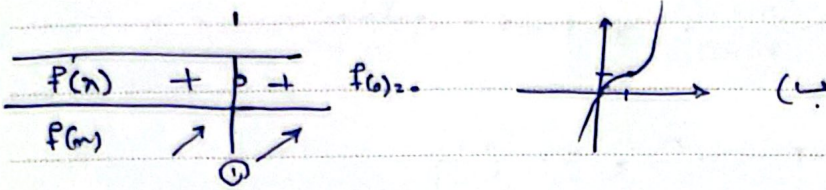


① $y = x^3 - 3x^2 + 4x \rightarrow y' = 3x^2 - 6x + 4 = 0 \rightarrow y' = 3(x-1)^2 \rightarrow \boxed{x=1}$ (برابر الف) روزن تریان



② الف) $y = \frac{-x^4 + 4}{x^2} = -x + \frac{4}{x^2} \rightarrow y' = -1 - \frac{8}{x^3} = 0$

$y' = \frac{-x^4 - 8}{x^3} = 0 \rightarrow x = -2 \rightarrow$ ↗ ↘
↗ ↘

۲ جبرانی

ب) $y = \frac{x^4}{x^2 - 1} \Rightarrow y' = \frac{(4x^3)(x^2 - 1) - (x^4)(2x)}{(x^2 - 1)^2} \Rightarrow y' = \frac{4x^5 - 4x^3 - 2x^5}{(x^2 - 1)^2} = \frac{2x^5 - 4x^3}{(x^2 - 1)^2}$

$y' = \frac{2x^3(x^2 - 2)}{(x^2 - 1)^2} = 0 \rightarrow x = 0, \pm\sqrt{2}$ ↗ ↘
↗ ↘

۴ جبرانی

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

$y' = \frac{-2x^2 + 4x - 4 + x^2 - 4x - 1}{(x - 1)^2} = \frac{-x^2 + 4x - 5}{(x - 1)^2} = 0 \rightarrow x = 1$ ↗ ↘
↗ ↘

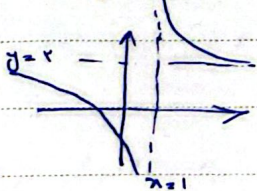
۱ عین جزء اولی

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

$x = 1 \rightarrow$ ↗ ↘
↗ ↘

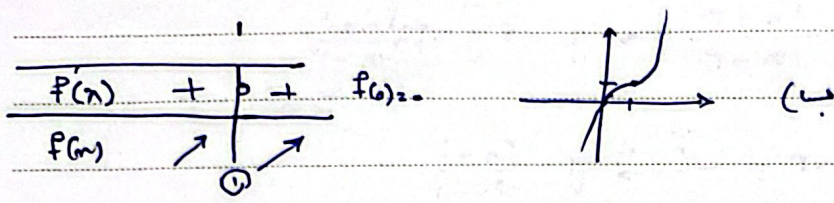
۱ عین جزء اولی

④ $y = \frac{4x + 3}{x - 1}$



الف) $x = 1, y = 2$ ب) ↗ ↘
↗ ↘

① $y = x^3 - 3x^2 + 4x \rightarrow y' = 3x^2 - 6x + 4 = 0 \rightarrow y' = 3(x-1)^2 \rightarrow x=1$ بحرانی (الف) رئیس تریبل



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

$y' = \frac{-x^3 - 2k}{x^3} = 0 \rightarrow x = -2 \rightarrow$ بحرانی
 $x=0 \rightarrow$ سن تفریق

ب) $y = \frac{x^k}{x^2-1} \Rightarrow y' = \frac{(kx^{k-1})(x^2-1) - (x^k)(2x)}{(x^2-1)^2} \Rightarrow y' = \frac{kx^k - 2x^{k+1} - kx^k}{(x^2-1)^2} = 0$

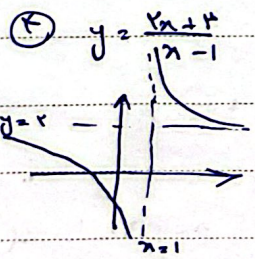
$y' = \frac{x^k - 2x^{k+1}}{(x^2-1)^2} = 0 \rightarrow x^k(1-2x) = 0 \rightarrow x=0, \pm\sqrt{3}$ بحرانی
 سن تفریق: $x=1$

③ (الف) $y = \frac{-x^2 + kx + 1}{x-1} \rightarrow y' = \frac{(-2x+k)(x-1) + (x^2 - kx - 1)}{(x-1)^2}$

$y' = \frac{-2x^2 + kx - k + x^2 - kx - 1}{(x-1)^2} = \frac{-x^2 + kx - k - 1}{(x-1)^2} = 0 \rightarrow x=1$ بحرانی

ب) $y = \frac{x^2 - kx + 3}{x-1} \rightarrow y' = \frac{(2x-k)(x-1) - (x^2 - kx + 3)}{(x-1)^2} = \frac{2x^2 - kx - 2x + k - x^2 + kx - 3}{(x-1)^2} = \frac{x^2 - 2x + k - 3}{(x-1)^2} = 0$

$x=1 \rightarrow$ بحرانی



(الف) $x=1, y=2$ بحرانی

5) $A = (2 \ 3)$ $x=2$ $y=3 \rightarrow a=3$ $b=2$ (الف)

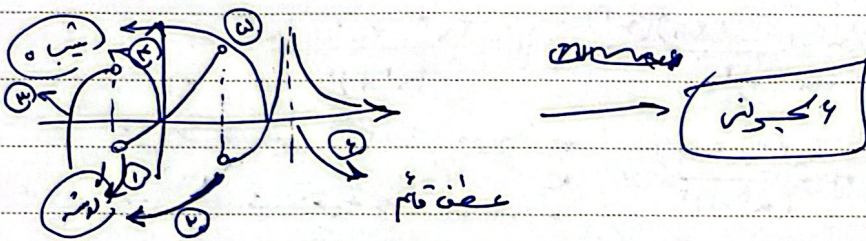
$$y = \frac{2n+3}{n-2} \rightarrow y \rightarrow -\frac{2n-3}{n-3} = y \rightarrow y^{-1} = \frac{2n+3}{n-3}$$

6) جانب عمودی $x=2$ $y=3$ $y = \frac{2n+1}{n-2}$

$$y' = \frac{-1}{(n-2)^2} \rightarrow \text{جانب عمودی } x=2 \rightarrow \text{جانب افقی}$$

$$\lim_{x \rightarrow \pm\infty} \frac{2n+1}{n-2} = 2 \rightarrow \text{جانب افقی}$$

7) متن مشرقی و غربی در نقطه 0

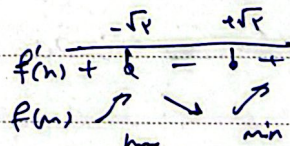


8) $y = |x^2 - ax + 2|$ \rightarrow رأس کجی \rightarrow $a^2 - 4 > 0$ $a > 2$ $a < -2$

$$\Delta > 0 \quad a^2 - 4 > 0 \quad a > 2 \quad a < -2 \rightarrow a$$

9) $y = \frac{x^2+2}{x^2+x+2} \rightarrow y' = \frac{(2x)(x^2+x+2) - (x^2+2)(2x+1)}{(x^2+x+2)^2}$ $y' = \frac{2x^3 + 2x^2 + 4x - 2x^3 - 2x^2 - 4x - 2}{(x^2+x+2)^2}$

$$y' = \frac{x^2-2}{(x^2+x+2)} = 0 \rightarrow x = \pm\sqrt{2}$$



$$\left(-\sqrt{2} \quad \frac{1}{1-\sqrt{2}}\right) \quad \left(\sqrt{2} \quad \frac{1}{1+\sqrt{2}}\right) \rightarrow \frac{1}{1}$$

10) $y = (x-1)(x+2) \rightarrow y = x^2 + x - 2$ $a=1$ $b=-2$ $x = -\frac{1}{2}$

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

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

