

# Polytopes.

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## 1 Basics.

**Definition 1** (Convex Polygon).  *$P$  will be said a convex polygon if for every  $x, y \in P$  we have that any point  $z$  that lays on the line between  $x$  and  $y$  belongs to  $P$ .*

### 1.1 Different Constructions.

*Consider two different polytopes  $P, Q \subset \mathbb{R}^d$  then we could construct a thired polytop by:*

1. *Intersection, takeing the  $P \cap Q \subset \mathbb{R}^d$*
2. *Minkeoski sum,  $P+Q = \{p+q : p \in P, q \in Q\} \subset \mathbb{R}^d$*
3. *Product,  $P \times Q = \{(p, q) : p \in P, q \in Q\} \subset \mathbb{R}^{2d}$*