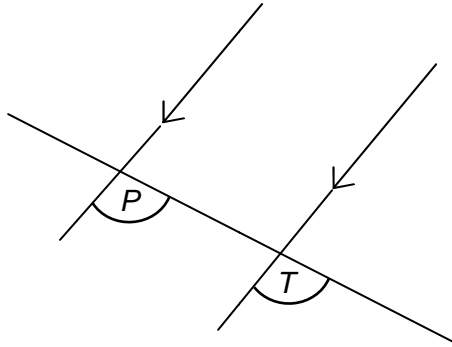


Foundation Check In – 8.03 Angles

1. Calculate the exterior angle of a regular 20-sided polygon.
- 2.



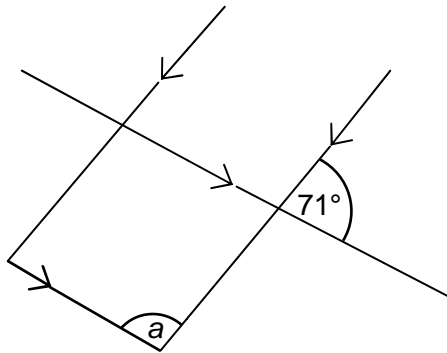
Not to scale

Circle the correct word to complete the statement below.

Alternate Corresponding Parallel Intersecting Opposite

Angles P and T are _____ angles.

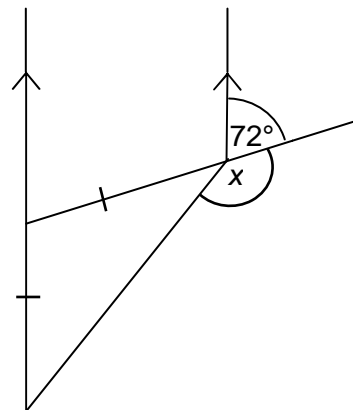
3. Calculate the size of angle a .



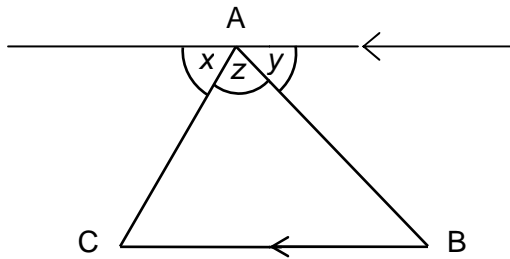
Not to scale

4. Work out the size of an interior angle of a regular 12-sided polygon.
5. Calculate the size of angle x .

Not to scale

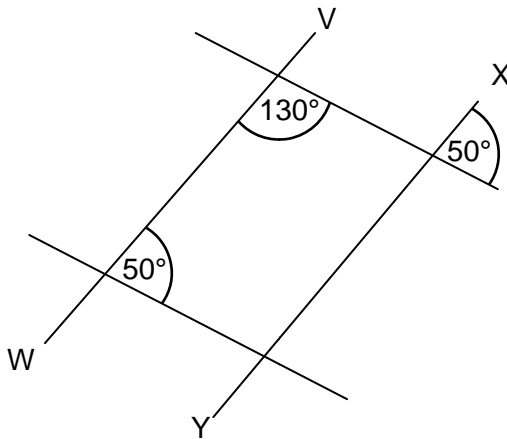


6. Prove that the angles in triangle ABC sum to 180° .



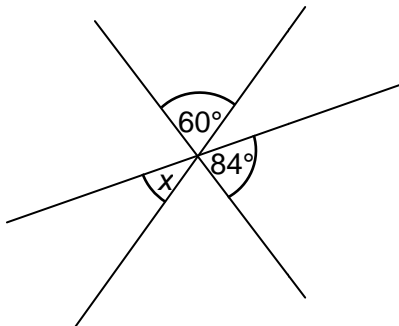
Not to scale

7. Jane says, "The lines VW and XY are parallel". Is she right? Explain how you decide.



Not to scale

8. Explain why angle x is 36° .

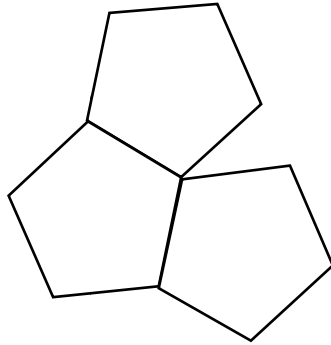


Not to scale

9. A computer programme is being used to draw regular polygons. The initial instruction for the first shape is "forward 3 cm then right 20° ". How many times does this instruction have to be repeated to complete the polygon and what is the sum of its interior angles?

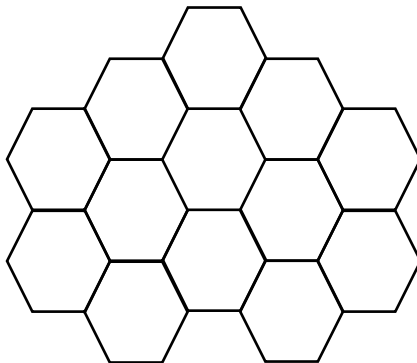


10. Terri has started making a tessellation using regular polygons. Work out what other shape will need to be used in the tessellation and state the size of its angles.



Extension

- a) How many regular polygons have interior angles which are a whole number of degrees?
- b) This is a tessellation of regular hexagons. Investigate which regular polygons tessellate, and which do not, giving reasons.



Answers

- 18°
- Corresponding
- 109°
- 150°
- 144°
- Angle C = x° (alternate angles)
Angle B = y° (alternate angles)
So the angles in triangle ABC sum to $x + y + z = 180^\circ$ (angles on a straight line)
- Yes, with any correct argument. Angles may be marked on diagram but there must be some explanation given.
- Angle opposite x is 36° (angles on a straight line). Angle x is 36° (opposite angles).
- 18 times and 2880°
- Rhombus, opposite angles 36° and 144°

Extension

- a) There are 22: 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 40, 45, 60, 72, 90, 120, 180, 360.

For integer interior angles to exist, the number of sides must be a factor of 360 (so that the exterior angles are integer). Factors can be found by listing factor pairs or by prime factorisation. Ignore 1 and 2 since a polygon has 3 or more sides.

- b) Equilateral triangles (60°), squares (90°) and hexagons (120°) tessellate, all others don't. The interior angle must be a factor of 360° to fit together. So, for example, pentagons (108°) and octagons (135°) do not tessellate as neither 108 nor 135 are factors of 360.

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| Assessment Objective | Qu. | Topic | R | A | G |
|----------------------|-----|---|---|---|---|
| AO1 | 1 | Know and use the sum of the exterior angles of a polygon is 360° | | | |
| AO1 | 2 | Know that corresponding angles on parallel lines are equal | | | |
| AO1 | 3 | Apply angle properties to find angles in a rectilinear figure | | | |
| AO1 | 4 | Find the interior angle of a regular polygon | | | |
| AO1 | 5 | Apply angle properties to find angles in a rectilinear figure | | | |
| AO2 | 6 | Justify results in a simple proof using angle properties | | | |
| AO2 | 7 | Apply angle properties for intersecting and parallel lines | | | |
| AO2 | 8 | Apply angle properties about a point | | | |
| AO3 | 9 | Solve a polygon problem using angle properties | | | |
| AO3 | 10 | Solve a polygon problem using angle properties | | | |

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