سلام خدا

Date : Subject :

(۱) الف) $\begin{cases} 9 = 3x - y \\ -4 = x + 2y \end{cases} \rightarrow \begin{cases} 9 = 3x - y \\ 12 = -3x - 6y \end{cases} \rightarrow y = 3$ $\quad x = 2$

$12 = -7y \rightarrow y = -3 \quad \frac{x}{y} = \frac{2}{-3}$

ب) $\frac{1}{x} - \frac{1}{y} = -1 \rightarrow \frac{1}{x} = \frac{1}{y} - 1$

$\frac{5}{x} - \frac{7}{y} = -3 \rightarrow 5\left(\frac{1}{y} - 1\right) - \frac{7}{y} = -3 \rightarrow \frac{5}{y} - 5 - \frac{7}{y} = -3$

$\rightarrow \frac{-2}{y} = 2 \rightarrow y = -1 \quad , \quad x = -\frac{1}{2} \quad \frac{x}{y} = \frac{-\frac{1}{2}}{-1} = \frac{1}{2}$

(۲) الف) $(1, a+1) = (1, -2) \rightarrow a+1 = -2 \rightarrow a = -3$

$f(a) + 2f(2) = 3f(1) \rightarrow 2a + 2b = 3a + 3 \xrightarrow{a=-3} -6 + 2b = -9$

$\rightarrow b = 0$

(۳) $m^2 - 3m = -2 \rightarrow m^2 - 3m + 2 = 0 \begin{cases} m = 1 \\ m = 2 \end{cases}$

$m=1 \rightarrow (2, 6) = (2, 2)$ غ ق ق

$m=2 \rightarrow (3, 6) = (3, 3)$ ق ق

هیچ مقداری

(۴) الف) ✗ ب) ✓ ج) ✗ د) ✓

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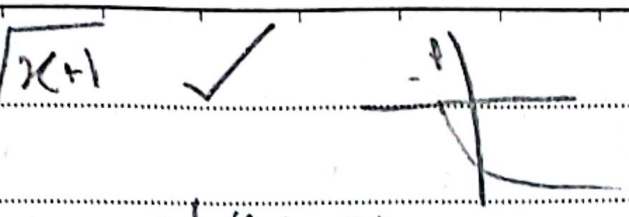
۵) $y = -\sqrt{x+1}$ ✓



ب) $x = \frac{y_1}{\sqrt{1-y_1^2}}$, $x = \frac{y_2}{\sqrt{1-y_2^2}}$

$\frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}}$ خرج قسمت برابر است پس صورت‌ها برابرند

طرفین را به توان ۲ می‌رسانیم

$y_1^2 - y_1^2 y_2^2 = y_2^2 - y_1^2 y_2^2$

$\Rightarrow y_1^2 = y_2^2$

تابع خطی است چون y_1 و y_2 هم‌علامت‌اند

۶) الف) $|y| = x \rightarrow$ if $x=1 \rightarrow y = \pm 1$

ب) $y^3 + 3y^2 + 3y + x^3 + 3x = 0$

$y_1^3 + 3y_1^2 + 3y_1 = -x^3 - 3x + 1$

$y_2^3 + 3y_2^2 + 3y_2 = -x^3 - 3x + 1$

$\rightarrow y_1^3 + 3y_1^2 + 3y_1 = y_2^3 + 3y_2^2 + 3y_2$

$\rightarrow y_1(y_1^2 + 3y_1 + 3) = y_2(y_2^2 + 3y_2 + 3)$

$\rightarrow y_1 = y_2$

۷) $f(x) = \frac{x(x+4)+5}{x(x+4)+7} \rightarrow \frac{(\sqrt{3}-2)(\sqrt{3}+2)+5}{(\sqrt{3}+2)(\sqrt{3}+2)+7} = \frac{3-4+5}{3-4+7} = \frac{4}{6}$

۸) $y = ax - x^3 \xrightarrow{(-1,-4)} -4 = -a - 3 \rightarrow a = 1$

$-4 = -1 - 1 + b \rightarrow b = -2$

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

$x^3 - 2x - 1 = 0$

$(x+1)(x^2 - x + 1) = 0 \rightarrow$ جواب $= -1$

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$a+b=2a \rightarrow a=b$

$a-2a+1=2a \rightarrow -3a+1=0 \quad a=\frac{1}{3}$ (9)

$\lim_{x\to\infty} \frac{4x^2+ax+c+1}{bx+3} = 1$ (10)

$\rightarrow 4x^2+ax+c+1 = bx^2+3bx$

$\rightarrow b=4 \rightarrow 3b=3 \rightarrow a=-3$

$c+1=0 \rightarrow c=-1$

$a+b+c=-3+4-1=0$