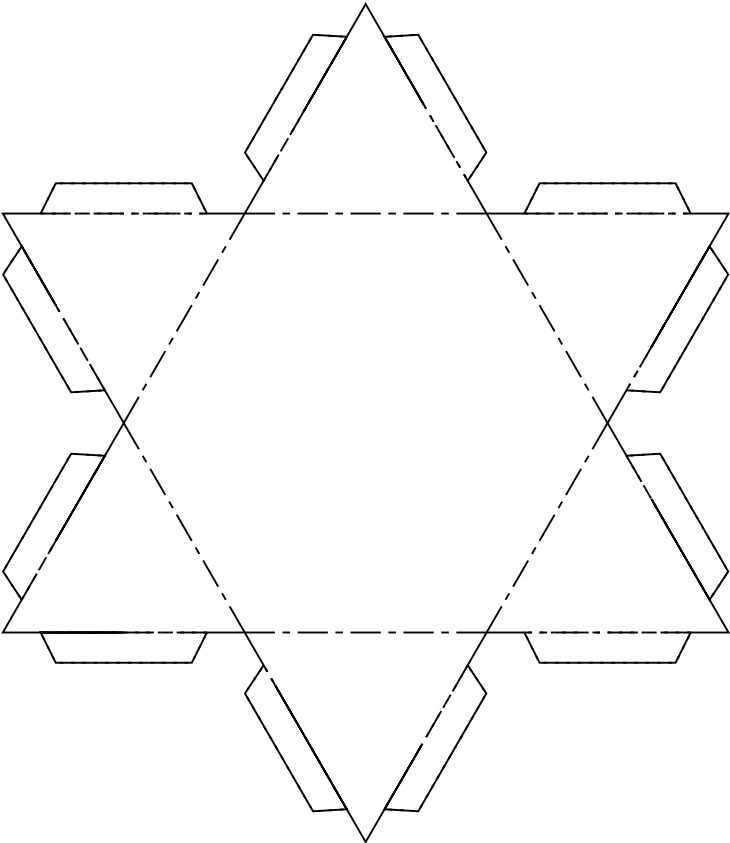


Equal-edge Hexagonal Antiprism

hexagonal-antiprism / 1.0.0 / Letter / Template page 1

L | cut 1
96.00 x 110.85 mm



Solid: cut | Dashed: valley | Dash-dot: mountain | Dotted: glue

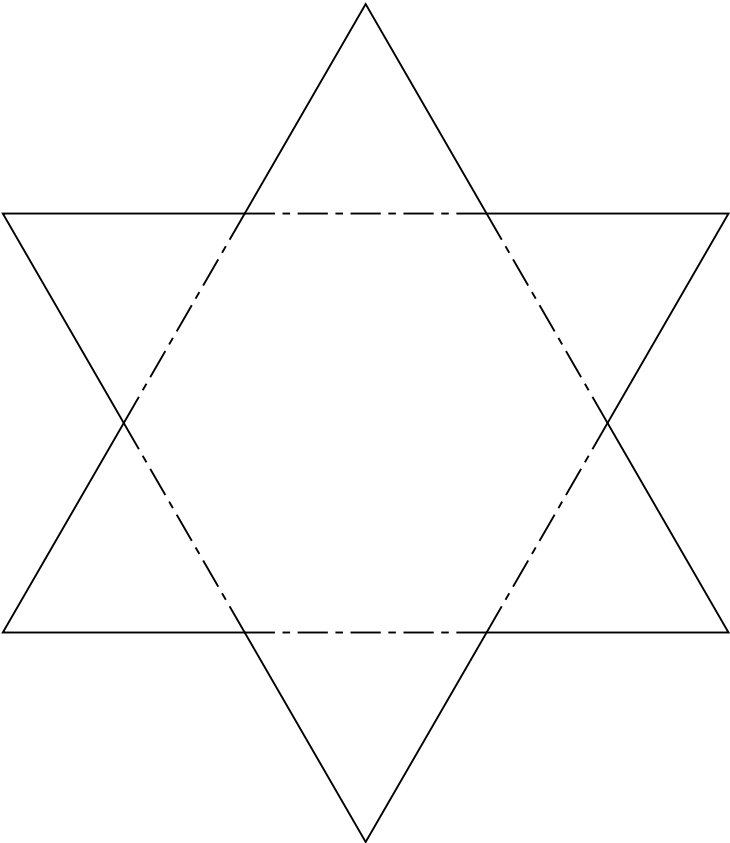
50 mm calibration

Print at 100% / Actual size. Do not fit to page. Original paper craft template.

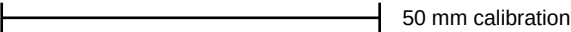
Equal-edge Hexagonal Antiprism

hexagonal-antiprism / 1.0.0 / Letter / Template page 2

U | cut 1
96.00 x 110.85 mm



Solid: cut | Dashed: valley | Dash-dot: mountain | Dotted: glue



Print at 100% / Actual size. Do not fit to page. Original paper craft template.

Equal-edge Hexagonal Antiprism

hexagonal-antiprism / 1.0.0 / Letter / Assembly instructions

Finished size: 64 x 64 x 27.379 mm

Materials: 160-180 gsm paper; Scissors or craft knife; Ruler and blunt scoring tool; PVA glue; Tweezers

Original exact rigid-face net: 2 physical cut pieces, 2 regular hexagons, 12 equilateral triangles, 12 integral tapered tabs. All 24 structural edges are 32 mm; 12 vertices.

Cap circumradius $R = 32$ mm. Cap rotation = 30 degrees. Height $h = \sqrt{s^2 - (2 R \sin(15 \text{ degrees}))^2} = 32 \sqrt{\sqrt{3}-1} = 27.379190$ mm.

Cap/triangle mountain turn from flat: 81.101 degrees; inside dihedral 98.899. Triangle/triangle tab turn: 34.778 degrees; inside dihedral 145.222. Printed sides face out on both crowns.

Each tab is 4 mm deep with 5 mm endpoint setbacks and another 2 mm taper at the outer corners. Tab faces are included in the flat and folded meshes and lie inside U.

Geometry indices B0..B5 and T0..T5 run counterclockwise from above. Lower face $i = B_i, B_{(i+1)}, T_i$; upper face $i = T_i, T_{(i+1)}, B_{(i+1)}$, modulo 6. Assembly labels L1..L6 and U1..U6 are one-based face labels, not extra cut pieces.

Paper and glue thickness and springback are idealized. Lap tabs are coplanar with their receivers in the zero-thickness preview. No curved surfaces, stretching or hidden joining pieces.

Generation only; screen review and physical printing, cutting, folding and final closure trials deferred. Physical validation pending.

Part inventory (cut each instance once):

L: Lower crown - 12 tabs

U: Upper crown - no tabs

1. Print and identify two crowns [L, U]: Print at 100% actual size and check the 50 mm ruler. Cut the two outer contours, keeping all 12 tabs on L. With the printed face toward you, mark L1 on the triangle attached to the lower-right hexagon edge, then L2-L6 clockwise around L. Mark on the reverse so the labels stay inside. U receives its labels during dry fitting.

2. Score and form both hexagonal crowns [L, U]: Score all six hexagon edges on each piece and the twelve short tab hinges on L. Printed side outside: mountain-fold each cap edge 81.10 degrees from flat (inside dihedral 98.90 degrees). Keep each hexagon flat and each triangle rigid. L is the bottom crown with triangles rising; invert U so its triangles descend from the top.

3. Pre-fold the seam tabs [L]: Mountain-fold every L tab 34.78 degrees from its triangle plane, giving side-face interior dihedral 145.22 degrees. The complete 4 mm tab depth will sit under U. Keep the 5 mm corner setbacks clear of glue.

4. Register the 30-degree cap rotation [L, U]: Dry-fit U over L, top hexagon rotated 30 degrees from bottom. Each top corner meets an L triangle tip; each bottom corner meets a U triangle tip. Label the U triangle between tips L1 and L2 as U1; continue U2-U6 cyclically. L1 joins U6 and U1, L2 joins U1 and U2, and so on; L6 joins U5 and U6. Match full 32 mm face edges edge-to-edge; only tabs overlap.

5. Anchor and close the first sector [L, U]: Glue the L1-to-U1 tab first and let the anchor set. Put a thin film on the printed face of the tab and press against the unprinted inside of U1. Glue L2-to-U1 next. Leave the other sectors open for tweezer access; keep both caps flat.

6. Work around four more sectors [L, U]: Close each U triangle in this order: L2-to-U2 then L3-to-U2; L3-to-U3 then L4-to-U3; L4-to-U4 then L5-to-U4; L5-to-U5 then L6-to-U5. Press each seam from inside through the unclosed side, and let it grab before continuing. Leave both edges of U6 unglued. Allow these ten seams to set.

7. Close the last opening [L, U]: Dry-seat U6 over the remaining L6 and L1 tabs. Through the open seams, apply a little glue to both tabs. Seat L6-to-U6 first, supporting it with tweezers through the still-open L1-to-U6 seam. Withdraw the tweezers and seat that final seam, pressing externally until tack holds. Do not force the caps to align: they remain rotated 30 degrees. Dry on the bottom hexagon. Final closure and paper-thickness fit await a physical build.