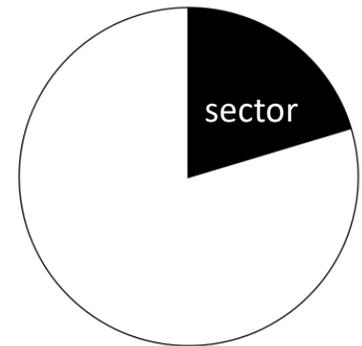


# 1. Angle Measures

There are **360** degrees in a full circle. Use this information to find the measures of each angle sector.



Color	Number of Pieces	Angle measure
Blue	<b>1</b>	<b>360°</b>
Brown	<b>2</b>	<b>180°</b>
Black	<b>3</b>	<b>120°</b>
Yellow	<b>4</b>	<b>90°</b>
Green	<b>5</b>	<b>72°</b>
Orange	<b>6</b>	<b>60°</b>
Red	<b>8</b>	<b>45°</b>
Purple	<b>10</b>	<b>36°</b>
Pink	<b>12</b>	<b>30°</b>

Now use this information to answer the questions on the back.

Write your answers to each question using the angle measures instead of the colors. Don't forget to label your measurements using the degree symbol.

1. Yellow + Orange =  $90^\circ + 60^\circ = 150^\circ$
2. Purple + Green =  $36^\circ + 72^\circ = 108^\circ$
3. Make  $75^\circ$  with two pieces.  $30^\circ + 45^\circ = 75^\circ$
4. Make  $90^\circ$  using two different colors.  $30^\circ + 60^\circ = 90^\circ$
5. Make  $81^\circ$ .  $36^\circ + 45^\circ = 81^\circ$
6. Make  $138^\circ$ .  $30 + 36^\circ + 36^\circ + 36^\circ$
7. Show two ways of making  $135^\circ$ .

$$45^\circ + 90^\circ \quad 45^\circ + 45^\circ + 45^\circ \quad 30^\circ + 45^\circ + 60^\circ \quad 30^\circ + 30^\circ + 30^\circ + 45^\circ$$

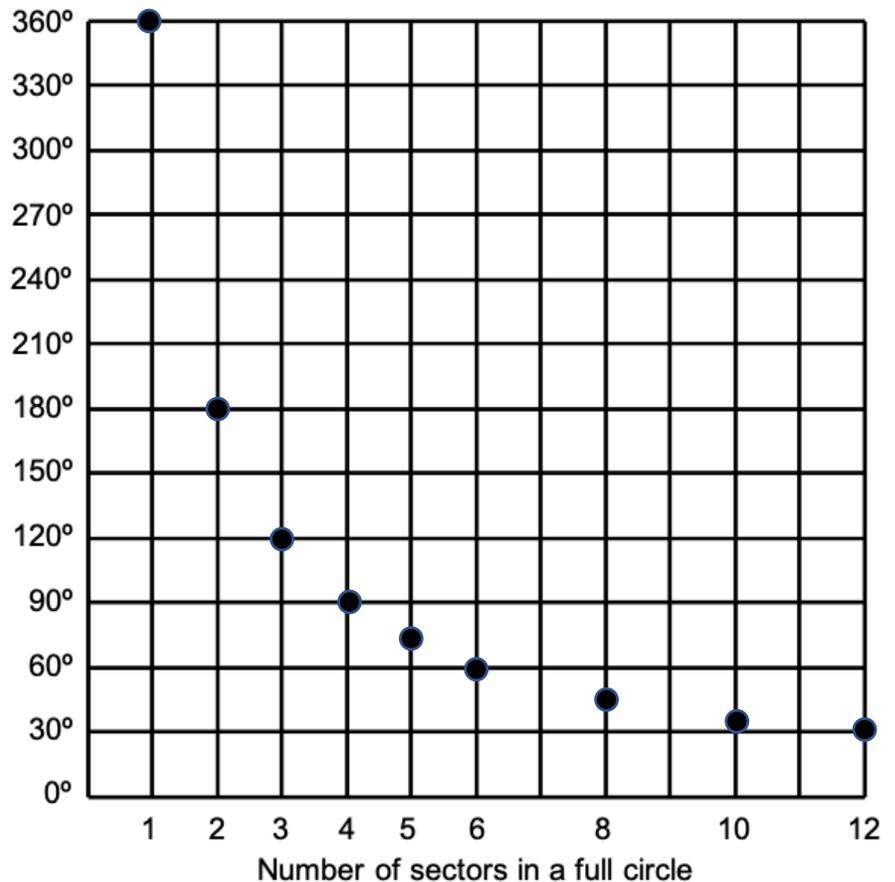
8. Set a yellow sector on top of black sector, how many degrees of the black are showing?

$$\text{Black} - \text{Yellow} = 120^\circ - 90^\circ = 30^\circ$$

9. Make a circle using the most colors. Record your answer here.

$$30^\circ + 30^\circ + 36^\circ + 45^\circ + 60^\circ + 72^\circ + 90^\circ \text{ (Six colors, seven pieces)}$$

10. Graph the degrees of each sector.



## 2 Interior Angles

Use your Fraction Circle sectors to measure the angles of each polygon and find the interior angle sum.

Polygon	Angle						Sum
	A	B	C	D	E	F	
Triangle 1	45°	90°	45°				180°
Triangle 2	60°	60°	60°				180°
Triangle 3	60°	45°	75°				180°
Triangle 4	30°	45°	105°				180°
Quadrilateral 1	90°	90°	90°	90°			360°
Quadrilateral 2	60°	120°	60°	120°			360°
Quadrilateral 3	60°	120°	90°	90°			360°
Quadrilateral 4	30°	45°	240°	45°			360°
Pentagon 1	108°	108°	108°	108°	108°		540°
Pentagon 2	135°	90°	135°	90°	90°		540°
Hexagon 1	120°	120°	120°	120°	120°	120°	720°
Hexagon 2	135°	135°	75°	60°	270°	45°	720°
Heptagon (7 sides)							900°

What patterns did you notice?

Each time that a new side is added, the interior angle sum increases by 180°.

Can you find a formula for the interior angle sum of a polygon where  $n$  is the number of sides?

$$S = 180(n - 2) \quad \text{or} \quad S = 180n - 360$$

Icosagon (20 sides)                      3,240°