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عارفه ... - دهم ریاضی

(1

$x^2 - ax + b$

x		1		3	
y	+	0	-	0	+

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

$9 - 3a + b = 0$
$\hookrightarrow -3a + b = -9$

$$\begin{array}{l} a - b = 1 \\ -3a + b = -9 \\ \hline -2a = -8 \rightarrow \underline{a = 4} \end{array} +$$

$4 - b = 1$
$\underline{b = 3}$

$x^2 - 4x + 3$

x		1		3	
y	+	0	-	0	+

✓

2

$a + b = 4 + 3 = \cancel{7}$ ✗

(2

$y = ((k-2)x + m - 1)(x - 3n)^2$

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

1,5

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

$4k - 8 + m - 1 = 0 \rightarrow 4k + m - 9 = 0 \hookrightarrow \underline{4k + m = 9}$

(3

$-\frac{1}{2}x^2 + 2x + 4 > \frac{3}{2} \rightarrow -\frac{1}{2}x^2 + 2x + 4 - \frac{3}{2} > 0$
$+\frac{5}{2}$

$\times -2 \hookrightarrow x^2 - 4x - 5 < 0$
$(x+1)(x-5) < 0$

$x^2 - \cancel{5x} \cancel{+ x} \dots$
$-4x$

$(-1, 5)$ $b = 5$
$(a, b) \rightarrow a = -1$

$\hookrightarrow 5 - (-1) = \cancel{\boxed{6}}$ ✗

2 $\leftarrow$

x		-1		5	
y	+	0	-	0	+

(4

0

(6

$$\frac{m(m^2 + m)}{\frac{m - 2}{2}} > 0 \rightarrow m(m^2 + 1) = 0 \rightarrow \underline{m = 0} \checkmark$$

$m^2 + 1 = 0$
$m^2 = -1$ غ ق

x		0		2	
y	-	0	-	∄	+

$\boxed{m > 2}$

2

(5

$$\frac{(x^2 - x - 6)(x-1)^2}{(x^2 + x + 1)(2 - x)^3} \leq 0 \rightarrow \frac{(x+2)(x-3)(x-1)^2}{(x^2 + x + 1)(2 - x)^3} \leq 0$$

1,5

x		-2		1		2		3	
y	+	0	-	0	-	∄	+	0	-

$\leftarrow$

$\boxed{-2 \leq x < 2 \quad \cup \quad x \geq 3}$

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(8

$f(x) = \dfrac{3x^2 - 2x}{x^2 + 4}$ $\qquad f(x) < 2$

$\dfrac{3x^2 - 2x}{x^2+4} < 2 \rightarrow 3x^2 - 2x < 2x^2 + 8 \rightarrow x^2 - 2x - 8 < 0$

$(x+2)(x-4) < 0$

x		-2		4	
y	$+$	0	$-$	0	$+$

$a = -2$

$b = 4$

$(-2, 4) \leftarrow (a, b)$

$4 - (-2) = \boxed{6}$

2

(9

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

$x(3x-4)$

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

$\cup \rightarrow f(x) > -1 \rightarrow \boxed{0 < x < \frac{4}{3}} \rightarrow \boxed{(0, \frac{4}{3})}$

2

(10

$\dfrac{x^2 - 10}{x} \leq 3 \rightarrow x^2 - 10 \leq 3x \rightarrow x^2 - 10 - 3x \leq 0$

$(x+2)(x-5) \leq 0$

$x \neq 0$ (1

x		-2		5	
y	$+$	0	$-$	0	$+$

1,5

$1 \cup 2 \rightarrow \boxed{-2 \leq x < 0 \cup 0 < x \leq 5} \qquad$ (2 $-2 \leq x \leq 5 \leftarrow$

(5

$(a-1)x^2 + (a-1)x + 1 < 0 \qquad a < 0 \rightarrow a < 1$ ①

$\Delta < 0 \rightarrow b^2 - 4ac < 0$

$a^2 - 6a + 1 < 0 \rightarrow x_1, x_2 = 3 \pm \sqrt{8}$

1,5

x		$3-\sqrt{8}$		$3+\sqrt{8}$	
y	$+$	0	$-$	0	$+$

$a = (3 - \sqrt{8}, 3 + \sqrt{8}) \leftarrow$ ②

① $\cup$ ② $\rightarrow \boxed{(3 - \sqrt{8}, 1)}$

$\dfrac{x^2 - 10}{x} \leq 3 \rightarrow \dfrac{x^2 - 10}{x} - 3 \leq 0 \rightarrow \dfrac{x^2 - 3x - 10}{x} \leq 0 \rightarrow \dfrac{(x-5)(x+2)}{x} \leq 0$

10

	-2		0		5	
$-$	0	$+$	$\pm$	$-$	0	$+$

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

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عبارت حول $x=-1$ تغییر علامت نداده است پس $x=-1$ ریشه‌ی عبارت $(x-3n)^2$ بوده است!

$$-1-3n=0 \to n=\frac{-1}{3}$$

پس $x=4$ ریشه‌ی عبارت $(k-2)x+m-1$ است! $\quad 4k-8+m-1=0$

$$4k+m-9=0$$

ضریب x باید منفی باشد چون عبارت به ازای $x>4$ منفی است!

$k-2<0 \to k<2 \to$ طبیعی $k \to \boxed{k=1} \to 4+m-9=0 \to \boxed{m=5}$

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

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$x^3-x-3x^2+3=0 \to x(x^2-1)-3(x^2-1)=0 \to (x^2-1)(x-3)=0 \to$ $x=\pm1$ یا $x=3$

x		-1		1		3	
$f(x)$	$-$	0	$+$	0	$-$	0	$+$

$\to$ $x>0$, $f(x)<0$ $\to x\in(1,3) \to$ نقطه‌ی میانی $=\frac{1+3}{2}=2 \to f(2)=8-12+3-2=-3$

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برای اینکه عبارت همواره منفی باشد $a<0$ و $\Delta<0$

1: $a-1<0 \to a<1$

2: $\Delta<0 \to (a-1)^2-4(a-1)<0 \to 0<a-1<4 \to 1<a<5$

$a-1=t \to t^2-4t<0 \to 0<t<4$

$$1\cap 2=\varnothing$$

۷

$$\frac{\overbrace{(x^2-x-6)}^{(x-3)(x+2)}(x-1)^2}{(x^2+x+1)(2-x)^3}\leq 0 \to$$

		-2		1		2		3	
	$+$	0	$-$	0	$-$	∄	$+$	0	$-$

$\to f(x)\leq 0$

$x\in[-2,2)\cup[3,+\infty)$