

$$1 \rightarrow 1 \cdot a$$

$$1 - \frac{1}{x^2} \rightarrow [1, x^2] = \frac{1 - \frac{1}{x^2}}{x^2} = \frac{x^2 - 1}{x^4} = \frac{x^2 - 1}{x^4} \cdot \frac{x^2}{x^2} = \frac{x^4 - x^2}{x^6}$$

عوض في

$$f(x) = \frac{a}{x^2} - \frac{a}{x^2} + \frac{a}{x^2} = 2x^2 - 2 + \sqrt{x^2} \rightarrow +\sqrt{x^2}$$

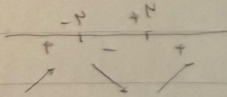
1.  $f(x) = a \cdot 1 - a \cdot x + a \cdot x^2 = a \cdot x^2 - a \cdot x + a$

$$f(x) = a \cdot x^2 - a \cdot x + a = 0 \rightarrow a \cdot x^2 - a \cdot x + a = 0 \rightarrow a \cdot x^2 - a \cdot x + a = 0$$

$$x = \frac{-(-a) \pm \sqrt{(-a)^2 - 4 \cdot a \cdot a}}{2 \cdot a} = \frac{a \pm \sqrt{a^2 - 4a^2}}{2a} = \frac{a \pm \sqrt{-3a^2}}{2a}$$

3.  $a = -\frac{1}{3}$

$$y = x^2 - 12x + 4 \rightarrow y = x^2 - 12x + 36 - 36 + 4 = (x - 6)^2 - 32$$



$$x^2 - 12x + 4 = (x - 6)^2 - 32$$

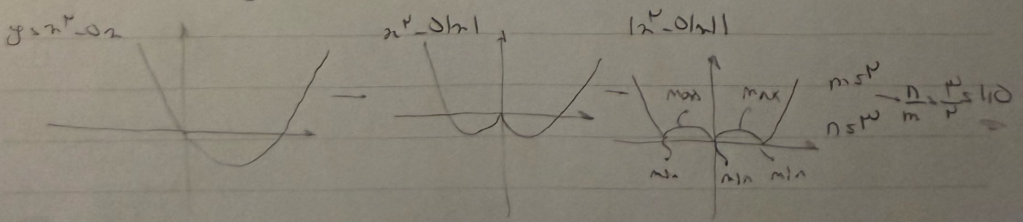
4.  $y = x^2 + ax^2 - bx - c \rightarrow y = x^2 + ax^2 - bx - c = 0 \rightarrow y = -bx - c = 0 \rightarrow b = 0$

$$x^2 - y = 11 - 6a \rightarrow 11 - 6a = 0 \rightarrow 6a = 11 \rightarrow a = \frac{11}{6}$$

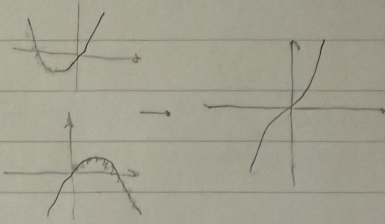
$$y = x^2 + \frac{11}{6}x^2 - 11x - 11 = \frac{17}{6}x^2 - 11x - 11$$

$$x = \frac{-(-11) \pm \sqrt{(-11)^2 - 4 \cdot \frac{17}{6} \cdot (-11)}}{2 \cdot \frac{17}{6}} = \frac{11 \pm \sqrt{121 + 74.8}}{17}$$

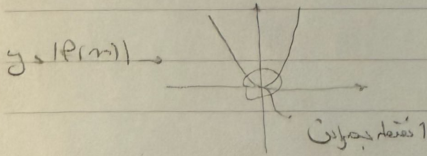
5.  $f(x) = x^2 - 0|x| - 1 \rightarrow f(x) = |x^2 - 0|x| - 1|$



$f(x) = a|x| + b$   $x > 0$   $f(x) = a^+ x + b$   
 $x < 0$   $f(x) = -a^- x + b$



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$[0, a]$   $0 \leq x < a$   $-a \leq x-a < 0 \rightarrow |x-a| = a-x$

۷

$f(x) = \sqrt[n]{x^p} (a-x) = a x^{\frac{p}{n}} - x^{\frac{p+n}{n}}$

$f'(x) = \frac{p}{n} a x^{\frac{p}{n}-1} - \frac{p+n}{n} x^{\frac{p+n}{n}-1} = \frac{p}{n} x^{\frac{p}{n}-1} (a - \frac{p+n}{p} x) = \frac{p(a - \frac{p+n}{p} x)}{n x^{\frac{p}{n}-1}}$  so بحرانی

$f(0), f(a) = 0$

$f(\frac{pa}{p+n}) > 0$   $\sqrt[n]{(\frac{pa}{p+n})^p} (a - \frac{pa}{p+n}) = \frac{p^{\frac{p}{n}} a^{\frac{p}{n}} (\frac{p+n-p}{p+n})}{n} = \frac{p^{\frac{p}{n}} a^{\frac{p}{n}} a^{\frac{n-p}{n}}}{n}$

$a > 0$   $\frac{0}{p} < \frac{0}{p+n}$   $a > \frac{pa}{p+n}$

$f(x) = \sqrt{2x^2-1} - \sqrt{x^2+1}$   $x > 1$

۸

$f'(x) = \frac{2x-1}{\sqrt{2x^2-1}} - \frac{x}{\sqrt{x^2+1}}$  so  $x > 1$  بحرانی

$f(x) = \sqrt{x^2+1} - \sqrt{x^2-1}$   $-1 \leq x \leq 1$

$f'(x) = \frac{x}{\sqrt{x^2+1}} - \frac{x}{\sqrt{x^2-1}}$  so  $x = 0$  بحرانی

