Let $S = \{(0,1), (0,2), (1,2), (1,3), (2,0), (4,1)\} \in \mathbb{R}^2$.

(1) Draw $\text{conv}(S)$.

(2) Is $\text{conv}(S)$ a polyhedron?

(3) Is it true that $(3,2) \in \text{conv}(S)$?

(4) Is it true that $(2,2) \in \text{conv}(S)$?

(5) If you answered yes to any of the last two questions, prove it using the definition of $\text{conv}(S)$ (that is, express the point as a convex combination of points in S).