

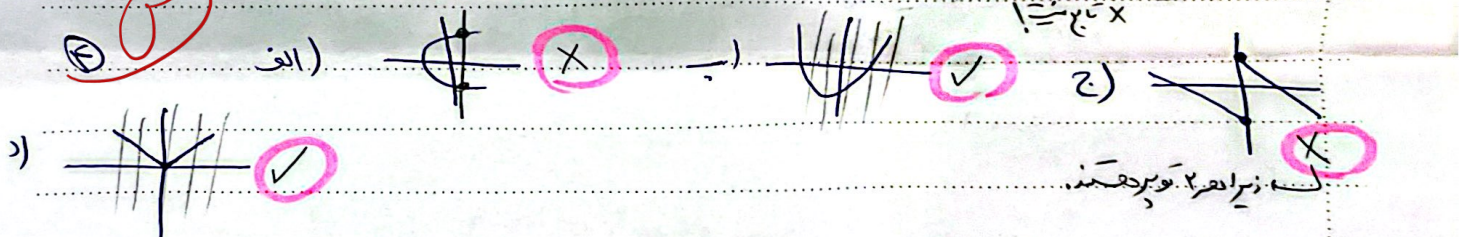
Subject:

Year: Month: Date:

1) الف)  $(9, n+2y), (3n-y, -4) \rightarrow 9 = 3n-y \rightarrow 18 = 4n-2y$   
 $n+2y = -4 \rightarrow -2 = n+2y$   
 $\rightarrow \frac{18}{2} = \frac{4n-2y}{-2} = \frac{-2}{2}$   
 $9 = -2n + y \rightarrow y = 9 + 2n$   
 $n + 2(9 + 2n) = -4 \rightarrow n + 18 + 4n = -4 \rightarrow 5n = -22 \rightarrow n = -\frac{22}{5}$   
 $y = 9 + 2(-\frac{22}{5}) = 9 - \frac{44}{5} = \frac{45-44}{5} = \frac{1}{5}$   
 ب)  $(-1, -4), (\frac{1}{n}, -\frac{1}{y}), (\frac{5}{x}, -\frac{y}{x})$   
 $-1 = \frac{1}{n} - \frac{1}{y} \rightarrow -1 = \frac{y-n}{ny} \rightarrow -ny = y-n \rightarrow -ny - y = -n \rightarrow -y(n+1) = -n \rightarrow y = \frac{n}{n+1}$   
 $\frac{5}{x} - \frac{y}{x} = -4 \rightarrow \frac{5-y}{x} = -4 \rightarrow 5-y = -4x \rightarrow y = 5+4x$   
 $\frac{n}{n+1} = 5+4x \rightarrow n = (5+4x)(n+1) \rightarrow n = 5n + 4xn + n + 4x \rightarrow n = 6n + 4xn + 4x \rightarrow -5n = 4xn + 4x \rightarrow -5n = 4x(n+1) \rightarrow x = \frac{-5n}{4(n+1)}$

2)  $P = \{(-2, 2), (1, 1), (2, 1), (2, 2)\}$   $a+1 = -2 \rightarrow a = -3$   
 $P(x) + 2P(2) = 3P(1)$   
 $\frac{x^2}{4} + 2b = 3x - 2 \rightarrow -x + 2b = -4 \rightarrow b = \frac{x-4}{2}$

3)  $P = \{(-1, m^2-2m), (3, 2), (-1, -2), (m+1, 1), (2, 2), (m^2+2, 2m+1)\}$   
 $m^2-2m = -2 \rightarrow m^2-2m+2 = 0 \rightarrow (m-1)(m-2) = 0$   
 $m = 1$  or  $m = 2$   
 For  $m=1$ :  $(-1, -1), (3, 2), (-1, -2), (2, 1), (2, 2), (3, 3)$   
 For  $m=2$ :  $(-1, 2), (3, 2), (-1, -2), (3, 1), (2, 2), (6, 5)$



4) الف)  $y = -\sqrt{x+1} \rightarrow \sqrt{x} \rightarrow x = y^2$   
 ب)  $x = \frac{y}{\sqrt{1-y^2}}$   
 $x_1 = x_2 \rightarrow \frac{y_1}{\sqrt{1-y_1^2}} = \frac{y_2}{\sqrt{1-y_2^2}} \rightarrow y_1 \sqrt{1-y_2^2} = y_2 \sqrt{1-y_1^2}$   
 $y_1^2(1-y_2^2) = y_2^2(1-y_1^2) \rightarrow y_1^2 - y_1^2 y_2^2 = y_2^2 - y_1^2 y_2^2 \rightarrow y_1^2 = y_2^2 \rightarrow y_1 = \pm y_2$

5) الف)  $|y| = x \rightarrow y = \pm x$   
 $y_1^3 + y_2^3 + y_3^3 + y_4^3 + y_5^3 + y_6^3 = y_1^2 + y_2^2 + y_3^2 + y_4^2 + y_5^2 + y_6^2$   
 $y_1^3 - y_2^3 + y_3^3 - y_4^3 + y_5^3 - y_6^3 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_3 - y_4)(y_3^2 + y_3 y_4 + y_4^2) + (y_5 - y_6)(y_5^2 + y_5 y_6 + y_6^2) = 0$   
 $\rightarrow (y_1 - y_2) [y_1^2 + y_1 y_2 + y_2^2 + 2(y_3 - y_4) + 3] = 0 \rightarrow y_1 = y_2$

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

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①  $P(n) = n^2 + an + b$        $y - 2n + a = 0$        $(-1, -2)$

$y = 2n - a \rightarrow -2 = -2a \rightarrow a = 1 \rightarrow (-1)^2 + (-1) + b = -2 \rightarrow b = -2$

$\rightarrow n^2 + n - 2 = 2n - 1 \rightarrow n^2 + n - 2n - 1 = 0 \rightarrow n^2 - n - 1 = 0 \Rightarrow \frac{n^2 - 2n - 1}{n^2 - n - 1} = \frac{n+1}{n-n-1}$

$\frac{-b}{a} = \frac{-(-1) - (-1)}{1} = \frac{+1}{-b} = (n^2 - n - 1)(n+1)$        $\leftarrow \frac{-n^2 - 2n - 1}{n^2 - n - 1}$

②  $P = \{ (2, a+b) (1, 2a) (-1, a-2b+1) \} \rightarrow$  تابع زوج  $\rightarrow a = 2$

تابع زوج  $\rightarrow$  زوجی بودن  $\rightarrow a+b = 2a = a-2b+1$

$a = b$        $a - 2a + 1 = 2a$

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

③  $P(n) = \frac{\sum n^2 - an + c + 1}{bn + 2} \rightarrow$  تابع فرد  $\rightarrow a + b + c = ?$

$P(0) = 0 \rightarrow \frac{c+1}{2} = 0 \rightarrow c+1 = 0 \rightarrow c = -1$

$P(1) = 1 \rightarrow \frac{1 - a + c + 1}{b + 2} = 1 \rightarrow 2 - a + c + 1 = b + 2$

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

$a + b + c \rightarrow c + c + c \rightarrow 2 - 1 - 1 = -b$