Regular-edge Triangular Bipyramid

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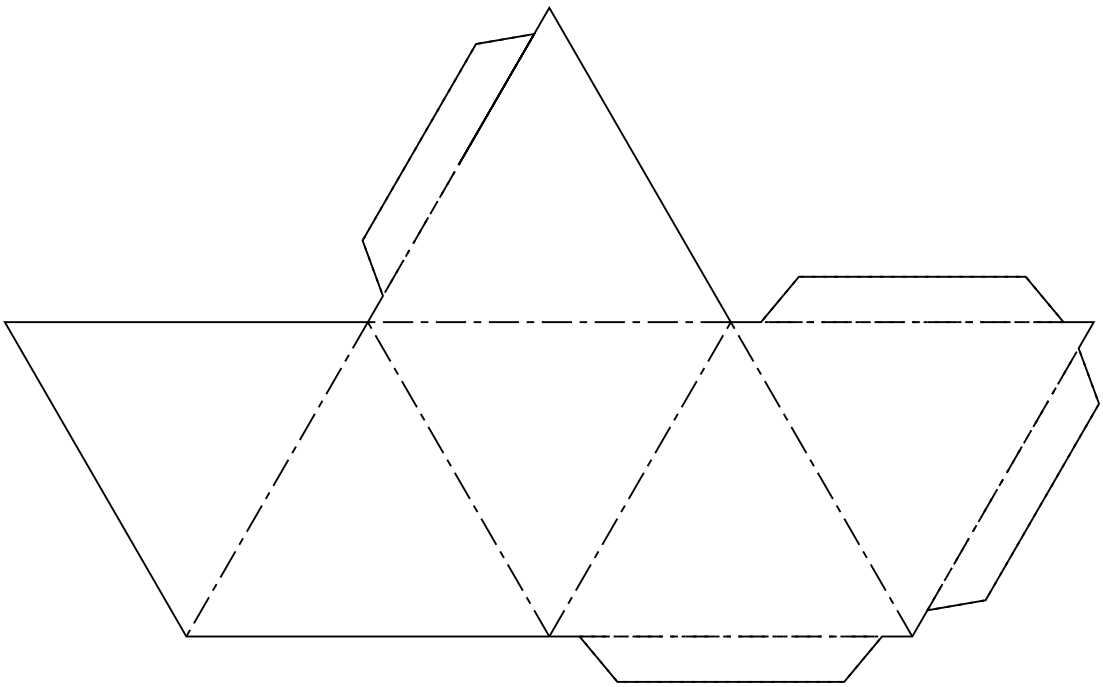
N1 | cut 1
144.70 x 89.14 mm



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.

Regular-edge Triangular Bipyramid

triangular-bipyramid / 1.0.0 / A4 / Assembly instructions

Finished size: 41.569 x 48 x 78.384 mm (X x Y x Z); all 9 edges 48 mm

Materials: 160-180 gsm paper; Scissors; Ruler and blunt scoring tool; PVA glue; Toothpick for applying glue

Original construction. Physical printing, cutting and assembly pending.

Six congruent equilateral faces: side 48 mm, altitude 24*sqrt(3) = 41.569219 mm. Equator circumradius 16*sqrt(3) mm; each cap height 16*sqrt(6) = 39.191836 mm. No internal equatorial paper face.

Print at 100%. Use the printed side as the exterior: every marked crease is a mountain fold. Cap side edges turn 109.471221 degrees from flat (interior dihedral 70.528779 degrees). Equator folds turn 38.942441 degrees (interior dihedral 141.057559 degrees). Tabs follow the side-edge fold angle.

The exact rigid-face mesh includes all four tabs, each 6 mm deep with 4 mm end relief. Glue overlaps are coplanar at ideal zero thickness; paper thickness and glue clearance are not simulated.

Face and seam names below are a positional key to pencil onto the blank faces before folding; they are not separate cut pieces. The preview shows final geometry, not intermediate folding motion.

Part inventory (cut each instance once):

N1: Six equilateral faces + four integral tabs

1. Cut and name the faces [N1]: Cut N1 once around the solid outline, retaining all four dotted tabs. Do not cut folds. Orient the printed net with its straight split-apex baseline at the bottom and its three outer triangle tips pointing upward. The midpoint of the baseline is U, its right end A, left end A2. The two upper fan corners are B on the right and C on the left. Pencil T1=UAB (right), T2=UBC (middle), T3=UCA2 (left). The outer faces on AB, BC, CA2 are L1, L2, L3; their free tips D1, D2, D3 all become D. A2 becomes A.

2. Score and pre-fold [N1]: Score the five full face hinges UB, UC, AB, BC, CA2 and the four short tab roots. Mountain-fold with the printed side outside. Pre-fold UB and UC by about 109.47 degrees, and each equator edge AB, BC, CA2 by about 38.94 degrees. Turn the tabs inward by about 109.47 degrees. Dry-fit before glue; never flatten the equator creases into a sharp fold.

3. Close upper cap: S1 [N1]: Bring UA and UA2 together so A meets A2 and the three U corners coincide. The only tab on the bottom baseline is S1 on T1 edge UA. Apply a thin film to its printed face and glue it under T3 edge UA2, using the full 6 mm depth. Hold from inside through the open lower cap until set. Keep L1, L2 and L3 open.

4. Join lower faces L1 and L2: S2 [N1]: Swing L1 and L2 below the equator, with D1 and D2 meeting at the lower apex. S2 is the L1 tab on D1B, nearest the central outer triangle. Glue its printed face under L2 edge D2B, matching B and D exactly. Pinch through the still-open L3 side; let this seam set before moving on.

5. Dry-fit the closing face L3 [N1]: Swing L3 down on CA2 without glue. Its CD3 edge receives S3, the tab on L2 edge CD2; its A2D3 edge receives S4, the outer tab on L1 edge AD1. Both tabs must sit inside L3. Match D3 to the joined D1/D2 and A2 to A. Open L3 again to apply glue; do not force the tips or add cuts.

6. Close S3 and S4 together [N1]: Apply a small amount of PVA to the printed faces of S3 and S4. Swing L3 over both tabs, first guiding CD3 onto S3, then A2D3 onto S4 before either seam sets. Align all three D tips. Press gently along both 6 mm overlaps from outside; use the unglued 4 mm tip reliefs to guide alignment with a toothpick if needed. Hold until tacky and allow the whole shell to dry supported on a broad face. Physical fit and closure handling remain to be tried with real paper.