

## Straight Edge Pizza Parlor Problem

You are the new employees hired to work at Straight Edge Pizza Parlor. It is a unique pizza parlor in that

- 1) It only sells pizzas in the shape of **regular polygons**. That is,  
They are equilateral & equiangular
- 2) The price of each pizza is based on the measure of its interior angles



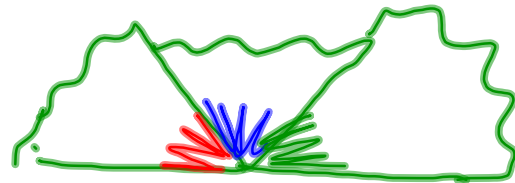
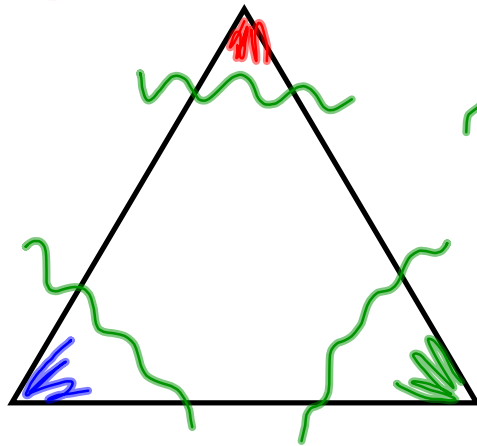
You have just gone through a rigorous training, but before you can start making pizzas and rolling in the dough... you must work together to complete a few tasks.



Task 1) Given that your pizzas are made up of triangular slices, your boss must have confidence in your math ability. Given the tools provided (paper, pens, scissors, protractor), create a triangle pizza slice and confirm the sum of the angles.

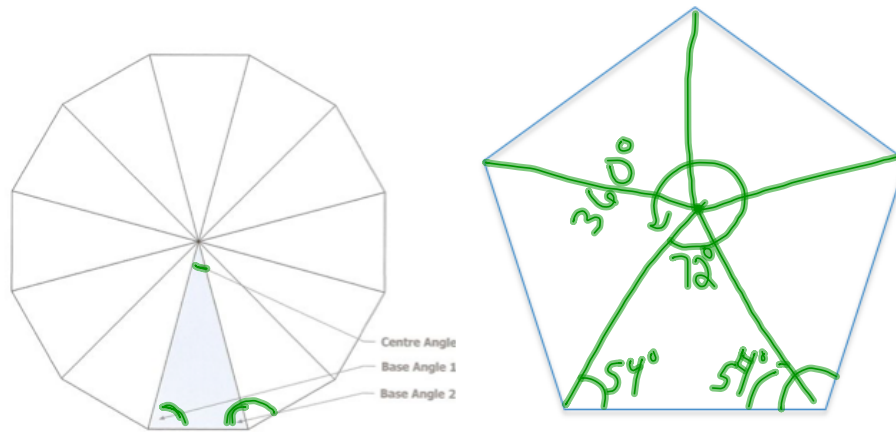
Sum of angles in pizza slice (triangle): 180°

Since most pizzas parlors don't keep protractors lying around, how might you do this without a protractor?



cut off  $\sphericalangle$ s  
and rearrange  
into a  
straight line

2) Task 2: Your boss wants to sell each pizza based on the measure of the interior angles. He charges \$0.05 per degree. Together, let's figure out how much would a 5-sided pizza would cost.



1) draw in slices

2) Goal = calculate interior angles

Can we calculate any any other angles?

(Center or Base angles?)

3) Center Angle =  $\frac{360}{5} = 72^\circ$

4) Base Angle =  $\frac{180 - 72}{2} = \frac{108}{2} = 54^\circ$

5) Interior Angle =  $2(\text{Base Angles}) = 2(54) = 108^\circ$

$$\frac{(5)108 - 360}{(5)1} = \frac{(5)(180) - 360}{5} = 1$$

6) Price per slice =

$$108(0.05) =$$

$$\$5.40$$

for a 5-sided pizza

$$180 - \frac{360}{6} = \frac{180(6) - 360}{6}$$

Task 3: Using the technique in task 2, fill in the following price sheet for your boss



Price Sheet



$$\frac{180(6-2)}{6}$$

# of Slices/Sides	Measure of Interior Angle (°)	Cost of Pizza (\$)
4	90°	\$4.50
5	108°	\$5.40
6	120°	\$6.00
7	128.58°	\$6.43
20	$\frac{180-360}{20} = 162^\circ$ $\frac{180(20)-360}{20} = 162^\circ$	\$8.10
n	$\frac{180-\frac{360}{n}}{n} = \frac{180(n-2)}{n}$	$0.05 \left( \frac{180(n-2)}{n} \right)$

$$\frac{180-\frac{360}{n}}{n} = \frac{180(n-2)}{n}$$

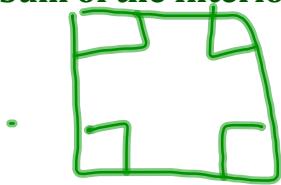
$$\frac{9(n-2)}{n}$$

$n=5$    $\frac{180(n-2)}{n}$  Food for Thought:

1) If your boss wanted to change his pricing system to be based on the sum of the interior angles, what would the new formula be for the sum of the interior angles of the n-sided pizza??

~~$n \cdot \left[ \frac{180(n-2)}{n} \right] =$~~

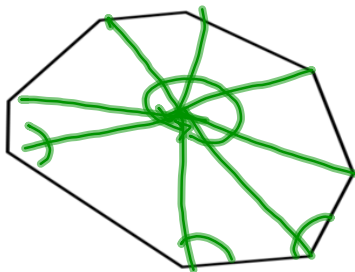
So the **Sum of the Interior angles of an n-sided POLYGON** is:  $\frac{180(n-2)}{n}$



$= 180(3-2) = 180^\circ$

$180(4-2) = 180(2) = 360^\circ$

2) If he decided to use a cost based on the sum of interior angles, would it matter if the pizza was a not a regular polygon? Why or why not?



360  
No - It wouldn't matter  
you still have n slices w/  
n sides ÷ n angles

Congratulations! You have completed all your tasks, and you are now ready to begin your j making pizzas!