

الف) $y = \frac{x+3}{x^3 - 10x^2 + 31x - 15}$

$\Rightarrow \frac{x+3}{(x-1)(x-3)(x-5)}$

DF: $(-\infty, -1) \cup (-1, 3) \cup (3, 5) \cup (5, +\infty)$

نقطه ها را با علامت مشخص کردیم

ب) $y = \frac{x+3}{3x^3 - x^2 - 14x - 4}$

$\Rightarrow \frac{x+3}{(x+1)(x-4)(x+2)}$

DF: $(-\infty, -2) \cup (-2, -1) \cup (-1, 4) \cup (4, +\infty)$

نقطه ها را با علامت مشخص کردیم

الف) $y = \frac{x+1}{x - \sqrt{3-2x}}$

$\sqrt{3-2x} \geq 0 \Rightarrow x \leq \frac{3}{2}$

$x - \sqrt{3-2x} \neq 0 \Rightarrow x \neq \sqrt{3-2x}$

$x^2 \neq 3-2x \Rightarrow x^2 + 2x - 3 \neq 0$

$(x+3)(x-1) \neq 0 \Rightarrow x \neq -3, x \neq 1$

DF: $(-\infty, \frac{3}{2}] - \{1\}$

ب) $y = \frac{x+3}{x - \sqrt{3x-2}}$

$\sqrt{3x-2} \geq 0 \Rightarrow x \geq \frac{2}{3}$

$x - \sqrt{3x-2} \neq 0 \Rightarrow x \neq \sqrt{3x-2}$

$x^2 \neq 3x-2 \Rightarrow x^2 - 3x + 2 \neq 0$

$(x-1)(x-2) \neq 0 \Rightarrow x \neq 1, x \neq 2$

DF: $[\frac{2}{3}, +\infty) - \{1, 2\}$

الف) $y = \frac{\sin x}{\cos x - 1}$

$\cos x - 1 \neq 0 \Rightarrow \cos x \neq 1 \Rightarrow x \neq 2k\pi$

DF: $\mathbb{R} - \{2k\pi\}$

ب) $y = \frac{\cos x + 1}{\sin x + 1}$

$\sin x + 1 \neq 0 \Rightarrow \sin x \neq -1 \Rightarrow x \neq -\frac{\pi}{2} + 2k\pi$

DF: $\mathbb{R} - \{-\frac{\pi}{2} + 2k\pi\}$

ج) $y = \frac{\tan x + 2}{\cot x - 1}$

$\cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow x \neq \frac{\pi}{4} + k\pi$

$\sin x \neq 0 \Rightarrow x \neq k\pi$

DF: $\mathbb{R} - \{\frac{\pi}{4} + k\pi, k\pi\}$

د) $y = \frac{\sin x + 1}{\cos x - 3}$

$\cos x - 3 \neq 0 \Rightarrow \cos x \neq 3$

DF: $\mathbb{R}$

الف) $y = x^2 - 2x + 4 > 0$

$(x-1)(x-3) > 0$

DF: $(-\infty, 1) \cup (3, +\infty)$

ب) $y = x^2 - 4x + 4 < 0$

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

DF: $\emptyset$

ج) $y = x^2 + 2x + 2 \geq 0$

$(x+1)(x+1) \geq 0$

DF: $\mathbb{R}$

د) $y = x^2 - 5x + 4 \leq 0$

$(x-1)(x-4) \leq 0$

DF: $[1, 4]$

الف) $y = \frac{x^2 - 3x + 2}{x - 5}$

$(x-1)(x-2) / (x-5)$

DF: $(-\infty, 5) \cup (5, +\infty)$

ب) $y = \frac{x^2 - 1}{x^2 - 4x + 8}$

$(x-1)(x+1) / (x-2)(x-4)$

DF: $(-\infty, -1) \cup (-1, 2) \cup (2, 4) \cup (4, +\infty)$

$$y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} = \sqrt{\frac{(x-1)(x-3)}{(x-1)(x+1)}}$$

$(-\infty, 1) \cup (3, +\infty)$

$$y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \rightarrow \mathbb{R} - \{1\}$$

$x \neq 1, -1$

0, 1, 2

0, 1, 2

$$y = \log(x^2 - 4x)$$

$x^2 - 4x > 0$
 $x(x-4) > 0$

$Df: (-\infty, 0) \cup (4, +\infty)$

$$y = \log(1 - x^2)$$

$1 - x^2 > 0$
 $(1-x)(1+x) > 0$
 $1-x > 0$
 $1+x > 0$
 $|x| < 1$

$Df: (-1, 1)$

$$y = \log \frac{x^2 - 4x + 3}{x - 1}$$

$1 - x > 0$
 $1 - x > 0$
 $1 > x$

$Df: (1, 3) \cup (3, +\infty)$

$$y = \sqrt{\frac{x}{x^2 - 11x + 18}} + \log \sqrt{xy - x^2}$$

0, 1, 2

$$y = \frac{x^2 - x}{x^2 + x}$$

$x^2 + x \neq 0$
 $x(x+1) \neq 0$
 $x \neq 0, -1$

$Df: (-\infty, -1) \cup (0, +\infty)$

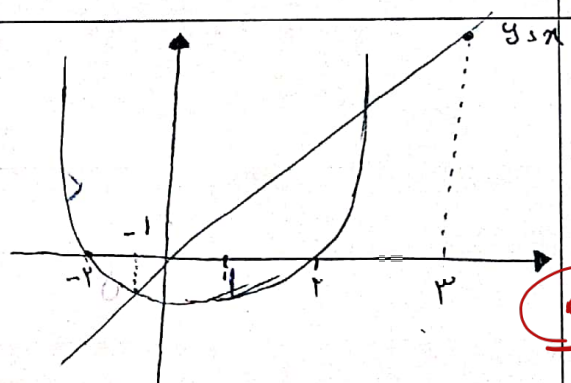
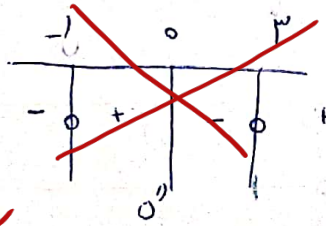
$P(x)$

x	-1	0	1	2
$x-1$	-	-	+	+
$x+1$	-	+	+	+
$P(x)$	-	+	-	+

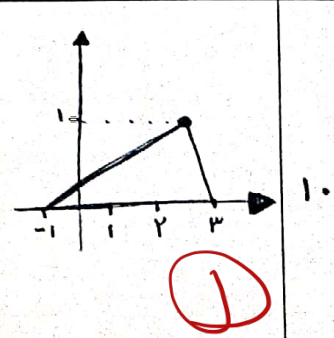
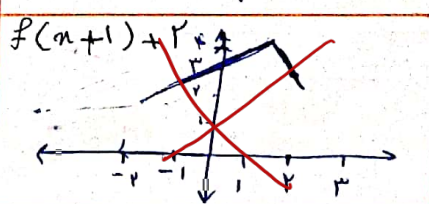
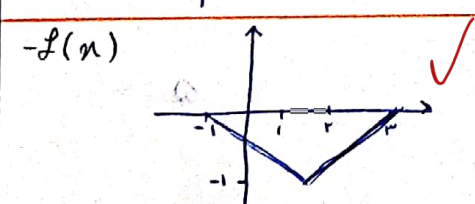
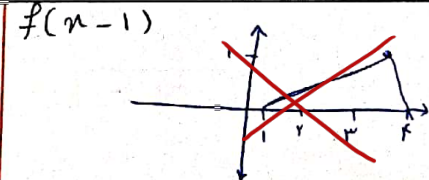
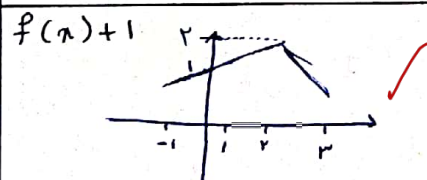
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$$y = \sqrt{\frac{x - f(n)}{f(n)}}$$

$f(n) \neq 0$



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