

(الف) $\frac{x}{y} = \frac{-2}{3}$ ✓ $\begin{cases} 9 = 3x - y \\ -4 = x + 2y \end{cases} \Rightarrow \begin{matrix} 18 = 6x - 2y \\ -4 = x + 2y \end{matrix} +$
 $14 = 7x \Rightarrow x = 2$
 $y = -3$

(ب) $\frac{x}{y} = \frac{-1}{1} = \frac{1}{1}$ ✓ $\begin{cases} \frac{1}{x} - \frac{1}{y} = -1 \\ \frac{0}{x} - \frac{y}{y} = -3 \end{cases} \Rightarrow \begin{matrix} -\frac{0}{x} + \frac{0}{y} = 0 \\ \frac{0}{x} - \frac{y}{y} = -3 \end{matrix} +$
 $\frac{1}{x} + 1 = -1 \Rightarrow \frac{1}{x} = -2 \Rightarrow x = -\frac{1}{2}$
 $-\frac{y}{y} = 2 \Rightarrow y = -1$

$f = \{(a, 2a), (1, a+1), (1, -2), (2, b)\}$ تابع است

$-2 = a + 1 \Rightarrow a = -3$ ✓
 $(-3, -6), (1, -2), (1, -2), (2, b)$
 $(-3, -6), (1, -2), (2, b)$
 $f(-3) + 2f(2) = 3f(1) \Rightarrow -6 + 2b = -6 \Rightarrow 2b = 0 \Rightarrow b = 0$ ✓

$f = \{(m^2 - 3m, -1), (2, 0), (-1, -2), (m+1, 6), (2, 3), (m^2 + 2, 4m+1)\}$

$m^2 - 3m = -2 \Rightarrow m^2 - 3m + 2 = 0$
 $(m-1)(m-2) = 0$
 $m_1 = 1$
 $m_2 = 2$
 غیر قابل قبول
 قابل قبول

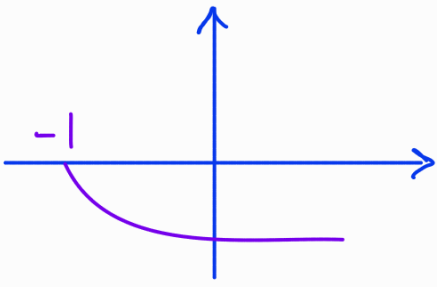
به ازای هیچ متعادلی تابع نیست ✓

- (الف) تابع نیست ✓
- (ب) تابع است ✓
- (ج) تابع نیست ✓
- (د) تابع است ✓

(الف) $y = -\sqrt{x+1} \Rightarrow y^2 = (1-x) = (x+1) = x^2 + 1 + 2x$
 $y^2 = x^2 + 1 + 2x$
 $x = 1$
 $y = \pm 1$

(ب) $x = \frac{y}{\sqrt{1-y^2}}$
 $\sqrt{1-y^2} = y$
 $|1-y^2| = y^2$
 $1-y^2 = y^2 \Rightarrow 1 = 2y^2$
 $-1+y^2 = y^2 \Rightarrow y^2 = \frac{1}{2}$

<p>$y = n$</p> <p>آگر n را عدد صحیح مثبت n بگیریم جواب بدست می آید</p> <p>نتیجه نهایی</p> <p>(ج)</p> <p>$y_1 = y_2$ $y_1 - y_2 = 0$ $y_1^2 + y_1 y_2 + y_2^2 = 0$</p> <p>$y + \sqrt{3}y^2 + \sqrt{3}y = -n - n$ $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) = 3(y_1^2 + y_1 y_2 - y_2^2)$</p> <p>$y_1 = \frac{-y_2 \pm \sqrt{\Delta}}{2}$ $y_1^2 + \sqrt{3}y_1^2 + \sqrt{3}y_1 = -n - n$ $\Rightarrow y_1^2 + \sqrt{3}y_1^2 + \sqrt{3}y_1 = y_1^2 + \sqrt{3}y_2^2 + \sqrt{3}y_2$</p> <p>$\sqrt{3}y_1^2 + \sqrt{3}y_1 = \sqrt{3}y_2^2 + \sqrt{3}y_2$ $y_1 - y_2 = 3y_2^2 + 3y_2 - 3y_1^2 - 3y_1$</p>	<p>(الف) ۲</p>
<p>$f(n) = \frac{n^2 + 4n + 4}{n^2 + 4n + 4}$</p> <p>$(\sqrt{3}-1) = 3 + 4 - 4\sqrt{3} + 1$</p> <p>$\frac{3 + 4 - 4\sqrt{3} + 1 + 0}{3 + 4 - 4\sqrt{3} + 1 + 3} = \frac{8}{9}$</p> <p>$\frac{8}{9} = \frac{8}{9}$</p>	<p>۲</p> <p>۷</p>
<p>$y = 3n - a$ $f(n) = n^2 + an + b$</p> <p>$(-1, -4)$ $f(-1) = -1 - 1 + b = -4$</p> <p>$n = -1$ $-2 + b = -4$</p> <p>$y = -4$</p> <p>$-4 = -3 - a$ $b = -2$</p> <p>$a = 1$ $n + n - 2 = 3n - 1$</p> <p>$n^2 - 2n = 1$ $n = -1$</p>	<p>۱۵</p> <p>۸</p>
<p>$(n+1)(n^2 - n - 1) = 0$</p> <p>$a + b = 2a = a - 2b + 1$ $\hookrightarrow S = -\frac{b}{a} = 1$</p> <p>$b = a$</p> <p>$a - 2a + 1 = -a + 1 = 2a \Rightarrow 3a = 1$</p> <p>$a = \frac{1}{3}$</p>	<p>۲</p> <p>۹</p>
<p>جای نداشت</p> <p>$\frac{kn^2 - an + c + 1}{bn + 3}$ $\frac{k-3-1=0}{a+b+c}$</p> <p>$\frac{c+1}{+3} = 0$ $\frac{kn^2 + bn - 2}{3b + 3} = 3$</p> <p>$c + 1 = 0$ $\Rightarrow \frac{kn^2 - an}{bn + 3}$ $kb + 3 = 13 + 4b - 2$</p> <p>$c = -1$ $\frac{k-a}{b+3} = 1 \Rightarrow b+3 = k-a$ $3b = 11$ $b = \frac{11}{3}$</p> <p>جای نداشت $a = -3$ $b = -a + 1$ $3 = -a + 1$</p> <p>$-a = b - 1$</p>	<p>۲</p> <p>۱۰</p>



تابع هست!

۵ ب)

مخرج سرها مثبت اند پس
 y_1 و y_2 هم علامته!

$$\begin{aligned} n &= \frac{y_1}{\sqrt{1-y_1^2}} \\ n &= \frac{y_2}{\sqrt{1-y_2^2}} \end{aligned}$$

$$\Rightarrow \frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}} \xrightarrow[\text{طرفین وسطین}]{\text{توان ۲}} y_1^2 - y_1^2 y_2^2 = y_2^2 - y_1^2 y_2^2$$

$$y_1^2 = y_2^2$$

$$\xrightarrow[\text{تابع هست!}]{y_1 \text{ و } y_2 \text{ هم علامته}} \boxed{y_1 = y_2}$$