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تجزئة الكسور

$$f(x) = \begin{cases} x^r + rx & x > a \xrightarrow{x=a} a^r + ra \\ ax - r & x \leq a \xrightarrow{x=a} a^r - r \end{cases}$$

$$\begin{aligned} a^r + ra &= a^r - r \\ ra &= -r \\ a &= -r \end{aligned}$$

$$f(x) = rx + b$$

$$f(x) = \frac{x^r + a}{rx - b}$$

$$\begin{aligned} f(r) &= r = r(r) + b \\ b &= -1 \end{aligned}$$

$$\begin{aligned} f(r) &= r = \frac{r+a}{r-b} \rightarrow \begin{cases} b = r+a \\ a = 11 \end{cases} \\ r - (-1) &= a \end{aligned}$$

$$f(x) = \frac{x^r + 11}{rx + 1} \rightarrow f(1) = \frac{1+11}{r+1} = \frac{1r}{r} = r$$

$$f(x) = \frac{rx + 1}{rx^r + ax + b} \rightarrow rx^r + ax + b \neq 0$$

$$\begin{aligned} x = -1 &\rightarrow r(-1)^r + a(-1) + b = 0 \rightarrow \begin{cases} r - a + b = 0 \\ r + ra + b = 0 \end{cases} \\ x = r &\rightarrow r(r)^r + a(r) + b = 0 \rightarrow \begin{cases} r - a + b = 0 \\ r + ra + b = 0 \end{cases} \end{aligned}$$

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

$$f(x) = \frac{x^r - \sqrt{r}}{-rx^r + ax + b} \quad Df = R - \{-1\} \rightarrow -(rx + k)^r$$

$$x = -1 \rightarrow -(r(-1) + k)^r = 0 \rightarrow -rx^r + ax + b \rightarrow$$

$$-(rx^r + rxk + kr) = -rx^r - rxk - kr = -rx^r + ax + b$$

$$k = r \rightarrow -rx^r - rxr - r = -rx^r + ax + b$$

$$b = -r \rightarrow a = -r$$

$$b + a = -1r$$

$$x = -1 \rightarrow -fx^r + ax + b = 0 \rightarrow -f(-1)^r + b = 0 \rightarrow -f - a + b = 0 \rightarrow b - a = f$$

$$f(x) = \frac{rx}{(x-1)(x^r + mx + 1)} \quad D_f = \mathbb{R} - \{1\}$$

$x=1$  ✓ ✓

$$x=1 \rightarrow (x^r + mx + 1) = 0 \rightarrow 1 + m + 1 = 0 \rightarrow m = -2$$

$$\Delta = b^2 - 4ac \rightarrow \Delta = m^2 - f(1)(1) = m^2 - f < 0$$

$$m^2 < f \rightarrow -\sqrt{f} < m < \sqrt{f}$$

② ①  $[-2, 2] \rightarrow$  محدود مقدار  $x$

$$f(x) = \sqrt{f - \frac{1}{x^r}} \quad f - \frac{1}{x^r} \geq 0 \rightarrow f \geq \frac{1}{x^r} \rightarrow x^r \geq \frac{1}{f}$$

$$x^r \neq 0 \rightarrow x \neq 0 \quad x \geq \frac{1}{\sqrt{f}} \leq x \leq -\frac{1}{\sqrt{f}}$$

$$D_f = (-\infty, -\frac{1}{\sqrt{f}}] \cup [\frac{1}{\sqrt{f}}, +\infty)$$

$$f(x) = \sqrt{mx^r + rx + 1}$$

اگر ضرب  $x^r - 1$  باشد  
 همه دامنه بیابنی و منفی شود  
 $m \geq 0$   
 $\Delta \leq 0 \rightarrow (rm)^2 - f(m)(r) \leq 0 \rightarrow fm^2 - fm \leq 0$

$$fm(m-1) \leq 0$$

0	1
+	-
+	+

$$\begin{matrix} m=0 \\ m=1 \end{matrix} \rightarrow [0, 1]$$

$$f(x) = \begin{cases} \frac{rx-1}{rx-1} & x \neq a \rightarrow \text{مخرج به ازای } a \text{ برابر } 0 \text{ شود} \\ rx+k & x = \frac{1}{r} \end{cases}$$

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$$rx-1 = ra-1=0 \rightarrow a = \frac{1}{r}$$

$$g(x) = rx+1$$

$$rx+k = rx+1$$

$$a+k = \frac{1}{r}$$

$$\begin{cases} r+k=r \\ k=0 \end{cases}$$

$$f(x) = \begin{cases} \frac{9x^2-5}{rx+r} & x \neq \frac{-r}{r} \\ rax+r & x = \frac{-r}{r} \end{cases}$$

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$$\frac{9x^2-5}{rx+r} = rx+b$$

$$(rx+b)(rx+r) = 9x^2-5$$

$$(rx+b)(rx+r) = (rx-r)(rx+r)$$

$$b = -r$$

$$g(x) = rx+b$$

$$\rightarrow x = \frac{-r}{r} \rightarrow rax+r = rx+b$$

$$r(-\frac{r}{r})a+r = r(-\frac{r}{r})+b \rightarrow$$

$$a-b = r - (-r) = 2r$$

$$-ra+r = -r-r$$

$$\begin{cases} -ra = -2r \\ a = r \end{cases}$$

$$f(x) = \begin{cases} \frac{x^2-5}{x-r} & x \neq r \\ ra^2+ax & x=r \end{cases}$$

$$g(x) = x+r$$

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$$ra^2+ax = x+r \xrightarrow{x=r}$$

$$ra^2+ra = r \rightarrow ra^2+ra-r=0$$

● dotnote

$$\Delta = b^2 - 4ac \rightarrow r - r(r)(-r) = r^3$$

$$a = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{-r \pm \sqrt{r^3}}{r} \rightarrow \begin{cases} x_1 = -r \\ x_2 = 1 \end{cases}$$