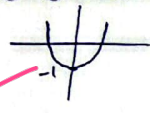


۱۹,۵ آفرین

الف) $y^3 = 2x^2 - 1 \rightarrow \begin{cases} y_1^3 = 2x_1^2 - 1 \\ y_2^3 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ✓

ب) $y^3 + y = 2x^2 - 1 \rightarrow \begin{cases} y_1^3 + y_1 = 2x_1^2 - 1 \\ y_2^3 + y_2 = 2x_2^2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 + y_1 = y_2^3 + y_2 \Rightarrow y_1^3 - y_2^3 + y_1 - y_2 = 0$ ✓

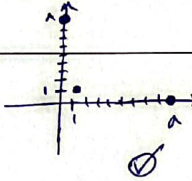
$\Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + y_1 - y_2 = 0 \Rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0$ ✓
 $y_1 = y_2$ $y_1 = y_1^2 + y_1 y_2 + y_2^2 + 1$

الف) $y = x^2 - 1$  ✓

ب) $|y| + xy = x^2 + 1 \xrightarrow{x=0} |y| = 1 \Rightarrow y = \pm 1$ ✓

ج) $y^3 + x^3 = 2x - 1 \rightarrow \begin{cases} y_1^3 = -x_1^3 + 2x_1 - 1 \\ y_2^3 = -x_2^3 + 2x_2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ ✓

الف) $\sqrt{y} + \sqrt{x} = 2 \rightarrow \begin{cases} x=0, y=4 \\ x=4, y=0 \\ x=1, y=1 \end{cases}$ ✓



الف) $\tan \frac{\pi}{4} = \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$ ✓

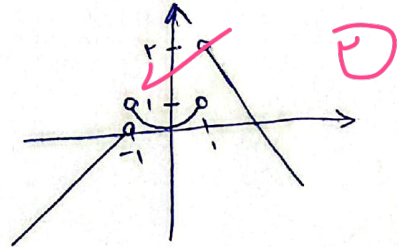
ب) $\cot \frac{\sqrt{\pi}}{2} = \frac{\cos \frac{\sqrt{\pi}}{2}}{\sin \frac{\sqrt{\pi}}{2}} = \frac{1}{\sqrt{2}}$ ✓

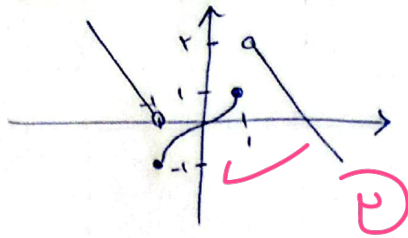
ج) $\tan \frac{\pi}{4} = -\frac{1}{\sqrt{e}}$ ✓

د) $\csc 18^\circ = \frac{1}{\sin 18^\circ} = \frac{1}{\frac{1}{2}} = 2$ ✓

الف) $\sin \alpha = \frac{1}{2} \Rightarrow \alpha = \frac{\pi}{6}, \frac{5\pi}{6}$ ✓

ب) $\csc \alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = \frac{\pi}{4}, \frac{3\pi}{4}$ ✓





٤

الف) $y = (n-2)(n-3)(n-4)$
 $\textcircled{2} \quad \textcircled{3} \quad \textcircled{4}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ - \quad + \quad - \quad + \end{array}$$

ب) $y = (n-2)(n-3)^2(n-4) = (n-2)(n-3)(n-3)(n-4)$
 $\textcircled{2} \quad \textcircled{3} \quad \textcircled{3} \quad \textcircled{4}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ + \quad - \quad + \quad - \end{array}$$

٧

الف) $y = \frac{(n-2)(n-4)}{(n-3)}$
 $\textcircled{2} \quad \textcircled{4} \quad \textcircled{3}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ - \quad + \quad - \quad + \end{array}$$

ب) $y = \frac{(n-2)(n-4)}{(n-3)^2} = \frac{(n-2)(n-4)}{(n-3)(n-3)}$
 $\textcircled{2} \quad \textcircled{4} \quad \textcircled{3} \quad \textcircled{3}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ + \quad - \quad + \quad - \end{array}$$

٨

الف) $y = \frac{n^3 - 3n^2 + 2}{n-2} = \frac{(n-1)^2(n+2)}{(n-2)} = \frac{(n-1)(n-1)(n+2)}{(n-2)}$
 $\textcircled{1} \quad \textcircled{1} \quad \textcircled{2} \quad \textcircled{2}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ + \quad - \quad + \quad - \end{array}$$

ب) $y = \frac{n^2 - 3n + 2}{n^2 - 4n + 4} = \frac{(n-1)(n-2)}{(n-2)(n-2)}$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{2} \quad \textcircled{1}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ - \quad + \quad - \quad + \end{array}$$

٩

$n^2=0 \rightarrow n \times n=0 \rightarrow$ قيمتان صفر، $n=0$

الف) $y = \frac{n^3 - n^2}{n^2 + n + 2} \rightsquigarrow n^2(n^2 - 1) = n^2(n+1)(n-1)$
 $\textcircled{2} \quad \textcircled{1} \quad \textcircled{1} \quad \textcircled{2}$

$$\begin{array}{r} 2 \quad 3 \quad 4 \\ + \quad - \quad + \quad - \end{array}$$

١٠

ب) $\frac{n^2 + 3n + 2}{n^2 + 2n + 2} \rightsquigarrow \Delta = 9 - 12 = -3$
 $\frac{n^2 + 2n + 2}{n^2 + 2n + 2} \rightsquigarrow \Delta = 4 - 12 = -8$

١٥

الف - ١٠) $y = \frac{n^2 - n^2}{n^2 + n + 2} = \frac{n^2(n^2 - 1)}{n^2 + n + 2} = \frac{n^2(n-1)(n+1)}{n^2 + n + 2}$

صفر منفرد ← $n^2(n-1)(n+1)$

صفر مضروب! $n^2 + n + 2$

Diagram: A number line with points at -1, 0, and 1. The sign of the expression is positive for $x < -1$ and $x > 1$, and negative for $-1 < x < 1$. The point 0 is marked with an asterisk (*).