Arda

Math

Problem 2 continuity

$\lim_{x \to 2}$ $\lim_{x \searrow 2}$ $\begin{cases} 2x-2 & \text{if } x \text{ is } \geq 2 \\ -(2x-2) & \text{if } x < 2 \end{cases}$

$x \leq 2$

case 2:

left sided $\lim_{x \to 2} = 2 \cdot 2 - 2 = 2$

|| so $\lim_{x \to 2} = 2 \cdot 2 - 2 = 2$

right $\lim_{x \searrow 2} = 2 \cdot 2 - 2 = 2$

~~left $\lim_{x \to 2} = -(2$~~

$\lim \begin{cases} \sqrt{x}+2 & x \geq 4 \end{cases}$ only case since $x \geq 4$

$\lim_{x \to 4} = 4$ since $\sqrt{4}+2 = 2+2$

|| $\lim_{x \to 4} \sqrt{4}+2 = 4$

$\lim_{x \searrow 4} = 4$ ||

$f(x) = ax+b$

$f(x) = \cancel{2a+b}$ $\cancel{2x+4}$ $\begin{cases} 2a+b = 2 \\ 4a+b = 4 \end{cases}$ - subtract

$2a = 2 \,|: 2$

$a = 1$

$4+b = 4$

$b = 0$ so

$f(x) = \begin{cases} -(2x-2) & x < 2 \\ x & 2 \leq x \leq 4 \\ \sqrt{x}+2 & x \geq 4 \end{cases}$

Problem 3

i) ~~is not linearly independent as they all are a three not in linearly~~

~~Eot~~

$$\begin{matrix}1&1&1\\1&2&2\\1&2&3\end{matrix} \quad \begin{matrix}1&1&1\\0&1&1\\0&1&2\end{matrix} \quad \begin{matrix}1&1&1&=0\\0&1&1&=0\\0&0&1&=0\end{matrix}$$

~~$x_3 = 1$~~

$x_3 = 0$

$x_2 = 0$

$x_1 = 0$

Thus the vectors $\begin{pmatrix}1\\1\\1\end{pmatrix}$ $\begin{pmatrix}1\\2\\2\end{pmatrix}$ $\begin{pmatrix}1\\2\\3\end{pmatrix}$ are linearly independent as the only way to get the zero vector is by multiplying by 0. And the condition for it is that it should not be 0.

ii) $\begin{pmatrix}1\\-1\\0\end{pmatrix}, \begin{pmatrix}0\\1\\-1\end{pmatrix}, \begin{pmatrix}-1\\0\\1\end{pmatrix}$ * Thus these are vectors are linearly dependent on each other

$$\left(\begin{matrix}1&0&-1\\-1&1&0\\0&-1&1\end{matrix}\right)$$

$$\begin{matrix}1&0&-1\\0&1&-1\\0&-1&1\end{matrix} \quad \begin{matrix}1&0&-1&=0\\0&1&-1&=0\\0&0&0&=0\end{matrix} \quad \begin{pmatrix}x_3\\x_3\\x_3\end{pmatrix}$$

Test $x_3 = 1$

$x_1 = 1$ * Thus these vectors are linearly dependent on each other

$-x_2 - x_3 = 0$ $x_2 = x_3 =$

$-1 \cdot 1 + x_2 = 0$ -1 $x_1 = x_3$ $1 x_1 - x_3 = 0$