = \frac{3}{2}$

**سوال ۵:**




$\beta - \alpha = \frac{\sqrt{m^2 + 8 + 4m - 16}}{2} = \frac{|m-2|}{2}$

**سوال ۶:**

$y = ax^2 + 3x + a \rightarrow \min \rightarrow a > 0$

طول رأس $= -\frac{3}{2a}$ $\xrightarrow{\text{جایگذاری}}$ $\frac{9}{8} = \frac{9}{4a} + a \Rightarrow \frac{-9}{4a} + a = \frac{9}{8} \rightarrow \frac{4a^2 - 9}{4a} = \frac{9}{8}$

$8a^2 - 18 - 9a = 0 \rightarrow a^2 - 9a - 12 = 0 \quad (8a+9)(a-\frac{14}{8}) = 0 \quad a = -\frac{9}{8}$ ، $\boxed{a=2}$ چون $a > 0$

**سوال ۷:**

$x^2 - (a-1)x + a = 0 \Rightarrow x^2 - 4x + 3 = 0$ ① $\quad x^2 - (3a+1)x + b = 0 \rightarrow x^2 - 10x + 24 = 0$ ②

| ریشه‌ها | $2n+1, 2n-1$ | $2k, 2k+2$ |
|---|---|---|
| مجموع | $4n = a+1 \Rightarrow a = 4n-1 \xrightarrow{n=1} a=3$ | $4k+2 = 3a+1 \xrightarrow{a=3} 4k+2 = 10 \Rightarrow k=2$ |
| ضرب | $4n^2 - 1 = a \rightarrow 4n^2 = 4n$ | $4k^2 + 4k = b \Rightarrow b = 24$ |

$n^2 - n = 0 \rightarrow n(n-1) = 0 \xrightarrow{\text{طبیعی}} n=1$

① $(x-1)(x-3) = 0$ $\quad$ ② $(x-6)(x-4) \rightarrow 24 - 3 = 21$ جواب

**سوال ۵:**

$y = -ax^2 + 2ax + 2$ $\quad y = 2bx^2 - bx - 1$

$\Rightarrow \frac{1}{2}, y = 2 - \frac{a}{4}$ $\quad$ راس $\Rightarrow \frac{1}{4}, -1 - \frac{b}{8}$ $\quad \frac{3}{4} - \frac{-1}{2} = 2 - \frac{b}{8}$

جایگذاری در راس دوم $\rightarrow \frac{b}{2} - \frac{b}{2} - 1 = 2 - \frac{a}{4} \Rightarrow a = -12$ $\quad b = -4$

جایگذاری در راس اول، $a = -12$

$a - b = -12 + 4 = -8$ جواب

**سوال ۹:**

$y = 2\alpha x^2 + 4x + \beta$ ، $\beta > \alpha$

$\alpha + \beta = -\frac{4}{2\alpha}$ $\quad \alpha\beta = \frac{\beta}{2\alpha} \Rightarrow 2\alpha^2\beta = \beta \quad \beta(2\alpha^2 - 1) = 0$

$\alpha = \pm\frac{1}{\sqrt{2}}$ $\quad$ ناصیه اول $\uparrow$ $\quad x > 0, y > 0$

$\alpha = \frac{1}{\sqrt{2}} \rightarrow \frac{1}{\sqrt{2}} + \beta = -\frac{4}{\sqrt{2}} \Rightarrow \beta = -1$ ✓

$\alpha = -\frac{1}{\sqrt{2}} \rightarrow -\frac{1}{\sqrt{2}} + \beta = \frac{4}{\sqrt{2}} \Rightarrow \beta = 1$ ✓ $\quad \rightarrow -\sqrt{2}x^2 + 4x + 1 = y \rightarrow$ راس $= \frac{4}{\sqrt{2}}, y = \frac{9}{\sqrt{2}}$

سوال ۱۰

$a, b$ طبیعی

$x^2 - (a^2+b^2-12)x + a+b-1 = 0$

$ab = a+b-1 \longrightarrow ab-a-b+1=0 \Rightarrow (a-1)(b-1)=0$

$a=1 \quad b=1$

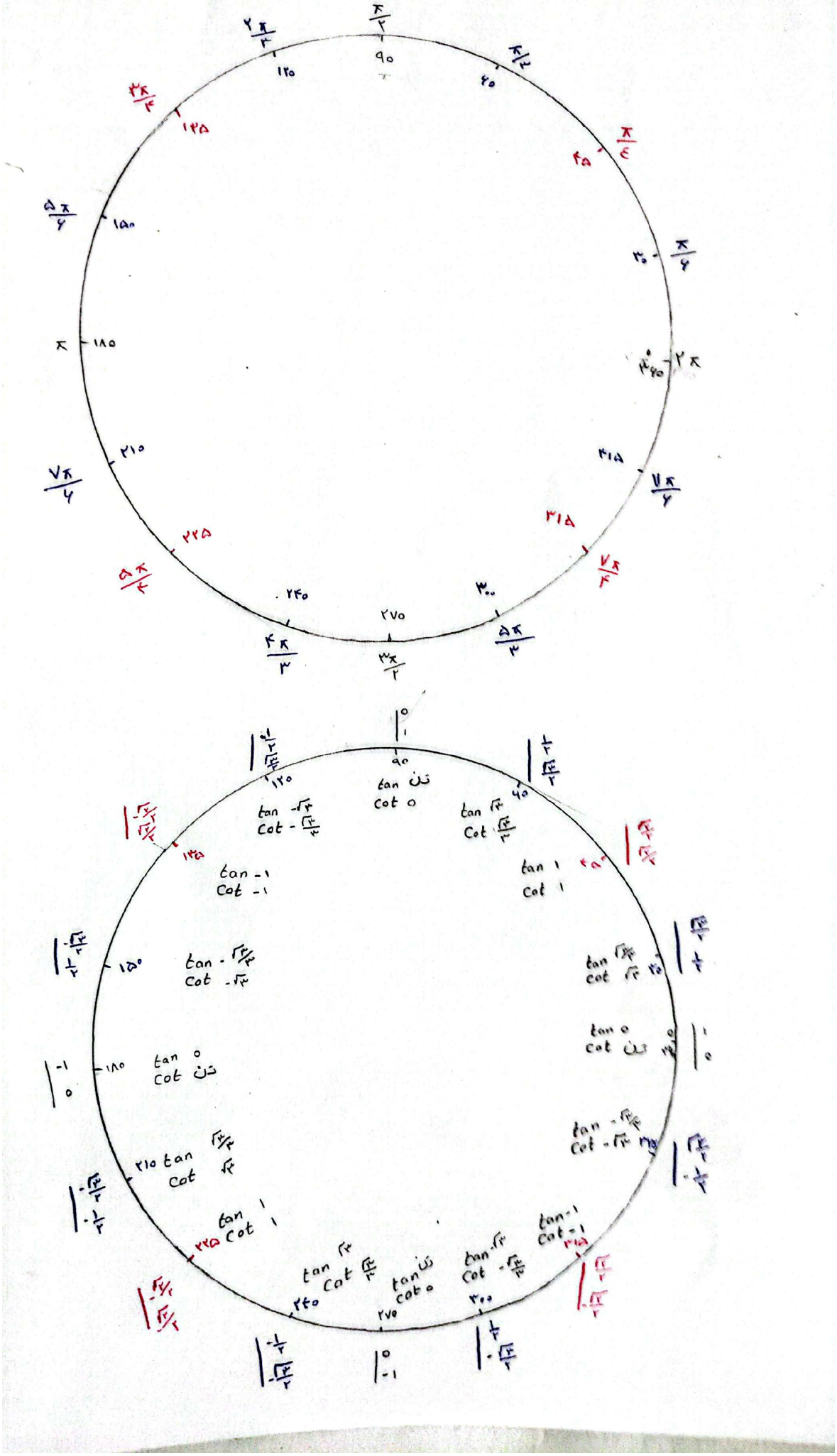
① $a=1 \rightarrow a+b = a^2+b^2-12 \Rightarrow 1+b = 1+b^2-12 \Rightarrow b^2-b-12=0 \Rightarrow (b-4)(b+3)=0 \longrightarrow a+b=5$ ⓐ جواب

② $b=1 \rightarrow a+1 = a^2+1-12 \Rightarrow a^2-a-12=0 \Rightarrow (a-4)(a+3)=0$

$b=4$ $\quad b=-3$ ✗

$a=4$ $\quad a=-3$ ✗

$a+b = 4+1 = 5$ ⓐ جواب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π/4
45°
π/6
30°
0
0°
360°
2π
330°
11π/6
315°
7π/4
300°
5π/3
270°
3π/2
240°
5π/4
225°
4π/3
210°
7π/6
180°
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150°
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135°
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