۱- الف)

$x^2 - x = 2 \Rightarrow x^2 - x - 2 = 0 \Rightarrow (x-2)(x+1) = 0$ $\begin{cases} x = 2 \\ x = -1 \end{cases}$ $\{(2,1),(-1,0),(-1,2)\}$

$m = 3$

ب) $m = 2 \rightarrow (2,3) = (m,3)$

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

$(4,x) = (1,2) \rightarrow x = 2$

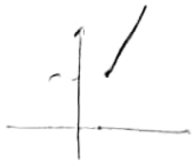
$x = 1 \Rightarrow a + 2$

$y = a + 1$

۲-

$a + 1 + 2 \rightarrow a + 3$

۳-

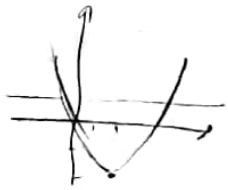


۴-

الف) $y = x^3 + 2 \rightarrow$

$x = y^3 - 2 \rightarrow \sqrt[3]{x-2} = y$

ب) $y = \dfrac{x^2 - 4x + 2 + 2 - 2}{(x-2)^2}$



۵-

الف) $y = \dfrac{3x+1}{x-2}$

$x = 0 \rightarrow y = -\dfrac{1}{2}$

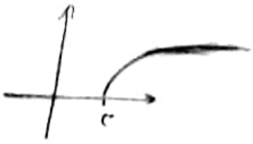
$f^{-1}(x) \Rightarrow x = \dfrac{3y+1}{y-2} \rightarrow y = \dfrac{2x+1}{x-3}$

ج) $y = \dfrac{4 + 2x}{x+2} = \dfrac{2(2+x)}{x+2} \Rightarrow y = 2$

$x \neq -2$

۶-

الف) $y = \sqrt{x - 2}$



$x = \sqrt{y - 2} \rightarrow x^2 + 2 = y$

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۲) $y = (x-3)(x-1)$

$y = x^2 - 4x + 3$

$x_s = \frac{-b}{2a} = 2$

$x \in [2, +\infty)$

$y = x^2 - 4x + 4 - 1 = (x-2)^2 - 1 \rightarrow f^{-1}_{(x)}: \sqrt{y+1} = x-2 \quad f^{-1}_{(x)}: \sqrt{y+1} + 2 = x \rightarrow f^{-1}_{(x)} = \sqrt{x+1} + 2 = y$

$D_{f_{(x)}} = R_{f^{-1}_{(x)}} \rightarrow 2 \leq \sqrt{x+1} + 2 \rightarrow 0 \leq \sqrt{x+1} \rightarrow -1 \leq x$

$f_{(x)} = x + \sqrt{x} \rightarrow \underline{x + \sqrt{x} + \frac{1}{4}} - \frac{1}{4}$

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

$\frac{1}{2} < \sqrt{x + \frac{1}{4}} \rightarrow \frac{1}{4} < x + \frac{1}{4} \rightarrow 0 < x \qquad y = \sqrt{x + \frac{1}{4}} - \frac{1}{2}$

$a = 0 \qquad b = +\frac{1}{4}$

حاصل عبارت $f(-\frac{2}{5}) + g^{-1}(-\frac{2}{5})$ — ۹

$f^{-1}_{(x)} = \frac{x}{1+|x|}$ $\quad g_{(x)} = \sqrt{x-1}$

$f^{-1}_{(x)} = y = \frac{x}{1+|x|}$ $\quad x<0$ $\quad f^{-1}_{(x)} = x = \frac{y}{1+y} \Rightarrow y = \frac{-x}{x-1}$

$x<0$ $\quad -\frac{2}{5}$ $\quad f^{-1}_{(x)} = x = \frac{y}{1-y} = y = \frac{x}{x-1} \rightarrow y = \frac{-\frac{2}{5}}{-\frac{7}{5}} = \frac{2}{7}$

$g^{-1}_{(x)} = y = \sqrt{x-1} \longrightarrow g^{-1}_{(x)} = x = \sqrt{y-1} \rightarrow (x^2+1) = y$

$-\frac{2}{5}$ $\quad \frac{29}{25}$

$f(-\frac{2}{5}) + g^{-1}(-\frac{2}{5}) = \frac{2}{7} + \frac{29}{25}$

x^2+1

$f^{-1}_{(x)} = \sqrt[3]{x-1}$ $\quad g_{(x)} = f_{(x)} + \sqrt{f_{(x)}}$ $\quad g^{-1}_{(12)}$ — ۱۰

$g_{(x)} = x^3+1 + \sqrt{x^3+1} \quad \rightarrow x^3+1 = 9 \quad \rightarrow x = \boxed{2}$

12

$f^{-1}_{(x)} = y = \sqrt[3]{x-1} \rightarrow f_{(x)} = x = \sqrt[3]{y-1} \Rightarrow y = x^3+1$

حمید صفدریان

پ) $y=(x-۳)(x-۱)$

$y=x^2-۴x+۳$

$x_s=\frac{-b}{۲a}=۲$

y

[illegible]

$x\in[۲,+\infty)$

$y=x^2-۴x+۳=(x-۲)^2-۱ \to f^{-1}_{(x)}=\sqrt{x+۱}=x-۲ \quad f_{(x)}=\sqrt{x+۱}+۲=x \to f^{-1}_{(x)}=\sqrt{x+۱}+۲=y$

$D_{f_{(x)}}=R_{f^{-1}_{(x)}} \longrightarrow ۲\leq\sqrt{x+۱}+۲ \to ۰\leq\sqrt{x+۱} \to -۱\leq x$

۷-

$f_{(x)}=x+\sqrt{x} \longrightarrow x+\sqrt{x}+\frac{۱}{۴}-\frac{۱}{۴}$

$y=\left(\sqrt{x}+\frac{۱}{۲}\right)^2-\frac{۱}{۴} \longrightarrow \sqrt{y+\frac{۱}{۴}}-\frac{۱}{۲}=x \longrightarrow \sqrt{x+\frac{۱}{۴}}-\frac{۱}{۲}=y$

$\frac{۱}{۲}\leq\sqrt{x+\frac{۱}{۴}} \longrightarrow \frac{۱}{۴}\leq x+\frac{۱}{۴} \to ۰\leq x \qquad y=\sqrt{x+\frac{۱}{۴}}-\frac{۱}{۲}$

$a=۲ \qquad b=+\frac{۱}{۴}$