$x^2 - ax + b = 0$

پاسخ‌های تشریحی

1	2
+	−
−2	+2

1) $S = \varepsilon = \frac{-(-a)}{1} \Rightarrow a = \varepsilon$

$P = \frac{b}{1} = 2 \Rightarrow b = 2$

$b + a = \varepsilon + 2 = \boxed{7}$

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2) $x = -1 \Longrightarrow x - 2n = 0 \Longrightarrow 2n = -1 \Rightarrow n = -\frac{1}{2}$

$x = \varepsilon \Longrightarrow K - 2 = 1 \Rightarrow K = 2, \quad m - 1 = -\varepsilon \Rightarrow m = -2$

$\frac{m}{n} + K = \frac{-2}{-\frac{1}{2}} + 2 = \boxed{12}$

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3) $\frac{1}{2}x^2 + 2x + 6 > \frac{7}{2} \Rightarrow -\frac{1}{2}x^2 + 2x + \frac{5}{2} > 0$

ریشه‌ها $\leftarrow -1, 5$

-1	5
−	+	−

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

---

4) $x^3 - 2x^2 - x + 2 < 0, \quad x > 0$

$x^3 - 2x^2 - x + 2 = 0 \Longrightarrow \frac{x^3 - 2x^2 - x + 2}{x - 1} = 0 = x^2 - x - 2$

-1	1	2
−	+	−	+

$\xrightarrow{x>0} (a, b) = (1, 2) \Rightarrow f = \boxed{2}$

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5) $a - 1 < 0 \Rightarrow a < 1 \qquad \Delta = a^2 + 1 - 2a - 4a + 1 = a^2 + 5 - 6a$

$a^2 + 5 - 6a = (a - 1)(a - 5) < 0$

1	5
+	−	+

$\Rightarrow a = (1, 5)$

$a = (-\infty, 1) \cap (1, 5) \Rightarrow a \in \varnothing$

۶)

$$\frac{m^2(m^2+1)}{m-2}$$

m^2+1 همواره مثبت است $\Rightarrow$

	$-\infty$		0		2		$+\infty$
m^2	+	ϕ	0	−	0	+	
$m-2$	−		−		0	+	
$\frac{m^2(m^2+1)}{m-2}$	−	ϕ	0	+	∄	+	

$$m = (-\infty, 0) \cup (2, +\infty)$$

---

۷)

$$\left.\begin{array}{l} x^2 - x - 6 = (x+2)(x-2) \\ x^2 + x + 1 \text{ همواره مثبت} \end{array}\right\} \Rightarrow$$

	$-\infty$		-2		1		2		$+\infty$
$x+2$	−		0	+		+		+	
$x-2$	−			−		−	0	+	
x^2+x+1	+			+		+		+	
$\frac{(x+2)(x-2)}{x^2+x+1}$	+		0	−		−	0	+	

$$\Rightarrow x = [-2, 2)$$

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۸)

$$\frac{x^2 - 2x}{x^2 + 3} < 2 \Rightarrow \frac{x^2 - 2x - 6}{x^2 + 3} < 0 \Rightarrow \frac{(x-3)(x+2)}{x^2+3} < 0$$

x^2+3 همواره مثبت $\Rightarrow$

	$-\infty$		-2		3		$+\infty$
$x+2$	−		0	+		+	
$x-3$	−			−	0	+	
$\frac{(x+2)(x-3)}{x^2+3}$	+		0	−	0	+	

$$(a, b) = (-2, 3) \Rightarrow b - a = 3 - (-2) = \boxed{5}$$

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۹)

$$\frac{2x^2 - 4x}{x+1} < 0 \Rightarrow$$

	$-\infty$		-1		0		$\frac{4}{3}$		$+\infty$
$2x$	−			−	0	+		+	
$2x-4$	−			−		−	0	+	
$x+1$	−		0	+		+		+	
$\frac{2x(2x-4)}{x+1}$	−		∄	+	0	−	0	+	

$$\Rightarrow x = (-\infty, -1) \cup (0, \tfrac{4}{3})$$

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

$2x^2-2x+1$ همواره مثبت

	$-\infty$		-1		$+\infty$
$x+1$	−		0	+	
$\frac{2x^2-2x+1}{x+1}$	−		∄	+	

$$\Rightarrow x = (-\infty, -1)$$

---

۱۰)

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

	$-\infty$		-2		0		5		$+\infty$
$x+2$	−		0	+		+		+	
$x-5$	−			−		−	0	+	
x	−			−	0	+		+	
$\frac{(x+2)(x-5)}{x}$	−		0	+	∄	−	0	+	

$$\Rightarrow x = (0, 5] \cup (-\infty, -2]$$