

Warm Up

- 1) What's the largest size the smallest interior angle of a triangle can be?
Draw a triangle where the smallest interior angle is that size.
- 2) What's the smallest size the smallest interior angle can be?
Can we draw a triangle with an angle that small?
- 3) If x is the size of the smallest interior angle of a triangle, how can we use our answers to (1) and (2) to create an inequality for x ?
(Be careful when choosing between $<$ and \leq .)
- 4) How about if the triangle must have a right angle?
How does that affect your answers to questions (1)-(3)?

The Task

Using a similar thought process, complete the table below, writing an inequality in each box.

| | A triangle | A right-angled triangle | An acute triangle (all angles $< 90^\circ$) | A quadrilateral |
|-------------------------------------------------------|------------|-------------------------|-------------------------------------------------|-----------------|
| The smallest interior angle | | | | |
| The largest interior angle | | | | |
| The median of the interior angles | | | | |
| The mean of the interior angles | | | | |
| The range of the interior angles | | | | |
| The (unique) mode of the interior angle, if it exists | | | | |

- 5) Now complete the same table for exterior angles instead of interior angles.
Can you use your original table to help you?
- 6) What do you notice about the range of the interior angles and range of the exterior angles in any triangle?

Warm Up

- 1) What's the largest size the smallest interior angle of a triangle can be? 60°
Draw a triangle where the smallest interior angle is that size. **An equilateral triangle**
- 2) What's the smallest size the smallest interior angle can be? 0°
Can we draw a triangle with an angle that small?
No, the smallest angle can be as close to 0° as we like, but never equal to 0° .
- 3) If x is the size of the smallest interior angle of a triangle, how can we use our answers to (1) and (2) to create an inequality for x ? $0^\circ < x \leq 60^\circ$
(Be careful when choosing between $<$ and \leq .)
- 4) How about if the triangle must have a right angle?
How does that affect your answers to questions (1)-(3)?
 $0^\circ < x < 45^\circ$, as the other two angles together must sum to 90° .

The Task

Using a similar thought process, complete the table below, writing an inequality in each box.

| | A triangle | A right-angled triangle | An acute triangle (all angles $< 90^\circ$) | A quadrilateral |
|-------------------------------------------------------|-------------------------------|------------------------------|-------------------------------------------------|-------------------------------|
| The smallest interior angle | $0^\circ < x \leq 60^\circ$ | $0^\circ < x \leq 45^\circ$ | $0^\circ < x \leq 60^\circ$ | $0^\circ < x \leq 90^\circ$ |
| The largest interior angle | $60^\circ \leq x < 180^\circ$ | $x = 90^\circ$ | $60^\circ \leq x < 90^\circ$ | $90^\circ \leq x < 360^\circ$ |
| The median of the interior angles | $0^\circ < x < 90^\circ$ | $45^\circ \leq x < 90^\circ$ | $45^\circ < x < 90^\circ$ | $0^\circ < x < 120^\circ$ |
| The mean of the interior angles | $x = 60^\circ$ | $x = 60^\circ$ | $x = 60^\circ$ | $x = 90^\circ$ |
| The range of the interior angles | $0^\circ \leq x < 180^\circ$ | $45^\circ \leq x < 90^\circ$ | $0^\circ \leq x < 90^\circ$ | $0^\circ \leq x < 360^\circ$ |
| The (unique) mode of the interior angle, if it exists | $0^\circ < x < 90^\circ$ | $x = 45^\circ$ | $45^\circ < x < 90^\circ$ | $0^\circ < x < 180^\circ$ |

- 5) Now complete the same table for exterior angles instead of interior angles.
Can you use your original table to help you?
- 6) What do you notice about the range of the interior angles and range of the exterior angles in any triangle?