ملیکا کریمی — ۲۰

به نام خدا

تکلیف شماره ۶ یازدهم تجربی C

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الف) $y = x^3 - 3x^2 + 3x \xrightarrow{+1-1} y = (x-1)^3 + 1 \rightarrow (x-1)^3 = y-1 \rightarrow x-1 = \sqrt[3]{y-1}$

$\Rightarrow x = \sqrt[3]{y-1} + 1 \rightarrow \boxed{R_f = \mathbb{R}}$

ب) $y = \dfrac{1}{x^2+2x} \rightarrow yx^2 + 2yx = 1 \rightarrow yx^2 + 2yx - 1 = 0 \rightarrow x = \dfrac{-2y \pm \sqrt{4y^2+4y}}{2y}$

$\Rightarrow 4y^2 + 4y \geq 0 \rightarrow 4y(y+1) \geq 0$ (جدول تعیین علامت: -1 و 0؛ $+\ -\ +$) $\Rightarrow (-\infty, -1] \cup [0, +\infty)$

$2y \neq 0 \rightarrow y \neq 0$

$\xrightarrow{\cap} \boxed{R_f = (-\infty, -1] \cup (0, +\infty)}$

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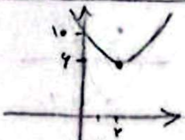
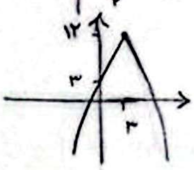
الف) $y = x^2 - 4x + 10$ ؛ min: $\dfrac{-b}{2a} = \dfrac{-(-4)}{2} = 2$ ، $(2)^2 - 4(2) + 10 = 6$ $\Rightarrow$  $\boxed{R_f = [6, +\infty)}$

ب) $y = -x^2 + 6x + 3$ ؛ max: $\dfrac{-b}{2a} = \dfrac{-6}{-2} = 3$ ، $-(3)^2 + 6(3) + 3 = 12$  $\boxed{R_f = (-\infty, 12]}$

ج) $y = \sqrt{x^2 - 4x - 3}$ (عبارت زیر رادیکال) min: $\dfrac{-b}{2a} = \dfrac{-(-4)}{2} = 2$ ، $(2)^2 - 4(2) - 3 = -7$ $\Rightarrow \sqrt{[-7, +\infty)} \Rightarrow \boxed{R_f = [0, +\infty)}$

د) $y = \sqrt{6x - x^2}$ (عبارت زیر رادیکال) max: $\dfrac{-b}{2a} = \dfrac{-6}{-2} = 3$ ، $6(3) - (3)^2 = 9$ $\Rightarrow \sqrt{(-\infty, 9]} \Rightarrow \boxed{R_f = [0, 3]}$

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الف) $y = x^3 - 5x^2 + 2x + 1 \rightarrow \boxed{R_f = \mathbb{R}}$

ب) $y = x^7 - 6x^4 + 3x + 2 \Rightarrow \boxed{R_f = \mathbb{R}}$

ج) $y = \sqrt{x^7 - 6x^2 + 5x + 1} \Rightarrow \boxed{R_f = [0, +\infty)}$

د) $y = (x^5 - 4x^2 + 3x + 1)^4 \Rightarrow \boxed{R_f = [0, +\infty)}$

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الف) $y = \dfrac{3x+1}{x-2} \Rightarrow \boxed{R_f = \mathbb{R} - \{\tfrac{3}{1}\}}$

ب) $y = \dfrac{2x+1}{x+1} \Rightarrow \boxed{R_f = \mathbb{R} - \{\tfrac{2}{1}\}}$

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الف) $y = \sqrt{\dfrac{2x+4}{x+1}} \rightarrow \sqrt{\mathbb{R} - \{\tfrac{2}{1}\}} \Rightarrow \boxed{R_f = [0, +\infty) - \{\sqrt{2}\}}$

ب) $y = \sqrt{\dfrac{3x+1}{2-x}} \Rightarrow \sqrt{\mathbb{R} - \{\tfrac{3}{-1}\}} \Rightarrow \boxed{R_f = [0, +\infty)}$

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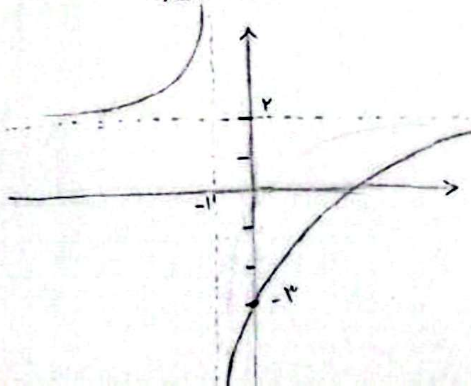
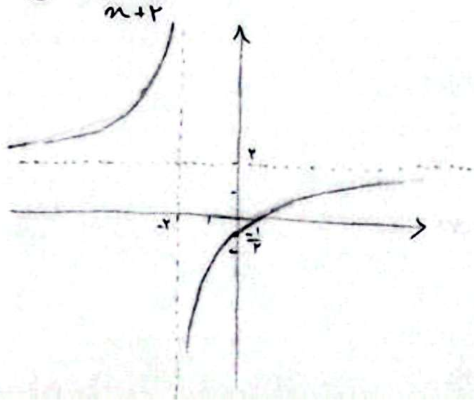
الف) $y = \dfrac{2x-3}{x+1}$



ب) $y = \dfrac{2x-1}{x+2}$



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الف) $y = \sin x + \frac{1}{\sin x}$ $\quad -1 \le \sin x \le 1$ $\Rightarrow$ $R_f = (-\infty, -2] \cup [2, +\infty)$

ب) $y = \frac{x^4+1}{x^2} = x^2 + \frac{1}{x^2}$ $\rightarrow$ تابع x^2 مثبت است $\rightarrow$ $R_f = (-\infty, 2] \cup [2, +\infty)$

ج) $y = \frac{\sqrt[3]{x^2+1}}{\sqrt[3]{x}} = \sqrt[3]{x} + \frac{1}{\sqrt[3]{x}}$ $\rightarrow$ $R_f = (-\infty, -2] \cup [2, +\infty)$

د) $y = \sqrt{x} + \frac{1}{\sqrt{x}}$ $\rightarrow$ $\sqrt{x} \ge 0$ $\rightarrow$ $R_f = [2, +\infty)$

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الف) $y = x^2 + \frac{1}{x^2+3}$ $\xrightarrow{+3-3}$ $y = \underbrace{x^2+3}_{a} + \frac{1}{x^2+3} - 3$ $\rightarrow$ a کمترین مقدار $= 3$ $\rightarrow$ $R_f = [\frac{1}{3}, +\infty)$ ، $a > 0$

ب) $y = \frac{x^2+5}{\sqrt{x^2+4}} = \frac{x^2+4+1}{\sqrt{x^2+4}} = \underbrace{\sqrt{x^2+4}}_{a} + \frac{1}{\sqrt{x^2+4}}$ $\rightarrow$ a کمترین مقدار $= 2$ $\Rightarrow$ $R_f = [\frac{5}{2}, +\infty)$ ، $a > 0$

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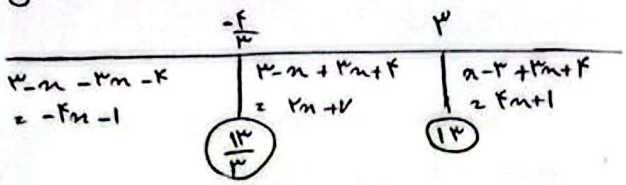
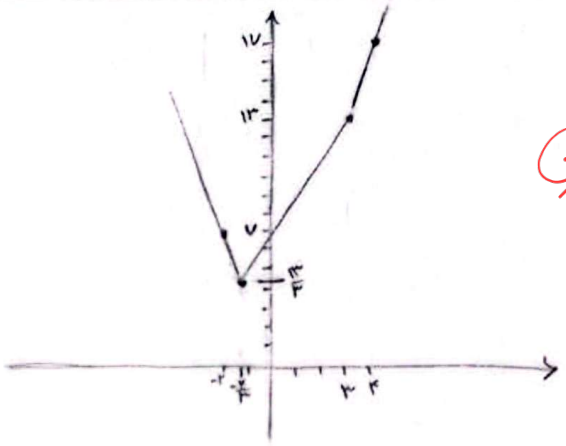
$y = |x+1| + |2x+4|$





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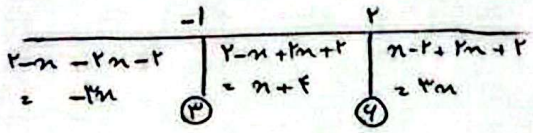
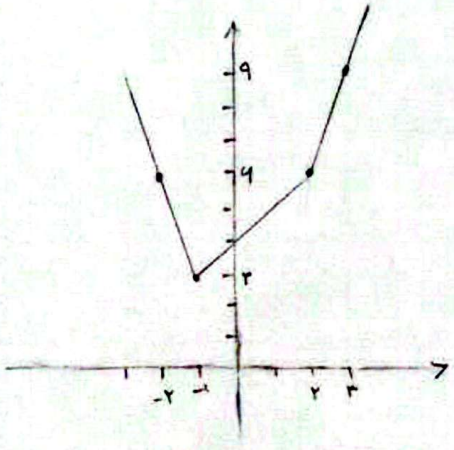
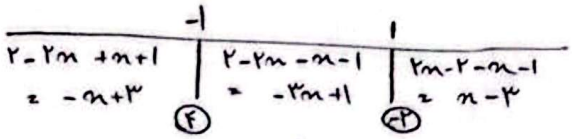
الف) $y = |x-1| + |2x+1|$

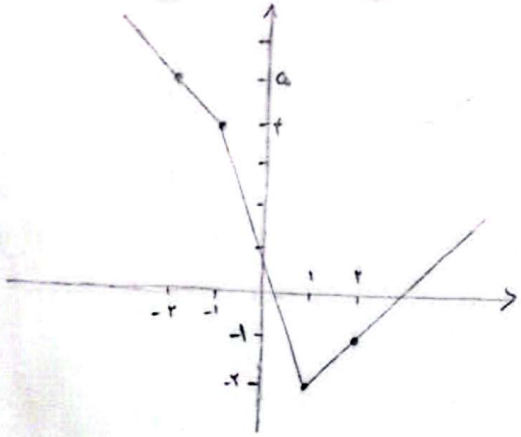




$R_f = [2, +\infty)$

ب) $y = |2x-1| - |x+1|$





$R_f = [-2, +\infty)$

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