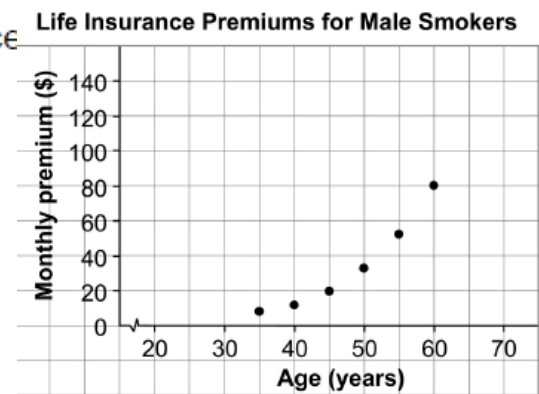


What we did last day:

Curve of best fit - non Linear Data

1. The money a person pays for a life insurance policy is called a premium. The premium depends on many factors, including how much insurance you want and your age. The monthly premiums one company charges for \$50 000 of life insurance for a male smoker are shown on the graph.



- a) Describe the trend in the data.
- a) The premiums are increasing, slowly at first, then faster.
- b) Draw a curve of best fit.
- c) Estimate the monthly premium this company would charge a 65-year-old male smoker.
- d) At about what age would a male smoker's monthly premium be \$40.

What we are doing today:

How to determine if data in a table is linear or non linear.

Problem 1

A. Jody works at a factory that produces square tiles for bathrooms and kitchens. She helps determine shipping costs by calculating the perimeter of each tile.

i) **Calculate** the perimeter and record your answers in the Perimeter column of the table.

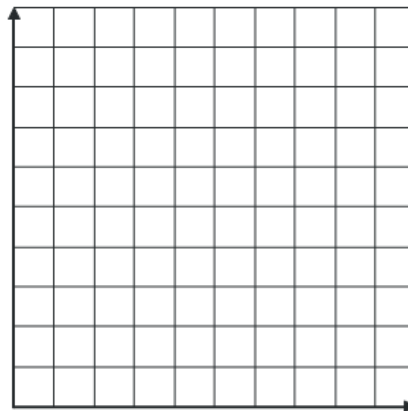
Recall: $P=4s$

Side Length (cm)	Perimeter (cm)	First Differences
1		
2		
3		
4		
5		

ii) **Describe** what happens to the Perimeter of each tile when the side length of a tile increases by one centimetre.

iii) **Construct** a graph of the perimeter vs. the length of the sides of the tiles. Include labels and titles.

- a) Which variable is the independent variable?
- b) Which variable is the dependent variable?
- c) Use the graph to describe the relationship between the perimeter and the side length of the tile.
- d) Describe the shape of the graph.



iv) **Calculate** the first differences in the First Differences column of the table. What do you notice about the first differences?

- v) **Summarize** your observations.
 - a) When the side length increases by one centimetre, the perimeter increases by _____.
 - b) The plotted points suggest a...
 - c) The first differences are...

B. Jody is paid \$8.50/hour to calculate perimeters.

i) **Calculate** her pay and record your answers in the Pay column of the table.

Number of Hours	Pay (\$)	
1		First Differences
2		
3		
4		
5		

ii) **Describe** what happens to her pay when the number of hours she works increases by one hour.

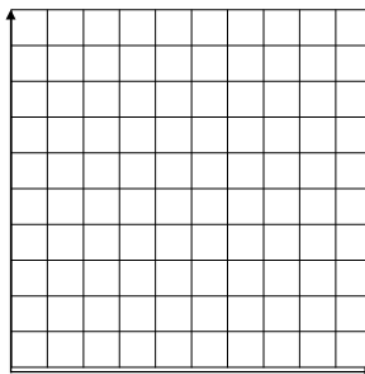
iii) **Construct** a graph of her pay vs. the number of hours she works. Include labels and titles.

a) Which variable is the independent variable?

b) Which variable is the dependent variable?

c) Use the graph to describe the relationship between her pay and the number of hours she works.

d) Describe the shape of the graph.



iv) **Calculate** the first differences in the First Differences column of the table. What do you notice about the first differences?

v) **Summarize** your observations.

a) When the number of hours worked increases by one, the pay increases by _____.

b) The plotted points suggest a...

c) The first differences are...

C. Raj, another employee at the factory, also works with the tiles. He helps to determine the shipping costs by calculating the area of each tile.

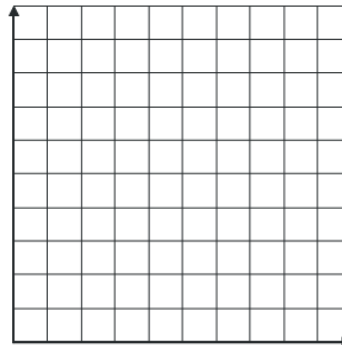
i) **Calculate** the area and record your answers in the Area column of the table.

Length of sides (cm)	Area (cm ²)	First Differences
1		
2		
3		
4		
5		

ii) **Describe** what happens to the area of each tile when the side length of a tile increases by one centimetre.

iii) **Construct** a graph of the area vs. the length of the sides of the tiles. Include labels and titles.

- Which variable is the independent variable?
- Which variable is the dependent variable?
- Use the graph to describe the relationship between the area and the side length of the tile.
- Describe the shape of the graph.



iv) **Calculate** the first differences in the First Differences column of the table. What do you notice about the first differences?

- Summarize** your observations.
- When the side length increases by one centimetre, the area increases by _____.
- The plotted points suggest a...
- The first differences are...

Deep Sea Divers

The table below shows data collected as divers descend below sea level. Calculate the first differences. Use the first differences to determine if the relationship is linear or non-linear. Check your solution by graphing. Include labels and titles. V)

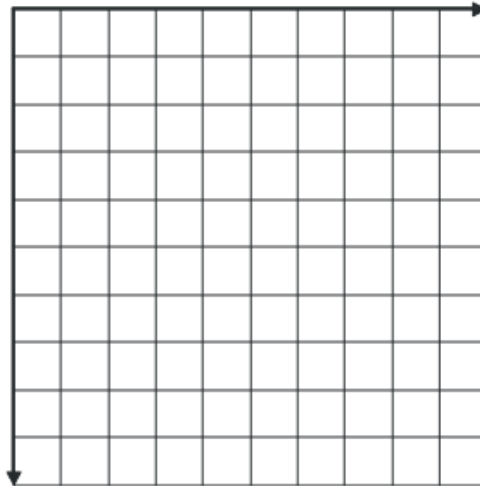
Summarize your observations.

a) When the side length increases by one centimetre, the area increases by _____.

b) The plotted points suggest a...

c) The first differences are...

Time (min)	Depth (m)	First Differences
0	-2	
1	-4	
2	-6	
3	-8	
4	-10	



The relationship is:

Hot Air Ballooning

The table shows data collected as a hot air balloon leaves the ground. Calculate the first differences. Use the first differences to determine if the relationship is linear or non-linear. Check your solution by graphing. Include labels and titles.

Time (sec)	Height (m)	First Differences
0	2	
1	4	
2	6	
3	8	
4	10	

The relationship is:

