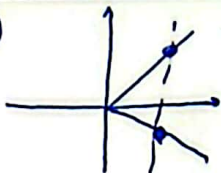


الف)



تابع نیست
X

ب) $y^3 - 3y^2 + 3y = (y+1)^3 - 1$

$$(y+1)^3 - 1 + x^3 - x = 0 \rightarrow (y+1)^3 = 1 - x^3 - x$$

$$y+1 = \sqrt[3]{1-x^3-x}$$

$$y = \sqrt[3]{1-x^3-x} - 1$$

چون فرجه 3 است پس به اعداد صحیح هر عدد صحیح را درون تابع یک مقادیر وجود دارد پس تابع است

6

$$f(x) = \frac{x^3 - 1^3}{x^2 + 1^2} = \frac{(x-1)(x^2+x+1)}{(x+1)^2 + 3} \xrightarrow{x=\sqrt{3}-2} \frac{3+1}{3+3} = \frac{4}{6}$$

7

$$x = -1 \rightarrow -1 - a + b = -4 \rightarrow b - a = -3 \rightarrow b - 1 = -3 \rightarrow b = -2$$

$$y = 3x - a \rightarrow -3 - a = -4 \rightarrow a = 1$$

$$f(x) = x^3 + x - 2$$

$$y = 3x - 1$$

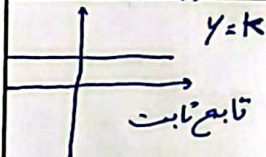
$$x^3 + x - 2 = 3x - 1 \rightarrow x^3 - 2x + 1 = 0 \xrightarrow{\text{جواب می دهد}} \frac{x^3 - 2x + 1}{-x^2 - 2x - 1} \left| \frac{x+1}{x^2 - x - 1} \right.$$

$$(x+1)(x-x-1) = 0$$

$$x^2 - x - 1 = 0 \rightarrow \Delta = b^2 - 4ac = 5$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{1 \pm \sqrt{5}}{2} \rightarrow \frac{1+\sqrt{5}}{2} \cup \frac{1-\sqrt{5}}{2} \rightarrow \frac{1+\sqrt{5}}{2} + \frac{1-\sqrt{5}}{2} = \frac{2}{2} = 1 \rightarrow \text{جواب}$$

8

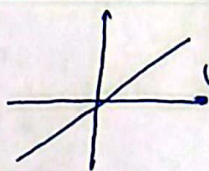


تابع ثابت

$$a + b = a - 2b + 1 \rightarrow 3b = 1 \rightarrow b = \frac{1}{3}$$

$$a + b = 2a \rightarrow b = a \rightarrow a = \frac{1}{3}$$

9



تابع صافی

$$\frac{ax^2 - a^2x + c + 1}{bx + 3} = x$$

$$ax^2 - a^2x + c + 1 = bx^2 + 3x$$

$$ax^2 - bx^2 - a^2x - 3x + c + 1 = 0 \rightarrow (a-b)x^2 + (-a^2-3)x + c + 1 = 0$$

$$a - b = 0 \rightarrow b = a$$

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

$$-a - 3 = 0 \rightarrow a = -3$$

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