Take out the Student Activity Sheet (SAS) from yesterday.

SAS pg 1

1. Some Key Characteristics of Linear, Exponential, and Quadratic Functions:

Linear	Exponential	Quadratic
Graph is a Line	Graph is a curve that inc OR decreases throughout.	Graph is a Parabola
Largest Exponent = 1	Exponent is X	Largest Exponent = 2
Eq for Linear Family: $y = mx + b$ Eq of Parent Linear Function: $y = x$	Eq for Exponential Family: $y = a(b)^x$ Eq of Parent Exponential Function: $y = 2^x$	Eq for Quadratic Family: $y = ax^2 + bx + c$ Eq of Parent Quadratic Function: $y = x^2$

Answer Questions 2 and 3 on Page 1 of SAS1

2. What rule describes the family of exponential functions?

$$y = a(b)^x$$

3. What is the quadratic parent function:

$$y = x^2$$

Function: Below are some ways to think of what a function is:

- **A function is a special relationship where each input produces a single output**.
- In a function, one quantity depends on another in a consistent, and therefore predictable, way
- Give examples of two quantities that can be related to each other in a consistent, predictable way.

Animation on pg 1 of the Agile Mind website for Topic 1. (basketball shot)

1. How can a function help you understand the basketball shot?

The graph of each function has its own shape. The graph of a Quadratic Function is a parabola which appears to be the shape the path of the basketball takes on its way to the basket. Therefore, a Quadratic Function can model the location and path of a basketball shot.

2. How can a function be used to make predictions?

When you substitute values for the independent variable a function "predicts" what is going to happen (what the output is).

3. How can a function by used to answer questions?

In the case of the basketball, if the function predicts the height as a function of how far away the ball is from the shooter you can answer questions such as, "How high will the basketball be when it's 8 feet away from the shooter".

pg 2 Agile Mind website

Answer question #4 on Page 1 of SAS 1

4. Compare the rates of change of linear, quadratic, and exponential functions:

Rates of Change:

Linear	Exponential	Quadratic
• Pattern of constant addition • When x inc by a constant amount, y also inc by a constant amount	• Pattern of constant multiplication • When x inc by a constant amount the first difference in y is exponential.	• When x inc by a constant amount, the second difference in y is constant

Pg 3 panel 1 of annimation on Agile Mind website

SAS 1 pg 3

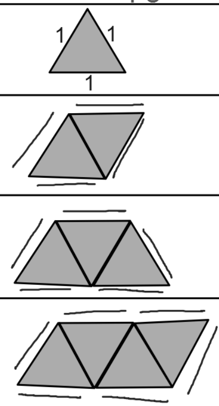


Figure	Perimeter
1	P = 3
2	P = 4
3	P = 5
4	P = 6

This table of Perimeters demonstrates what type of sequence?

Arithmetic

$d = 1$

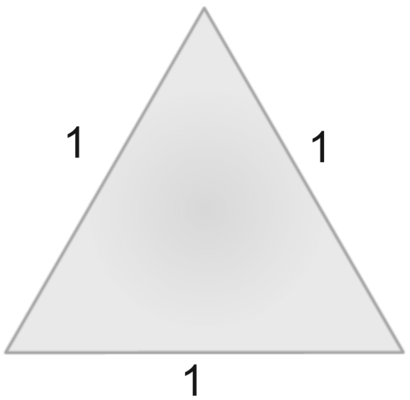
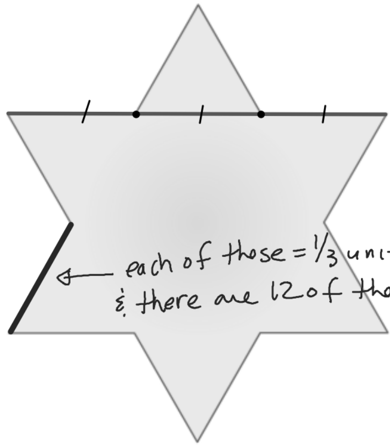


Figure number	Perimeter
1	**3 units**



each of those = 1/3 unit
& there are 12 of them

Each short segment represents 1/3 of a the original side:

$\boxed{\text{1/3 of a unit}}$

Figure number	Perimeter
1	**3 units**
2	$\boxed{12/3}$ **units** = 4

$$\text{perimeter} = (12 \text{ segments})\left(\tfrac{1}{3}\text{ unit each}\right) = \frac{12}{3}$$

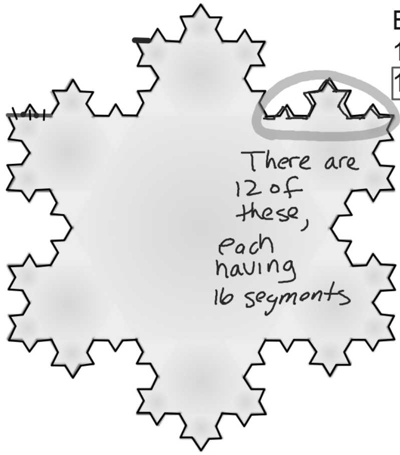
Each short segment represents
1/3 of 1/3 = 1/9 of a the original side:

Figure number	Perimeter	
1	**3 units**	
2	12/3 **units**	= 4
3	48/9 **units**	=16/3

segments = 6 × 8 = 48

each segment is 1/9 of a unit long

Perimeter = $48(1/9) = 48/9$



Each short segment represents
1/3 of 1/3 of 1/3 = 1/27 of a the original side:
1/27 of a unit

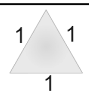
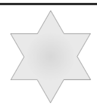
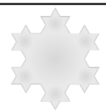
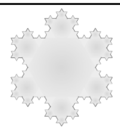
Figure number	Perimeter	
1	**3 units**	
2	12/3 **units**	= 4
3	48/9 **units**	= 16/3
4	192/27 **units**	= 64/9

# of short segments $= 16 \cdot 12 = 192$

each segment is 1/27 of a unit

Perimeter = $192(1/27)$

SAS 1 pg3

Figure		Perimeter
1		P = 3 $= \frac{3}{1}$
2		P = 12/3 $= \frac{3}{1} \cdot \frac{4}{3}$
3		P = 48/9 $= \frac{12}{3} \cdot \frac{4}{3}$
4		P = 192/27 $= \frac{48}{9} \cdot \frac{4}{3}$

This table of Perimeters demonstrates what type of sequence?

Geometric

$r = \frac{4}{3}$

What will be the perimeter of the fifth Figure?

$t_5 = t_4 \cdot r$

$= \frac{192}{27} \cdot \frac{4}{3}$

$t_5 = \frac{768}{81}$

pg 4 of Overview on Agile Mind website

Answer Questions 7 and 8 on SAS 1 pg 3

7. Which of the function families you studied in Algebra 1 grows like an arithmetic sequence? Why? pg 5 of overview

LINEAR FAMILY

8. Which of the function families you studied in Algebra 1 grows like a geometric sequence? Why? pg 6 of overview

Exponential Family

pg 7 of Overview on Agile Mind website

Hwk #3: Questions 9 and 10 on SAS 1

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