


# Subject

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مهم‌ان‌فراغتی - هم‌دختر C - تلفیق شماره ۲۶

① به ازای مقادیر دیگر نامنتی و همواره منفی است  $1 < x < 3$


$x^2 - ax + b$   و ۱ و ۳ ریشه‌های آن هستند

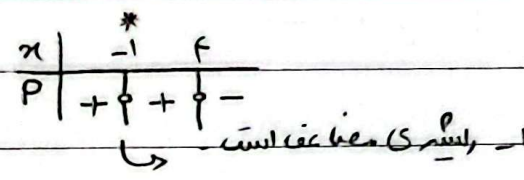
$y = x^2 - ax + b \xrightarrow{(1,0)} 0 = 1^2 - a + b \rightarrow 1 - a + b = 0$

$0 = 3^2 - 3a + b \rightarrow 9 - 3a + b = 0$

$9 - 3a + b = 0$   
 $-1 + a - b = 0 \rightarrow 3 - b = 0 \rightarrow b = 3$

$-1 + a - b = 0 \rightarrow 2a = 1 \rightarrow a = \frac{1}{2}$        $a + b = \frac{1}{2} + 3 = \boxed{V}$

$y = ((k-2)x + m-1)(x-3n)^2$   ②



$(x-3n)^2 = (x+1)^2 \rightarrow -3n = 1 \rightarrow n = -\frac{1}{3}$

$((k-2)x + m-1) = (-x+4) \rightarrow k-2 = -1 \rightarrow k = -1+2 = 1$

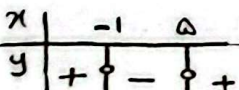
$m-1 = 4 \rightarrow m = 5$

$\frac{m}{n} + k = \frac{5}{-\frac{1}{3}} + 1 = -15 + 1 = \boxed{-14}$

$y = -\frac{1}{p}x^2 + 2x + 4 \rightarrow (a, b) \rightarrow \frac{y}{p}$  ③

$-\frac{1}{p}x^2 + 2x + 4 > \frac{y}{p} \xrightarrow{x^2} -x^2 + 4x + 4 > y \xrightarrow{x(-)} x^2 - 4x - 4 < -y$

$x^2 - 4x - 4 < -y \rightarrow x^2 - 4x - 4 < 0 \rightarrow (x-5)(x+1) < 0$

  $\rightarrow (-1, 5) \rightarrow b - a = 5 - (-1) = 5 + 1 = \boxed{6}$

$f(x) = x^3 - 3x^2 - x + 3$   $x > 0$   $(a, b) \rightarrow$  ④

$y = x^2(x-3) - (x-3) = (x^2-1)(x-3) = (x+1)(x-1)(x-3) < 0$

  $\rightarrow x > 0 \rightarrow (1, 3) \rightarrow$  ریشه‌های

$f(2) = 8 - 12 - 2 + 3 = 11 - 14 = \boxed{-3}$

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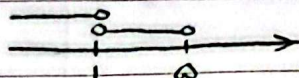
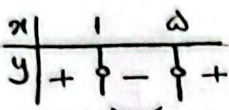
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$(a-1)x^r + (a-1)x + 1 \sim$  برای  $x$  مثبت و منفی (5)

$\hookrightarrow a-1 < 0 \sim a < 1 \sim a \in (-\infty, 1)$

$\hookrightarrow b^r - fac < 0 \sim (a-1)^r - f(a-1)x + 1 = a^r + 1 - ra - fa + f < 0$

$a^r - ra + 1 < 0 \sim (a-1)(a-a) < 0 \sim a \in (1, a)$



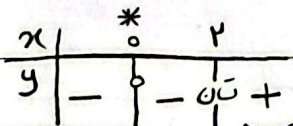
$(1, a) \cap (-\infty, 1) = \emptyset$

a متعلق به مجموعه نمی است (∅)

$\frac{m(m^r+m)}{m-r} > 0 \sim \frac{m \times m(m^r+1)}{m-r} > 0 \sim \frac{m^r(m^r+1)}{m-r} > 0$  (6)

حالت  $m_0$   $\sim$  مثبت و منفی

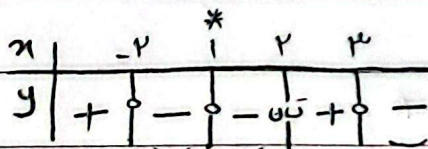
$\frac{m^r(m^r+1)}{m-r} > 0$



$\sim (r, +\infty)$

$\frac{(x^r - x - r)(x-1)^r}{(x^r + x + 1)(r-x)^r} \leq 0 \sim \frac{(x-r)(x+r)(x-1)^r}{(x^r + x + 1)(r-x)^r} \leq 0$  (7)

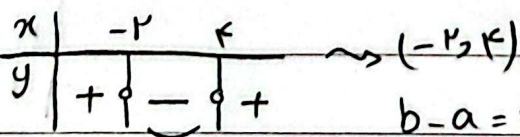
$\frac{x^r - x - r}{(x^r + x + 1)(r-x)^r} \leq 0$



$\hookrightarrow b^r - fac = 1 - r = -r$   $\hookrightarrow [-r, r) \cup [r, +\infty)$

$f(x) = \frac{rx^r - rx}{x^r + r} \sim (a, b) \sim y = r$  (8)

$\frac{rx^r - rx}{x^r + r} < r \sim \frac{rx^r - rx - rx^r - r}{x^r + r} < 0 \sim \frac{x^r - rx - r}{x^r + r} < 0 \sim \frac{(x-r)(x+r)}{x^r + r} < 0$



$b - a = r - (-r) = r + r = \boxed{4}$

**K.P.C**

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$$-1 < \frac{3x^2 - 4x}{x+1} < 0 \quad \text{---} \textcircled{9}$$

→  $\frac{3x^2 - 4x}{x+1}$

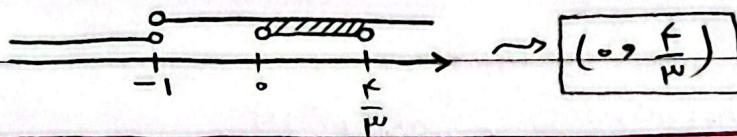
$$\rightarrow 9 - 12 = -3 \rightarrow \Delta < 0$$

$$\hookrightarrow 0 < \frac{3x^2 - 4x + x + 1}{x+1} \rightarrow 0 < \frac{3x^2 - 3x + 1}{x+1}$$

x	-1
y	-   0   +

$$\hookrightarrow \frac{3x^2 - 4x}{x+1} < 0 \rightarrow \frac{x(3x - 4)}{x+1} < 0$$

x	-1	0	$\frac{4}{3}$
y	-   0   +	0	-   +



$$\frac{x^2 - 10}{x} \leq 3 \rightarrow \frac{x^2 - 10 - 3x}{x} \leq 0 \rightarrow \frac{x^2 - 3x - 10}{x} \leq 0 \quad \text{---} \textcircled{10}$$

$$\rightarrow \frac{(x - 5)(x + 2)}{x} \leq 0$$

x	-2	0	5
y	-   +	0	-   +

$$\rightarrow (-\infty, -2] \cup (0, 5]$$