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Sayeh Roshan

(۶) $m(m^3+m)(m-1)(m-2) \geq 0$

$\frac{m^4+m^2}{m-2} \longrightarrow m^2(m^2+1)$ ($m^2>0$, $m^2+1>0$) ⇒ علامت عبارت به علامت $m-2$ بستگی دارد

$m-2$: $m<2$ (−), $m>2$ (+), $m=2$ (0)

$\Rightarrow \boxed{m>2}$

(۷) $\frac{(m^2-m-6)(m-1)^2}{(m^2+m+1)(2-m)^4} \leq 0 \Rightarrow \frac{(m-3)(m+2)(m-1)^2}{(m^2+m+1)(2-m)^4}$

m^2+m+1: $\Delta = 1-4 = -3 < 0$ ⇒ همواره مثبت

$(m-1)^2$: $m=1 \rightarrow 0$ ⇒ علامت ندارد

$(2-m)^4$: $m<2$ (+), $m>2$ (−)

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

(۸) $f(x) = \frac{3x^2-4x}{x^2+4}$ $\quad y=2$

$\frac{3x^2-4x}{x^2+4} < 2$

$3x^2-4x < 2(x^2+4) \rightarrow x^2-4x-8 < 0 \rightarrow (x-2)^2-12 < 0$

$(x-2-\sqrt{12})(x-2+\sqrt{12}) < 0$

$(-2, 4)$ $\rightarrow b-a = 4+2 = 6$

(۹) $-1 < \frac{3x^2-4x}{x+1} < 0$ $\quad \frac{x(3x-4)}{(x+1)}$ ⇒ $x=0$, $x=\frac{4}{3}$

$\frac{3x^2-4x}{x+1} < 0 \rightarrow$ (−1: ∄, 0: 0, $\frac{4}{3}$: 0) (+ | − | +) $\rightarrow (-\infty, -1) \cup (0, \frac{4}{3})$

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

$x+1>0 \Rightarrow x>-1$ $\quad (-1, +\infty)$ $\quad \Delta = 1-12 = -11 < 0$

$\Rightarrow (0, \frac{4}{3})$

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1- $\frac{x^2-10}{x} \leq x$

$\frac{x^2-10-5x}{x} \leq 0 \rightarrow \frac{x^2-5x-10}{x} \leq 0$

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

$x-5=0 \rightarrow x=5$

$x+2=0 \rightarrow x=-2$

$x=0$

	-2	0	5
	−	+	−	+

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

$\Rightarrow x \leq -2$

$0 < x < 5$

$(5, -2)$