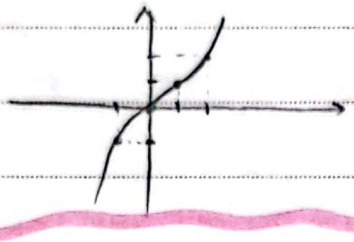
Subject

Date : Year: Month: Day:

حل تمرین

$y' = 3x^2 - 6x + 3 \longrightarrow 3(x^2 - 2x + 1)$ ①

$\longrightarrow 3(x-1)(x-1) = 0 \longrightarrow \boxed{x = 1}$



$x=1 \rightsquigarrow y = 1 - 3 + 3 = 1$

$x=2 \rightsquigarrow y = 8 - 12 + 6 = 2$

$x=-1 \rightsquigarrow -1 - 3 + 3 = -1$

الف) $y = \frac{-x^3+4}{x^2} \longrightarrow y' = \frac{-3x^2(x^2) - (2x)(-x^3+4)}{x^4} = 0$ ②

$\longrightarrow -3x^4 - (-2x^4 + 8x) \longrightarrow -x^4 + 8x \longrightarrow -x(x^3 - 8)$

$\boxed{x=0}$ $\boxed{x=2}$

ب) $y = \frac{x^3}{x^2-1} \longrightarrow y' = \frac{(3x^2)(x^2-1) - (2x)(x^3)}{(x^2-1)^2} = 0$

$3x^4 - 3x^2 - 2x^4 = 0 \longrightarrow x^4 - 3x^2 = 0 \longrightarrow x^2(x^2 - 3) = 0$

⊙ $\boxed{x = \pm\sqrt{3}}$

الف) $\frac{-x^2+4x+1}{x-1} \longrightarrow y' = \frac{(-2x+4)(x-1) - (-x^2+4x+1)}{(x-1)^2} = 0$ ③

$-2x^2 + 2x + 4x - 4 + x^2 - 4x - 1 \Rightarrow -x^2 + 2x - 5$

$\Delta = b^2 - 4ac \longrightarrow 4 - (4 \times 1 \times -5)$

$\longrightarrow \Delta < 0$ ∅

ب) $y = \frac{x^2-4x+3}{x-1} \longrightarrow y' = \frac{(2x-4)(x-1) - (x^2-4x+3)}{(x-1)^2} = 0$

$2x^2 - 2x - 4x + 4 - x^2 + 4x - 3 \longrightarrow x^2 - 2x + 1 = 0$

$(x-1)^2 = 0 \longrightarrow \frac{1}{\pm} \longrightarrow \emptyset$

① ②

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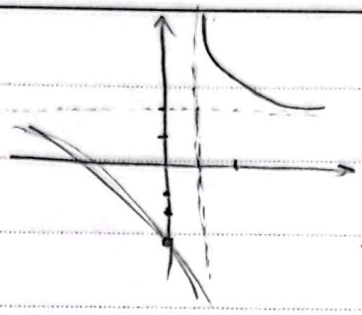

(۴)

مجانب قائم ۱ = ریشه مخرج

مجانب افقی ۲ = تقسیم ضرایب x

* از هر ۴ ناحیه می گذرد

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(۵)

الف) $y = \frac{ax+4}{x-b} \longrightarrow a=y \quad b=m$

محل برخورد مجانب ها همان مرکز تقارن است $(a,b) = (3,2)$ $a=3$ $b=2$

ب) $y = \frac{3x+4}{x-2} \longrightarrow yx-2y = 3x+4 \longrightarrow yx-3x = 2y+4$

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$x = \frac{2y+4}{y-3} \longrightarrow y = \frac{2x+4}{x-3}$

(۶)

$y = \frac{3x+1}{x-2} \longrightarrow y=3 / x=2$

مرکز تقارن $\begin{vmatrix} 2 \\ 3 \end{vmatrix} \longrightarrow \begin{cases} m=1 \rightarrow (y-3) \Rightarrow -1(x-2) \Rightarrow y-3 = -x+2 \\ m=-1 \rightarrow (y-3) \Rightarrow 1(x-2) \Rightarrow y-3 = x-2 \end{cases}$

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$\longrightarrow \begin{cases} y=-x+5 \\ y=x+1 \end{cases}$

(۷) با توجه به شکل داده شده در صورت سوال رادیکال $\frac{9}{2}$ نقطه بحران

(۸)

$\Delta > 0 \longrightarrow b^2-4ac > 0 \longrightarrow a^2-8 > a \longrightarrow a^2 > 8 \longrightarrow \begin{matrix} a > 2\sqrt{2} \\ a < -2\sqrt{2} \end{matrix}$

$y' = 2x-a = 0 \longrightarrow x = +\frac{a}{2} \longrightarrow a \in \{(-\infty, -2\sqrt{2}) \cup (2\sqrt{2}, +\infty)\}$

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$y = \frac{x^2+2}{x^2+x+1} \longrightarrow y' = \frac{(2x)(x^2+x+1)-(2x+1)(x^2+2)}{(x^2+x+1)^2} = 0$ (9)

$2x^4 + 2x^3 + 4x - 2x^4 - 4x - x^2 - 2 = 0$

$x^2 - 2 = 0 \longrightarrow x^2 = 2 \longrightarrow x = \pm\sqrt{2}$

$-\sqrt{2}$ $\qquad$ $\sqrt{2}$

$\frac{4}{4-\sqrt{2}}$ $\qquad$ $\frac{4}{4+\sqrt{2}}$

$\frac{4}{4-\sqrt{2}} \times \frac{4}{4+\sqrt{2}} = \frac{16}{16-4} = \frac{16}{12} = \frac{4}{3}$

$x_1 + x_2 = -a \Rightarrow -a = -1 \longrightarrow a = 1$

$x_1 \times x_2 = b \Rightarrow b = -2 \longrightarrow b = -2$ (10)

$y_1 = (x^2+x-2)^2 \longrightarrow y' = 2(2x+1)(x^2+x-2) = 0 \longrightarrow x = 1 / -2 / -\frac{1}{2}$

$y_2 = (x^2+x-2)^2 \longrightarrow y' = 2(2x+1)(x^2+x-2)^2 = 0 \longrightarrow x = 1 / -2 / -\frac{1}{2}$

$y_1 \longrightarrow x = 1 \longrightarrow 0 = y \;/\; x = -2 \longrightarrow y = 0$

$x = -\frac{1}{2} \longrightarrow (-\frac{9}{4})^2 \longrightarrow y = \frac{81}{16}$

$y_2 \longrightarrow x = 1 \longrightarrow y = 0 \longrightarrow x = -1 \;/\; y = 0$

$x = -\frac{1}{2} \longrightarrow (-\frac{9}{4})^2 \longrightarrow -\frac{729}{256}$

$\max_{\text{در}} y_1 = \frac{81}{16}$ ، $\min_{\text{در}} y = 0 \longrightarrow \frac{81}{16}$