The solution sets of linear equation below is?

$$\begin{cases} 2x_1 - 3x_2 + 5x_3 = -1 \\ x_1 + x_2 - 2x_3 = 2 \end{cases}$$

- Convex set and not Affine set
- Affine set and not convex
- Affine and Convex

 ✓

The set of the form below is?

$$\{x: a^T x = b\}, a \neq 0$$

- Convex set
- Affine set
- Affine and Convex

 ✓

✓ Correct 1/1 Points

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The set of the form as below is called? \Box_{40} $\{x: a^Tx \leq b\}, a \neq 0$

- Half space ✓
- Hyperplane
- O Cone

Is the union of two convex sets again convex?

-) Yes
- No
 ✓

✓ Correct 1/1 Points

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The function below are convex?

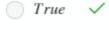
$$f(x) = \ln(e^{x_1} + \ldots + e^{x_n})$$

- Yes

 ✓
- O No

Does the statement true or false?

Let $f: \mathbb{R}^n \to \mathbb{R}$ be a differentiable function. f is convex over a nonempty convex set C if and only if $(\nabla f(x) - \nabla f(y))^T (x - y) \ge 0 \quad \forall x, y \in C$





What type of set C as below set? \Box

Let $A \in \mathbb{R}^{m \times n}$ and consider the <u>set</u> $C = \{x \in \mathbb{R}^n : Ax \le 0\}$.

- C is not convex
- C is cone
- C is convex cone

Is the unit ball $B = \{x \in \mathbb{R}^n : ||x||_2 \le 1\}$ a polyhedron?



Yes





Question []

Let $S = \{(0,0),(1,0),(0,1)\}$. Determine the convex hull of S.

a.
$$\operatorname{conv}(S) = \{(x_1, x_2) \in \mathbb{R}^2 : x_1 \le 0, x_2 \le 0, x_1 + x_2 \le 1\}$$

b.
$$\operatorname{conv}(S) = \{(x_1, x_2) \in \mathbb{R}^2 : x_1 \ge 0, x_2 \ge 0, x_1 + x_2 \ge 1\}$$

c.
$$\operatorname{conv}(S) = \{(x_1, x_2) \in \mathbb{R}^2 : x_1 \ge 0, x_2 \ge 0, x_1 + x_2 \le 1\}$$