Regular/irregular polygon

Mana Maths

Te reo Māori terms

taparau rite
regular polygon
Open in Te Aka

taparau
polygon
Open in Te Aka

koki roto
interior angle
Open in Te Aka

āhua
shape
Open in Te Aka

Regular/irregular polygon — Foundation

1. State whether each polygon is regular or irregular: a pentagon with all sides equal and all angles equal.

2. State whether each polygon is regular or irregular: a hexagon with equal sides but one angle different from the others.

3. State whether each polygon is regular or irregular: a quadrilateral with angles $90°$, $90°$, $90°$, and $90°$ but side lengths 3 cm and 5 cm.

4. Complete the sentence: in a regular polygon, all sides are the same length and all interior angles are equal.

5. Find the sum of the interior angles of a triangle.

6. Find the interior-angle sum of a quadrilateral.

7. Find the sum of the interior angles of a pentagon using $180(n-2)$.

8. Find the sum of the interior angles of a hexagon using $180(n-2)$.

9. Find the sum of the interior angles of an octagon using $180(n-2)$.

10. A regular pentagon has five equal interior angles. Find one interior angle.

11. A regular hexagon has six equal interior angles. Find one interior angle.

12. A regular octagon has eight equal interior angles. Find one interior angle.

13. An irregular pentagon has interior angles $100°$, $120°$, $110°$, $140°$, and $x°$. Find x.

14. An irregular hexagon has interior angles $120°$, $140°$, $130°$, $150°$, $110°$, and $x°$. Find x.

Regular/irregular polygon — Proficient

1. A polygon has all sides equal and all interior angles equal. Explain why it must be regular.

2. A polygon has six equal sides but its interior angles are not all equal. Is it regular or irregular? Explain briefly.

3. Find the sum of the interior angles of a heptagon.

4. Find the sum of the interior angles of a nonagon.

5. The sum of the interior angles of a polygon is 1260°. How many sides does the polygon have?

6. The sum of the interior angles of a polygon is 1440°. How many sides does the polygon have?

7. Find one interior angle of a regular decagon.

8. Find one interior angle of a regular nonagon.

9. An irregular pentagon has angles 95°, 115°, 130°, 140°, and x°. Find x.

10. An irregular hexagon has angles x°, 125°, 135°, 145°, 155°, and 160°. Find x.

11. A regular polygon has each interior angle equal to 135°. Name the polygon.

12. A regular polygon has each interior angle equal to 150°. How many sides does it have?

Regular/irregular polygon — Excellence

1. The sum of the interior angles of a polygon is $(180n - 360)^\circ$. Explain what the n represents.

2. A polygon has interior-angle sum 1620°. Find the number of sides.

3. A regular polygon has each interior angle 156°. Find the number of sides.

4. A regular polygon has each interior angle 165°. Find the number of sides.

5. An irregular hexagon has five interior angles of 118°, 132°, 147°, 151°, and 160°. Find the sixth angle.

6. An irregular octagon has seven interior angles of 120°, 140°, 150°, 135°, 160°, 145°, and 155°. Find the eighth angle.

7. The interior angles of a regular polygon add to 1980°. Find the polygon and one interior angle.

8. A regular polygon has interior angles of 140° each. Is this possible? Explain using the interior-angle formula.

9. An irregular pentagon has angles in the ratio $2:3:3:4:6$. Find the five angles.

10. An irregular hexagon has angles in the ratio $3 : 4 : 5 : 5 : 6 : 7$. Find the six angles.

11. A regular polygon has one interior angle of x°. Write a formula for the sum of all interior angles in terms of x and the number of sides n.

12. A student says, “If all the angles in a polygon are equal, the polygon must be regular.” Give a counterexample or explain why the claim is incomplete.

13. A regular polygon has twice as many sides as a regular pentagon. Find its interior-angle sum and one interior angle.

14. A polygon has 10 sides. Four interior angles are 140°, three are 150°, two are 160°, and one angle is x°. Find x.

15. A regular polygon has one interior angle that is 24° more than the interior angle of a regular hexagon. Find the polygon.