



## CHAPTER 2

*Patterns, Relationships And Representations*

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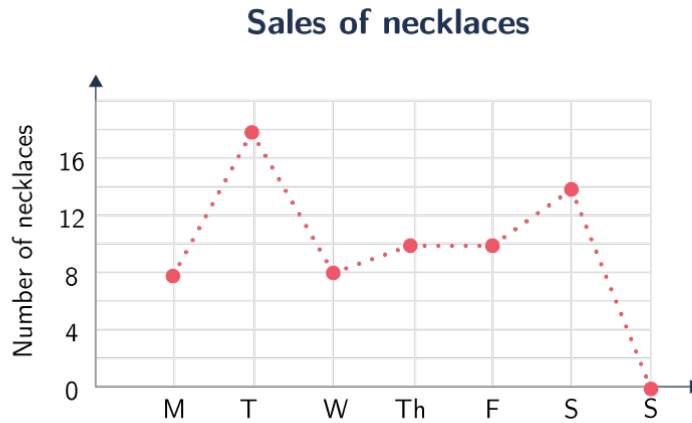
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August 26, 2021

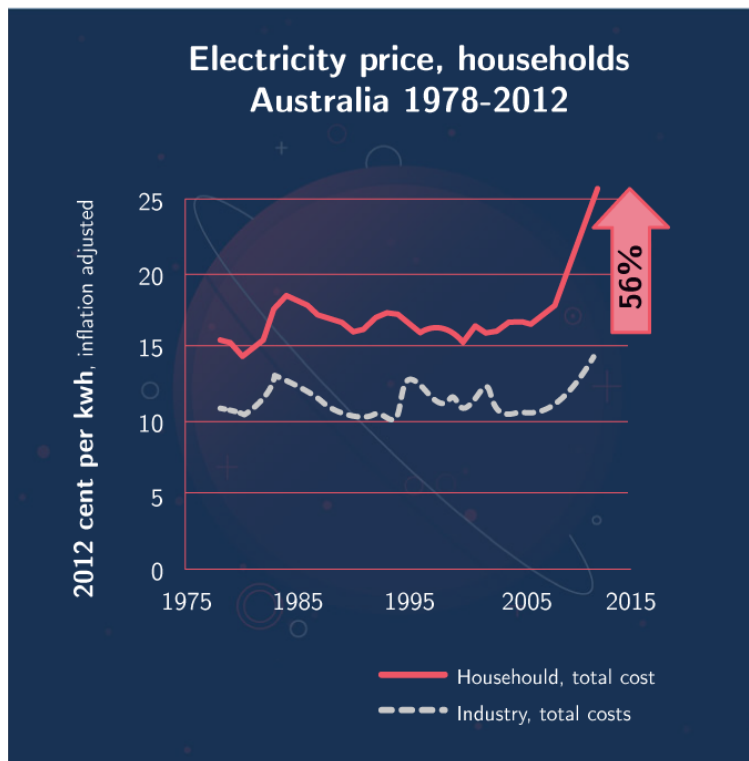
# 1 MAKING SENSE OF GRAPHS THAT TELL STORIES

## 1.1 Exercise 15: Different Graphs that tell stories

1. Write down the story that you can tell from this graph:

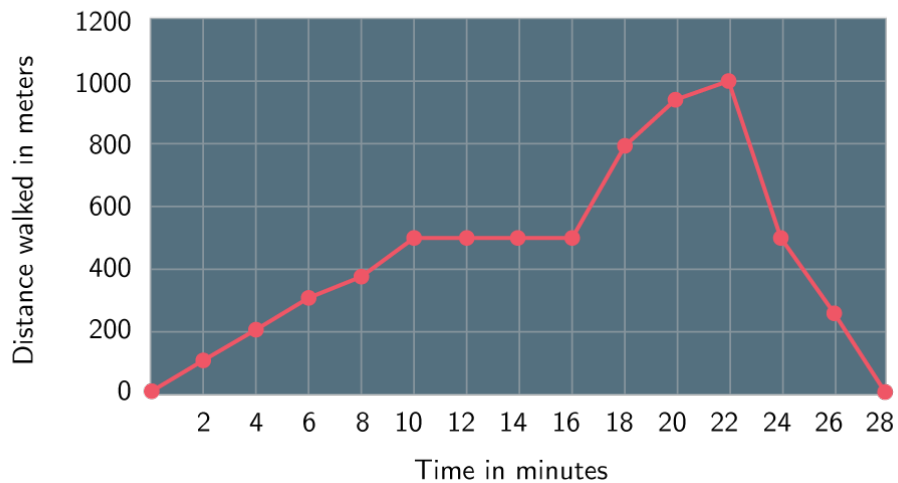


2. Write down the story that you can tell from this graph:



3. Chris went on a hike up the Drakensberg. The graph shows the distance he covered against time, during his journey up to the top of a mountain and back down the same way to where he started.

### Hiking trip



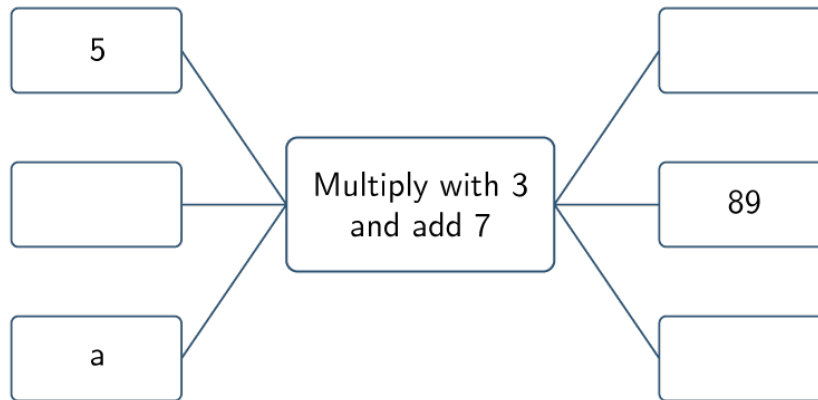
- 3.1 How long did it take Chris to walk the first 500 meters?
- 3.2 Where do you think Chris was 13 minutes after he started to climb the mountain?
- 3.3 What did Chris do from minutes 10 to minutes 16?
- 3.4 How long did it take Chris to descend the mountain? Do you think it is realistic?
- 3.5 What was the average speed in meters per minute to get down the mountain?
- 3.6 During which period of time did he descend the fastest?
4. The cable car travels 1200 m to the top of Table Mountain. A tourist travels up in the cable car. It takes 4 minutes to get to the top. The tourist then remains at a restaurant on top of the mountain for 30 minutes. The journey down takes 6 minutes.
- 4.1 Draw a distance versus time graph showing the tourist's journey.
- 4.2 What was the average speed of the cable car, in meters per second on the upward journey?

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## 2 PATTERNS AND RELATIONSHIPS

### 2.1 Exercise 16: Number Patterns

1. Complete the following:



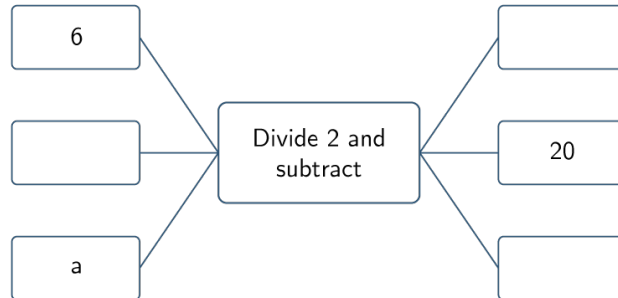
1.1 Underline the correct answer:

The input number is the (dependent /independent) variable and the output number is (dependent /independent) variable.

1.2 Complete the following table from this diagram:

The input number	5		a	45
The output number		89		

2. Complete the following:



2.1 Complete the following table from this diagram:

The input number	6		a	33
The output number		20		

## 3 REPRESENTING RELATIONSHIPS IN TABLES, EQUATIONS AND GRAPHS

### 3.1 Exercise 17: Graph of a Straight Line (Direct proportion)

1. A car travels 180 miles on 30 litres of petrol. Create a graph of a straight line (direct proportion) and answer the questions:

1.1 How far would you expect it to get on 20 litres of petrol? (Read this from your graph)

1.2 How far would you expect it to get on a full tank of petrol if the tank holds 55 litres? (Calculate this answer.)

1.3 Complete the table:

Petrol in litres	1	4	8	10
Distance in miles				

2. Convert kilometres to miles. Represent the table as a graph.

Complete the table:

Kilometres	1	10	15	20
Miles	1,6			

Use your graph and convert 120 miles to kilometres.

## 4 INDIRECT/ INVERSE PROPORTIONS

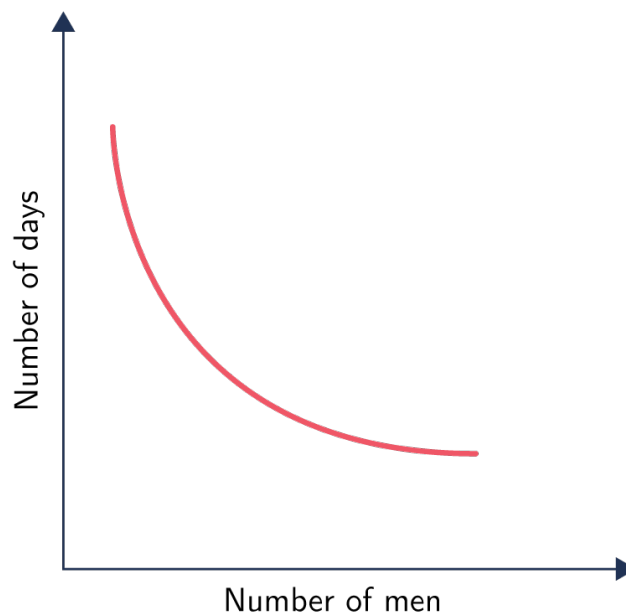
### 4.1 Exercise 18: Indirect/ Inverse Proportions

Jan's mother rather wants an in-ground trampoline for safety reasons. She hires a few men to do the labour. It takes 12 men 1 day to dig the hole.

1. Complete the table to determine the number of men and the corresponding number of days that it will take to dig the hole. (Inverse Proportion )

Number of men.	1	A	3	C	6	12
Number of days	12	6	B	3	D	1

2. Draw the graph of the table. The inverse proportion will have this shape:



3. What is the perimeter of the trampoline if the breadth is 1,5 m and the length is 3 m?  
**[Perimeter = 2L + 2B]**
4. What is the area of the trampoline? **[Area = L x B]**
5. What is the total area of the safety padding (50 cm wide ) that covers the springs?

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## 5 ANSWERS TO EXERCISES

### 5.1 Exercise 15

1. On Monday 8 necklaces were sold.  
On Tuesday 18 necklaces were sold.  
On Wednesday 8 necklaces were sold.  
On Thursday 10 necklaces were sold.  
On Friday 10 necklaces were sold.  
On Saturday 14 necklaces were sold.  
On Sunday 0 necklaces were sold.

Total number of necklaces sold for the week: 68

On Sunday the shop was closed.

2. The changes in the price of electricity that occurred during the period 1978 – 2012 are shown in the graph.  
The household prices of electricity fluctuated in a band between 15 cents per kWh and 20 cents per kWh during 1978 up till 2005.  
Since 2005, the price increased by 56%  
The difference between household and industry prices was approximately 5 cent / kWh during the period 1978 – 2010.  
Since 2010, this gap increased to more than 10 cents per kWh.

3.1 10 minutes

3.2 500 m

3.3 He took a break and rested for a moment.

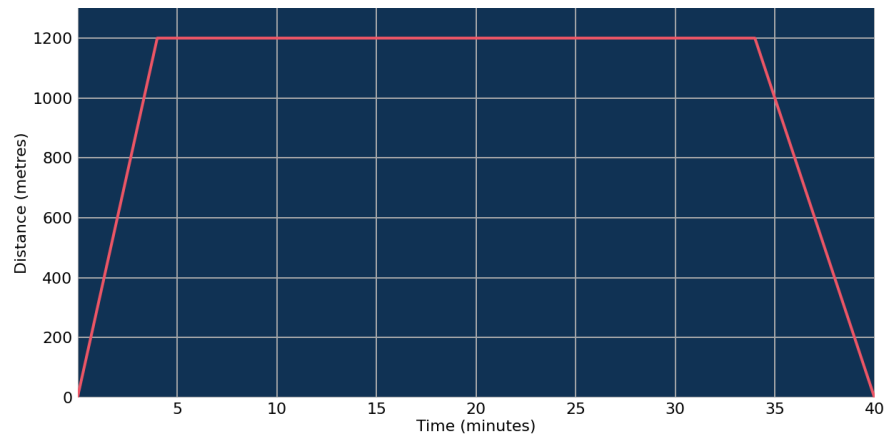
3.4 6 minutes + your opinion ...

3.5 166,67 meters/minute

3.6 Minutes 22 to 24



4.1



4.2 5 meters/second

## 5.2 Exercise 16

1.1 The input number is the **independent** variable and the output number is the **dependent** variable.

1.2

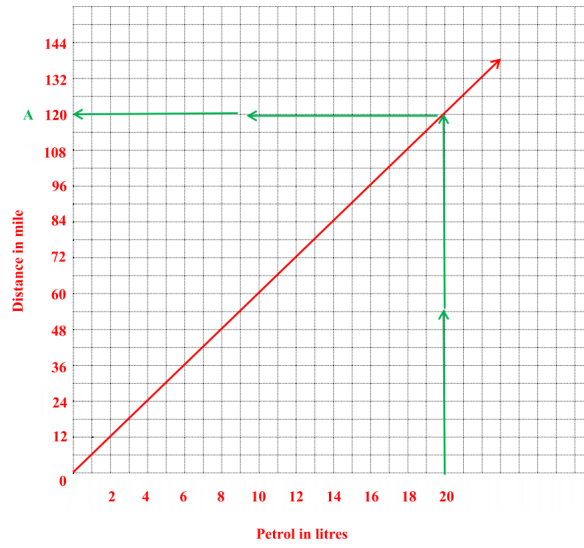
The input number	5	$27\frac{1}{3}$	a	45
The output number	22	89	$3 \times a + 7$	142

2.

The input number	6	48	a	33
The output number	-1	20	$a \div 2 - 4$	$12\frac{1}{2}$

## 5.3 Exercise 17

1.1 120



1.2 330

1.3

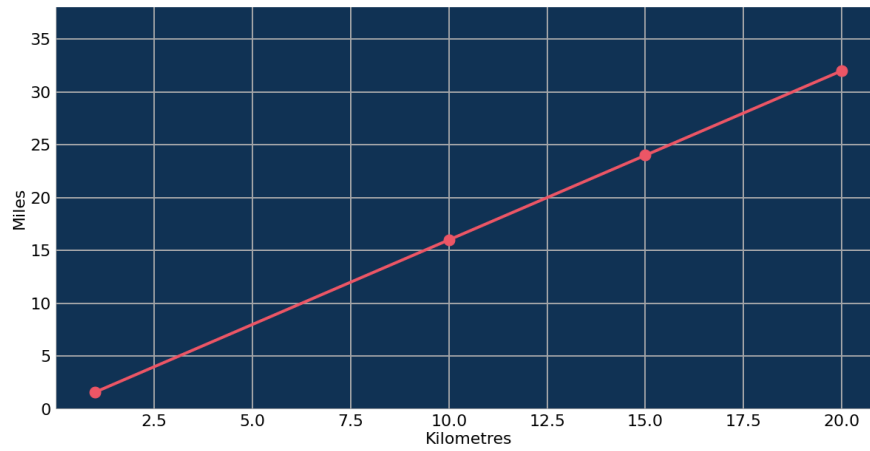
Petrol in litres	1	4	8	10
Distance in miles	6	24	48	60

2.1

Kilometres	1	10	15	20
Miles	1,6	16	24	32

2.2 75

2.3

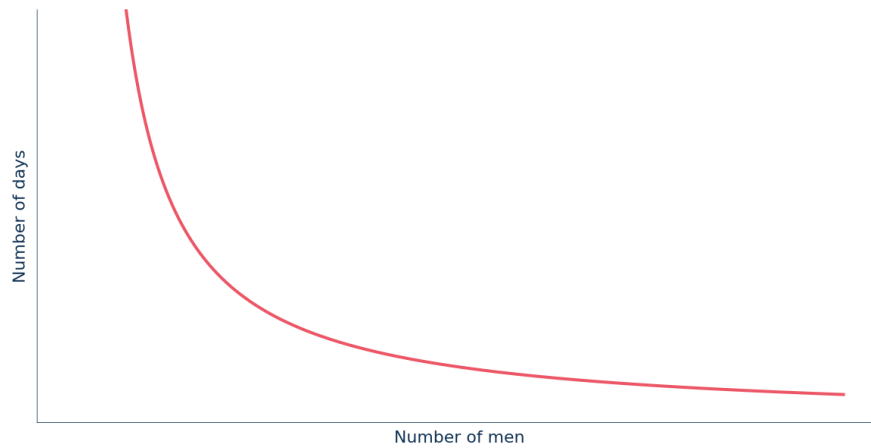


## 5.4 Exercise 18

1.

Number of men	1	2	3	4	6	12
Number of days	12	6	4	3	2	1

2.



3. 9 m

4. 4,5 m<sup>2</sup>

5. 10 m<sup>2</sup>