نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... کلاس .....

۱۹ آذر

۱

$$\frac{f(3)-f(1)}{3-1}=\frac{1-9+1+a}{2}=\frac{a/2}{2}=a/4$$

۷۵

$$f'(x)=\frac{a}{x^2} \qquad \frac{a}{x^2}=\frac{a}{4} \longrightarrow x=+2,-2$$

$$\frac{2-\frac{a}{3}+a}{2}=\frac{2a}{3}=\frac{a}{3} \rightarrow f'(x)=\frac{a}{x^2} \rightarrow \frac{a}{x^2}=\frac{a}{3} \rightarrow x=\pm\sqrt{3}$$

$x=-\sqrt{3}$ در بازه‌ی $[3,1]$ قرار ندارد

۲

$f(x)=x$

$$2ax^2-5x+18a=x$$

$$2ax^2-6x+18a=0$$

$$ax^2-3x+9a=0$$

$$\Delta=0$$

$$\Delta<0 \longrightarrow 9-4(a)(9a)=0$$

$$9-36a^2=0$$

$$1-4a^2=0$$

$a=+1/2$ و غ $-1/2$

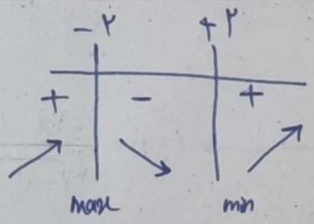
پس $x=\sqrt{3}$ تنها قابل قبول است!

۳

$$f'(x)=3x^2-12=0$$

$$x^2-4=0$$

$$x=+2,-2$$



$$f(2)=8-24+2=-14$$

۴

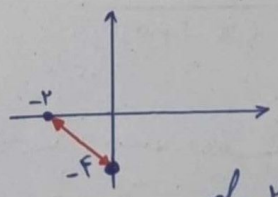
$$f'(x)=3x^2+2ax-27$$

$$f'(0)=0 \longrightarrow b=0$$

$$f'(-2)=0 \longrightarrow 12-4a=0 \longrightarrow a=+3$$

$$f(x)=x^3+3x^2-4$$

$$f(-2)=-8+12-4=0$$



$d=2\sqrt{5}$

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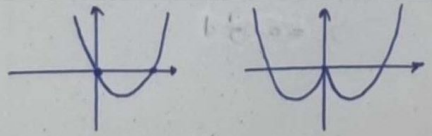
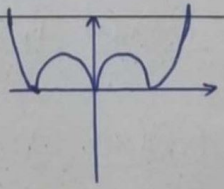


$$x^2-5x=0$$

$$x(x-5)=0$$



$|f(x)|$

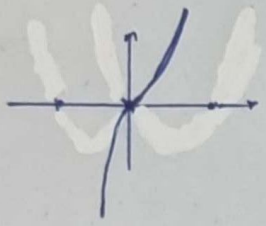
$m=$ max = ۲ عدد

$n=$ min = ۳ عدد

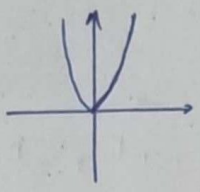
$$\frac{n}{m}=3/2$$

۶

$$f(x)=\begin{cases} x^2+3x & x\geq 0 \\ -x^2+3x & x<0 \end{cases}$$



$|f(x)|$



یک عدد

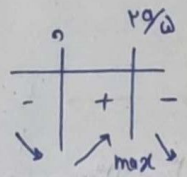
۷

$[0,a] \longrightarrow |x-a| \longrightarrow$ نفی $\longrightarrow -x+a$

$f(x)=\sqrt[3]{x^2}\,(a-x)$

$f'(x)=\dfrac{2x(a-x)}{3x\sqrt[3]{x}}+(-x)\left(\dfrac{3}{\sqrt[3]{x^2}}\right)$

$f'(x)=\dfrac{2a-2x-3x}{3\sqrt[3]{x}}=\dfrac{2a-5x}{3\sqrt[3]{x}}$



$2a-5x=0$

$x=\dfrac{2a}{5}$

$f\left(\dfrac{2a}{5}\right)=3/4$

$\sqrt[3]{\dfrac{4a^2}{25}}\times\dfrac{3a}{5}=\dfrac{3}{2}$

$a=2/4$

۸

$x\geq 0 \longrightarrow f(x)=\sqrt{x^2-x} \longrightarrow f'(x)=\dfrac{2x-1}{2\sqrt{x^2-x}}$

$x=1/2$

$x=0,1$

$x^2-x=0$

$x(x-1)=0$

$Df: x\geq 1$

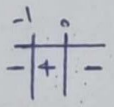
$x\leq 0 \longrightarrow f(x)=\sqrt{-x^2-x} \longrightarrow f'(x)=\dfrac{-2x-1}{2\sqrt{-x^2-x}}$

$x=-1/2$

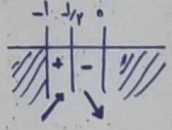
$x=-1,0$

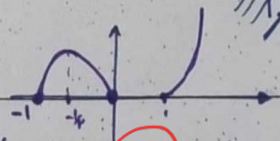
$-x^2-x=0$

$-x(x+1)=0$



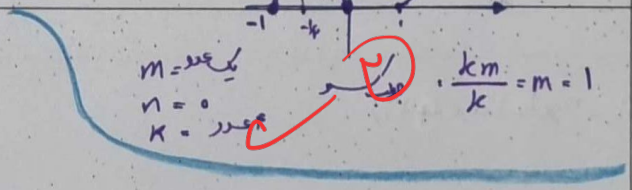
$Df: -1\leq x\leq 0$





۹

$f'(x)=\dfrac{-m+m^2-2}{(x-1+m)^2}=\dfrac{m^2-m-2}{(x-1+m)^2}$



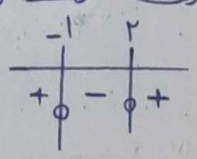
$m=$ یک عدد

$n=0$

$k=$ عدد

$\dfrac{km}{k}=m=1$

خارج هم علامت $\longrightarrow$ صورت $\longrightarrow$ نزدیک



$m^2-m-2=0$

$(m-2)(m+1)=0$

m { -1, 2, $+1$, $+2$ غ ق $\longrightarrow$ ۳ عدد

۱,۷۵

۱۰

$x\geq 0 \longrightarrow \dfrac{x}{1-x^2}$

$f'(x)=\dfrac{1(1-x^2)-(-2x)(x)}{(1-x^2)^2}=\dfrac{1+x^2}{(1-x^2)^2}$

$x=+1$

$x=1$ ریشه‌ی این عبارت نیست!

$x<0 \longrightarrow \dfrac{x}{1+x^2}$

$f'(x)=\dfrac{1(1+x^2)-(2x)(x)}{(1+x^2)^2}=\dfrac{1-x^2}{(1+x^2)^2}$

$x=-1$ ۱,۷۵

۲ عدد $\longleftarrow x=+1,-1$

۹

$f'(x) < 0 \rightarrow x^2 - x - 2 \leq 0 \rightarrow -1 \leq x \leq 2$, $x \neq 2$ $\rightsquigarrow$ $-1 \leq x < 2$ (1)

x در بیشتر مقدار $\rightarrow 1 - x \leq 1 \rightarrow x \geq 0$ (2)

$1, 2 \rightsquigarrow \boxed{x = 0 \text{ یا } 1}$

۱۰

$$y = \begin{cases} \dfrac{x}{1-x^2} & x \geq 0 \\ \hookrightarrow x \neq 1 \\ \dfrac{x}{1+x^2} & x \leq 0 \end{cases} \rightsquigarrow D_y = \mathbb{R} - \{1\}$$

$$y' = \begin{cases} \dfrac{1-x^2+2x^2}{1-x^2} = \dfrac{1+x^2}{1-x^2} & x > 0 \\ \dfrac{1+x^2-2x^2}{1-x^2} = \dfrac{1-x^2}{1+x^2} & x < 0 \rightarrow \boxed{x = -1} \end{cases}$$

تابع در $x = 0$ مشتق‌پذیر است و مشتق در آن صفر است پس تنها یک نقطه‌ی بحرانی $x = -1$ دارد.