

$$\left. \begin{aligned} x=1 &\rightarrow y=1-a \\ x=3 &\rightarrow y=1-\frac{a}{3} \end{aligned} \right\} \Rightarrow m = \frac{1-\frac{a}{3}-1+a}{3-1} = \frac{\frac{2}{3}a}{2} = \frac{1}{3}a \Rightarrow f'(x) = \frac{a}{x^2} \Rightarrow \frac{a}{x^2} = \frac{1}{3}a$$

(1)

۱، ۱۷۵

$\Rightarrow \frac{1}{x^2} = \frac{1}{3} \Rightarrow x = \sqrt[3]{3}$   
 در بازه  $[1, 3]$  قرار دارد  
 پس  $x = \sqrt[3]{3}$  تنها نقطه قوت است!

(2)  $f'(x) = 1$  و  $x < 0$  ناحیه سوم معادله است  $x < 0$

$$f'(x) = 3a - x - a \Rightarrow 3ax - a = 1 \Rightarrow x = \frac{1+a}{3a}$$

پ

$$f'(x) = x \Rightarrow 3ax^2 - ax + 1 = \frac{1+a}{3a} \Rightarrow 3a^2x^2 - 9 = 0 \Rightarrow a = \pm \frac{1}{3} \Rightarrow a = \frac{1}{3} \Rightarrow x = -2$$

$$f'(x) = 3x^2 - 12 \Rightarrow \begin{matrix} -2 & 2 \\ + & - & + \end{matrix} \Rightarrow f(x) = \text{min نسبی} = -12$$

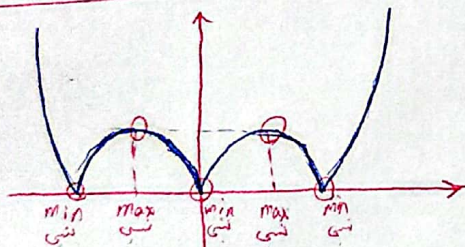
(3)  $(-2) - 12(2) + 2 = -14$  ارتفاع پ

$$f'(x) = 3x^2 + 2ax - 2b \begin{cases} x=1 & b=0 \\ x=-2 & a=3 \end{cases} \Rightarrow f(x) = x^3 + 3x^2 - 2$$

(4)

$$\begin{aligned} x=0 &\rightarrow y = -2 \\ x=-2 &\rightarrow y = 0 \end{aligned} \Rightarrow \sqrt{2+12} = \sqrt{14} = \sqrt{2} = \sqrt[3]{2}$$

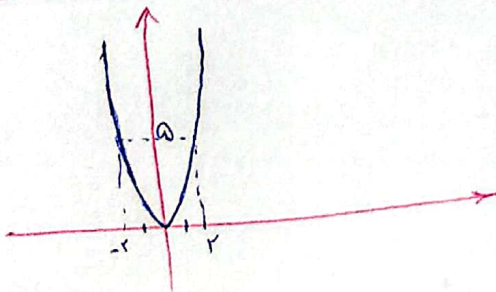
پ



$$\begin{aligned} m &= 2 \\ n &= 3 \end{aligned} \Rightarrow \frac{m}{n} = \frac{2}{3} = 1,5$$

پ

(5) شکل می کشیم:



(6) شکل می کشیم: 1 نقطه بجزای دارد

پ

$$x \in [0, a] \rightarrow |x-a| = -(x-a) \rightsquigarrow f(x) = -\sqrt[r]{x^r(x-a)}$$

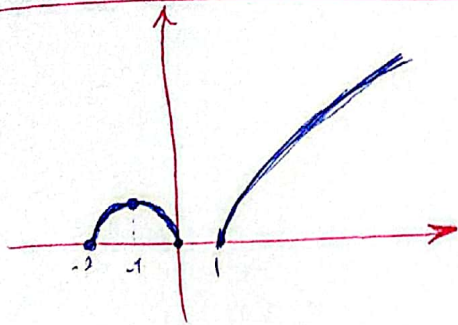
$$= -x^{\frac{r}{r}} + a(x^{\frac{r}{r}}) \rightsquigarrow f'(x) = -\frac{r}{r} x^{\frac{r}{r}-1} + \frac{r}{r} a x^{\frac{r}{r}-1}$$

$$-\frac{1}{r} x^{-\frac{1}{r}} (ax - ra) \rightsquigarrow f'(x) \rightarrow x=0$$

$$\hookrightarrow x = \frac{ra}{a} \checkmark \text{ max} \rightarrow f\left(\frac{ra}{a}\right) = 1 \cdot a$$

$$\sqrt[r]{\frac{ra}{a}} \left| \frac{ra}{a} - a \right| = \frac{r}{r} \rightsquigarrow a^{\frac{r}{r}} \times \frac{ra}{ra} = \frac{ra}{a} \rightsquigarrow a^a = \frac{a^a}{r^a} \rightarrow \boxed{a = r, a}$$

7  
8



$$m = 1$$

$$n = 0$$

$$K = r$$

$$\Rightarrow \frac{r \cdot x^1}{\Sigma} = 1$$

8

$$f'(m) = \frac{m(n-1+m) - (mn+r)}{(n-1+m)^r} < 0 \Rightarrow \frac{m^2 - m - r}{(n-1+m)^r} < 0 \Rightarrow \frac{-1}{+1 - +} +$$

$$m = 0, 1$$

9

$$\frac{x}{1-x^r} \Rightarrow f'(m) = \frac{1-x^r - (-r)x}{(1-x^r)^r} = \frac{x^r+1}{(1-x^r)^r}$$

در دامنه  $\rightarrow$   $\begin{matrix} 1 \\ -1 \end{matrix}$

$$\frac{x}{1+x^r} \Rightarrow \frac{-x^r+1}{(1+x^r)^r} = f'(m) \Rightarrow \begin{matrix} 1 \\ -1 \end{matrix}$$

در یک نقطه بحرانی است

10