# Higher Check In – 8.03 Angles

1. A regular polygon has an interior angle of 156°. How many sides does the polygon have?
2. Find angle *x*.

*x*

44°

119°

1. Find angle *y*.

101°

*y*

332°

1. Find angle *z*.

51°

*z*

115°

1. The interior angles of a polygon sum to 1620°. How many sides does the polygon have?
2. Point P is inside an *n*-sided polygon ABCD….

B

C

D

A

P

Use the diagram to show that the sum of the interior angles of a polygon can be given by this formula:

Sum of the interior angles 

1. Prove that AB is parallel to CD.

C

A

P

Q







R

S

B

D

1. Prove that angle JLK .

K

*x*

E

J

L

1. Find angle *x*.

6*a*

*a*





*x*



(6*a* – 1)

1. The size of an exterior angle of a regular polygon is 5*x*° and the number of sides of this polygon is 8*x*. Find the size of the interior angle.

**Extension**

A spiral pattern is made using right-angled isosceles triangles as shown in the diagram below. The lengths of the sides of the first triangle are 1, 1, .



How many triangles are needed to complete a full rotation, and what are the sizes of each triangle in the pattern?

## Answers

1. 15 sides
2. 
3. 
4. 
5. 11 sides
6. *n* triangles each with sum of interior angles 180° 

Sum of angles at point P 

Therefore sum of interior angles is 

1.  (interior angles add to 180°) which gives .

Angle PAB  and angle ACD .

AB is parallel to CD because corresponding angles are equal oe.

1. Angle JKE  (base angles of an isosceles triangle are equal).

Angle JEK  (angle sum of a triangle is 180°).

Angle LEK  (angles on a straight line).

Angle JLK  LEK  (base angles of an isosceles triangle are equal).

1. 
2. 165°

**Extension**

Since the angles are 45° there will be  triangles to complete the spiral.

| **Triangle** | **Side Lengths** |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |   |
| 8 |   |

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Use the sum of the exterior angles of a polygon is 360° |  |  |  |  | AO1 | 1 | Use the sum of the exterior angles of a polygon is 360° |  |  |  |
| AO1 | 2 | Apply angle properties to find angles in a rectilinear figure |  |  |  |  | AO1 | 2 | Apply angle properties to find angles in a rectilinear figure |  |  |  |
| AO1 | 3 | Apply angle properties about parallel lines |  |  |  |  | AO1 | 3 | Apply angle properties about parallel lines |  |  |  |
| AO1 | 4 | Apply angle properties to find angles in a rectilinear figure |  |  |  |  | AO1 | 4 | Apply angle properties to find angles in a rectilinear figure |  |  |  |
| AO1 | 5 | Use the sum of the interior angles of a polygon, 180(*n* – 2) |  |  |  |  | AO1 | 5 | Use the sum of the interior angles of a polygon, 180(*n* – 2) |  |  |  |
| AO2 | 6 | Use angle properties to justify the sum of the interior angles of a polygon |  |  |  |  | AO2 | 6 | Use angle properties to justify the sum of the interior angles of a polygon |  |  |  |
| AO2 | 7 | Apply angle properties in a more formal proof of geometrical results |  |  |  |  | AO2 | 7 | Apply angle properties in a more formal proof of geometrical results |  |  |  |
| AO2 | 8 | Apply angle properties in a more formal proof of geometrical results |  |  |  |  | AO2 | 8 | Apply angle properties in a more formal proof of geometrical results |  |  |  |
| AO3 | 9 | Use angle properties to solve a triangle problem |  |  |  |  | AO3 | 9 | Use angle properties to solve a triangle problem |  |  |  |
| AO3 | 10 | Use angle properties to solve a polygon problem |  |  |  |  | AO3 | 10 | Use angle properties to solve a polygon problem |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| AO2 | 6 | Use angle properties to justify the sum of the interior angles of a polygon |  |  |  |  | AO2 | 6 | Use angle properties to justify the sum of the interior angles of a polygon |  |  |  |
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