(1)

(1) $\vec{x} = \begin{pmatrix} -1 \\ -5 \\ -3 \end{pmatrix}$

L1 norm

$\|\vec{x}\|_1 = 1+5+3 = 9$

$\|\vec{x}\|_2 = \sqrt{1+5^2+9^2} = \sqrt{35}$

(2) $\vec{y} = \begin{pmatrix} 0 \\ 4 \\ 16 \end{pmatrix}$

$\|\vec{y}\|_1 = 0+4+16 = 20$

$\|\vec{y}\|_2 = \sqrt{0+4^2+16^2} = \sqrt{272}$

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(2) Cosine values between vectors.

(1) $\vec{x} \begin{pmatrix} 4 \\ -5 \\ 3 \end{pmatrix}$ $\vec{y} \begin{pmatrix} 8 \\ 10 \\ 6 \end{pmatrix}$

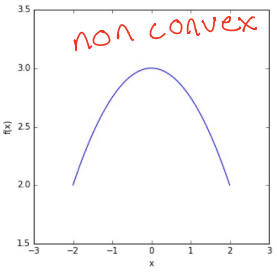
$\vec{x} \cdot \vec{y} = |\vec{x}| \cdot |\vec{y}| \cos\theta$

$\cos\theta = \dfrac{\vec{x} \cdot \vec{y}}{|\vec{x}||\vec{y}|} = \dfrac{0}{\sim} = 0$

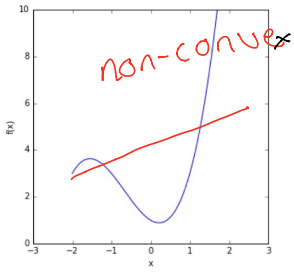
(2) $\vec{x} = \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$, $\vec{y} = \begin{pmatrix} -1 \\ 1 \\ 1 \end{pmatrix}$

$\cos\theta = \dfrac{-1}{\sqrt{3} \cdot \sqrt{3}} = -\dfrac{1}{3}$

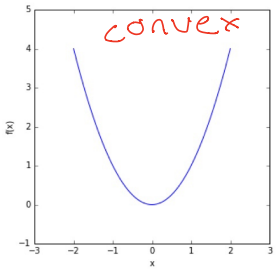
3



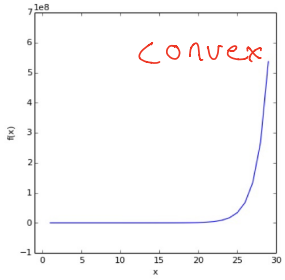

(a)




(b)




(c)




(d)

(a) & (b) are not convex

(c) & (D) are convex