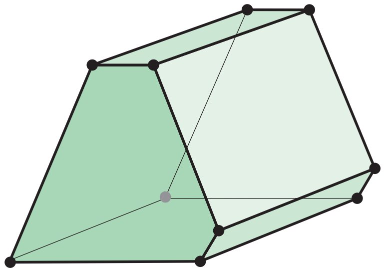
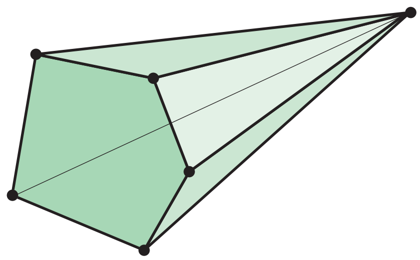
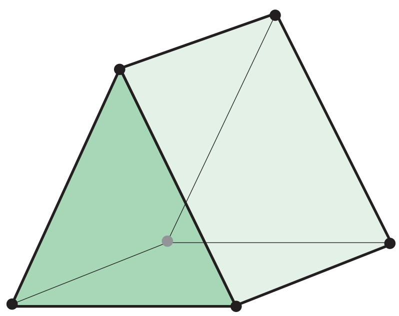
P_1



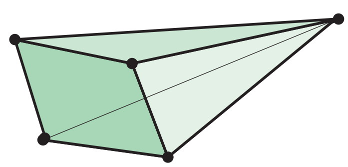
P_2



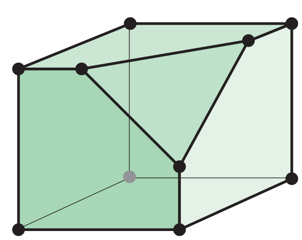
P_3



P_4



P_5



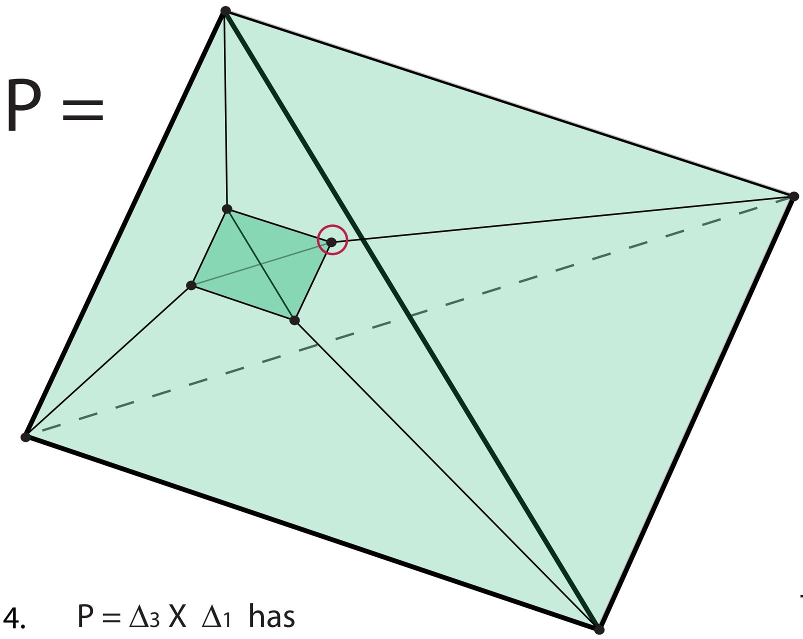
1. For each polytope P above draw P^{Δ}, find $f(P)$, and $f(P^{\Delta})$.

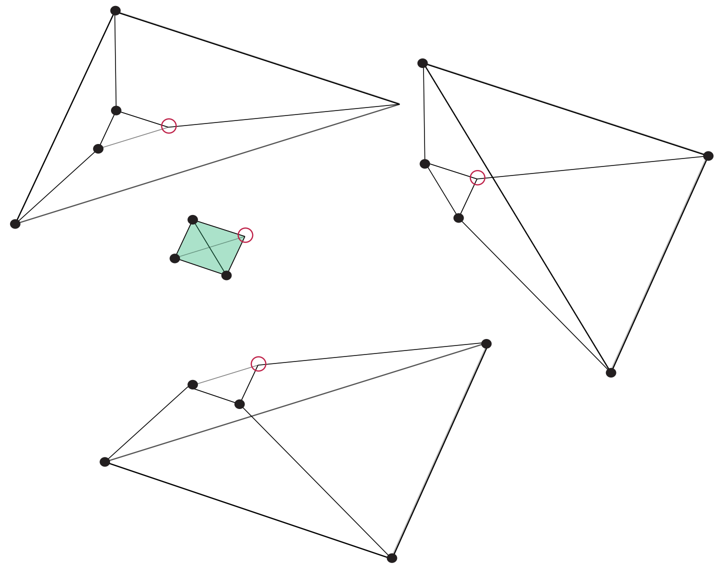
2. From the above examples, what infinite collection of polytopes, other than polygons and simplices, obeys $P = P^{\Delta}$(where = denotes combinatorial equivalence) ?

3. Draw Schlegel diagrams for: P_4 X Δ_1 ; pyr(P_3); Δ_2 X (Square); and bipyr(Δ_3). For each of the four, list the facets (draw one of each type and tell how many of each).

HW4, part 2.

P =

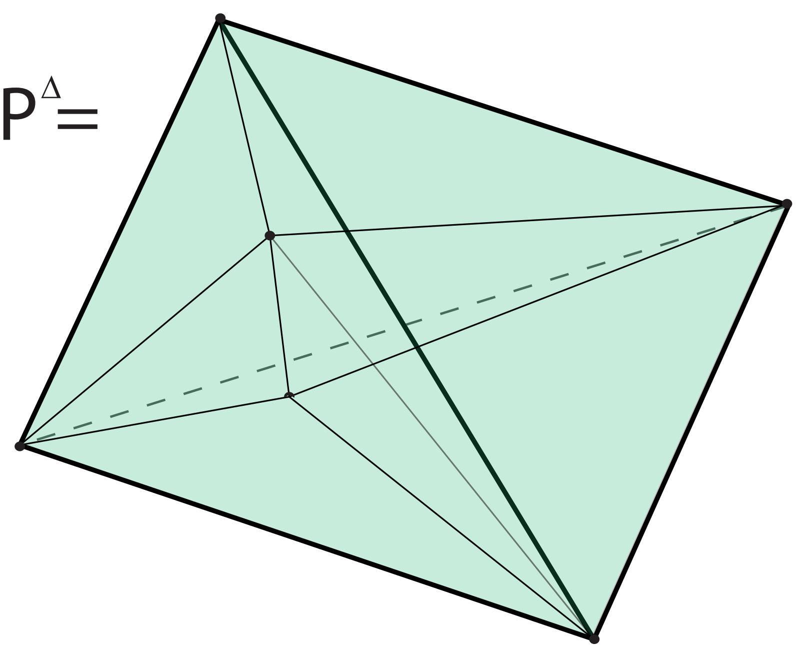




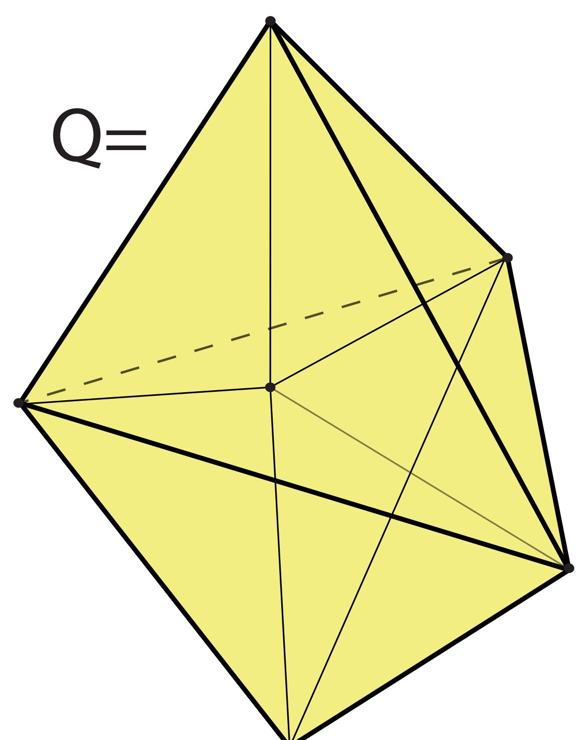
4. $P = \Delta_3 \times \Delta_1$ has eight vertices and 6 facets. Thus P^Δ will have 6 vertices and 8 facets.

The circled vertex is adjacent to the four shown facets. In fact, every vertex is adjacent to 4 of the 6 facets. Therefore each facet of P^Δ will be a tetrahedron.

P^Δ=



Q=



These two pictures have the same 1-skeleton, but only the picture above has 8 tetrahedral facets. The picture to the right is a Schlegel diagram of a different polytope Q. In fact this is an example of two distinct polytopes with the same 1-skeleton.

4.) Prove that Q is a real polytope by finding Q as a construction using operations such as pyr, bipyr, X, polar, and operands that are simplices.