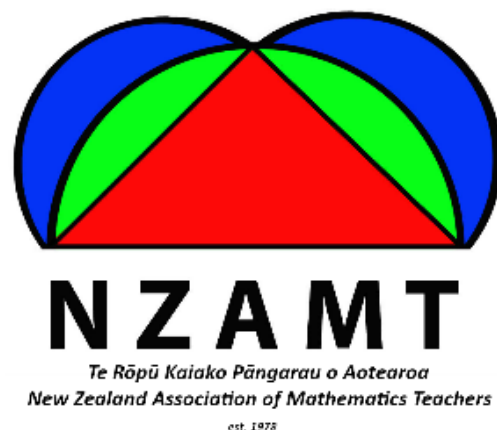


NZAMT



NUMERACY Questions

written by teachers at camp January 2022

Pages 2 and 3 show the process ideas and content ideas for each question based on the information we had at the time of writing. For details on these, see [here](#) and [here](#).

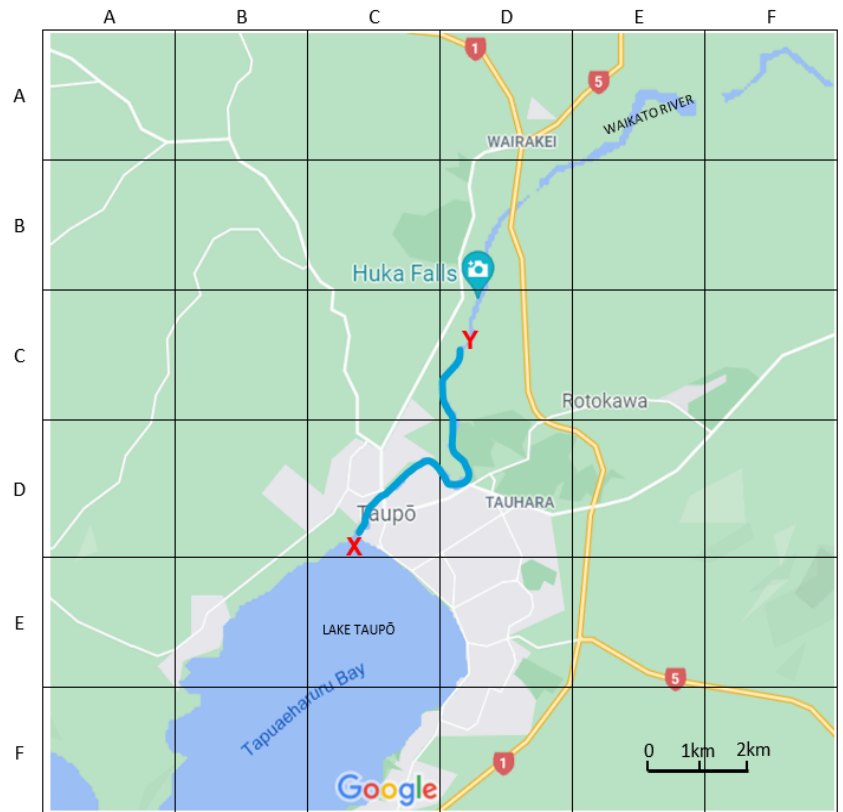
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QUESTION ONE – PLASTIC POLLUTION

- a) A plastic bottle is dumped in the Waikato River at Point X.

Give the grid reference of the location the bottle was dumped.

- b) Use the scale on the map to estimate how far the bottle travels from Point X to Point Y on the Waikato River.

 km


- c) A local community group cleans up at a spot further down the Waikato River. 138 plastic bottles were collected in one day.

A local newspaper claims, “1000 bottles dumped in the lake end up in the river each week”.

Is this a reasonable claim? Explain your answer using information from this question.

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QUESTION ONE-PLASTIC POLLUTION

- a) A plastic bottle is dumped in the Waikato River at Point X.
Give the grid reference of the location the bottle was dumped.



Evidence	Process	Content
(C,D)	B	4

- b) Use the scale on the map to estimate how far the bottle travels from Point X to Point Y on the Waikato River.

Evidence	Process	Content
6.2km (Accept 5.7km – 6.7km)	A	1 & 5

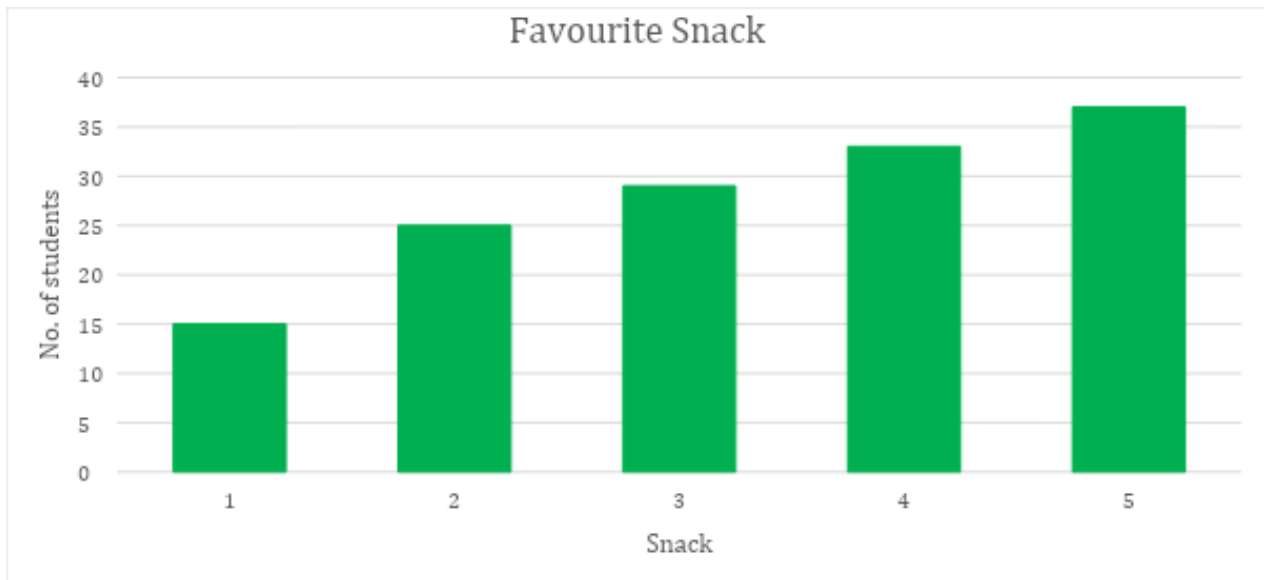
- c) A local community group cleans up at a spot further down the Waikato River. 138 plastic bottles were collected in one day.
A local newspaper claimed, “1000 bottles dumped in the lake end up in the river each week”.
Is this a reasonable claim? Explain your answer using information from this question.

Evidence	Process	Content
Yes – it is reasonable (answer is 966 bottles which is close to the 1000 bottle claim)	C	1

--	--	--

QUESTION TWO – YUM! SNACKS

Ms Jones surveyed her class to find what snacks they liked. Here is a graph of their responses:



- a) Sam said that lollies were the most popular snack. Is his statement correct? Explain your answer using information from the graph.

- b) What percentage of students chose Kit Kats as their favourite snack?

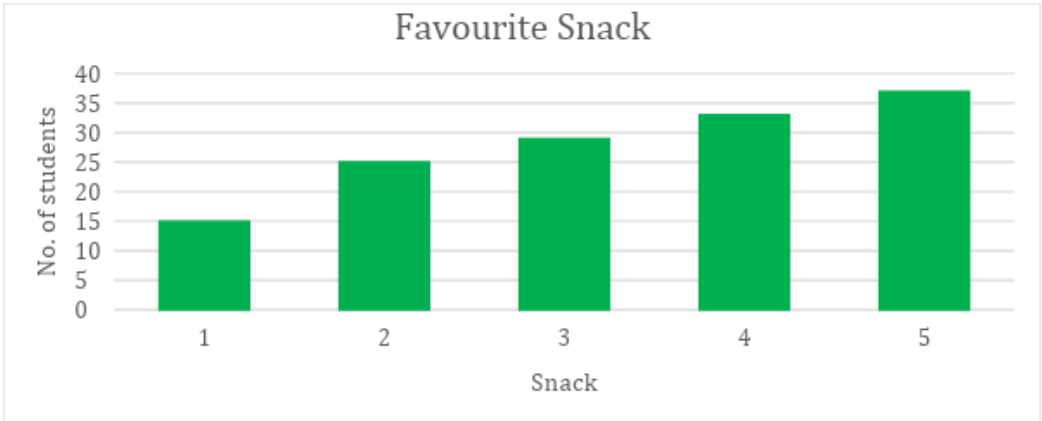
- A. 5%
- B. 8%
- C. 12%
- D. 20%

- c) Based on this graph, calculate the probability of choosing a student in Ms Jones' class whose favourite snack was M&Ms.

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QUESTION TWO- YUM! SNACKS

Ms Jones surveyed her class to find what snacks they liked. Here is a graph of their responses:



a)	Sam said that lollies were the most popular snack. Is his statement correct? Explain your answer using information from the graph.		
Evidence		Process	Content
No, his statement is not correct because the graph shows that the mode in the data set is popcorn. This means popcorn is the most popular favourite snack, not lollies.		C	6

b)	What percentage of students chose Kit Kats as their favourite snack? A. 5% B. 8% C. 12% D. 20%		
Evidence		Process	Content
B		A	1

c)	Based on this graph, calculate the probability of choosing a student in Ms Jones' class whose favourite snack was M&Ms.		
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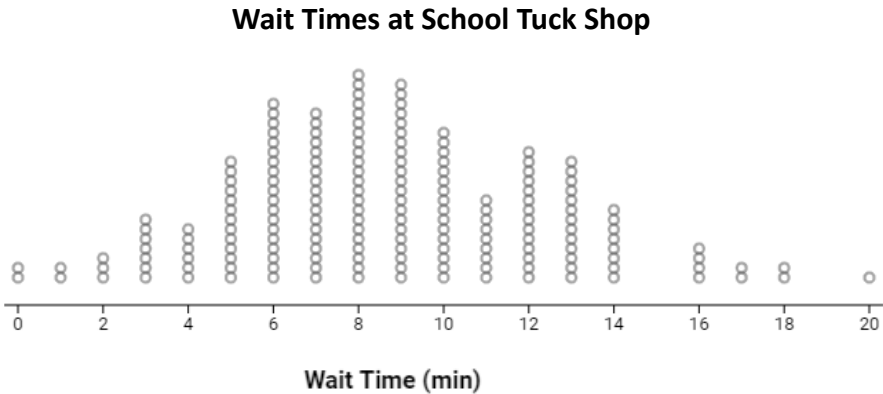
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Evidence	Process	Content
5/25 OR 1/5	A	1 & 7

QUESTION THREE – WAITING, WAITING

The school council at Dixon High School conducted a survey of how long students have to wait in line (wait time) at the school tuck shop. This table shows the wait time of 183 students:

Wait Time (min)	No. of Students
0 - 2	8
3 – 5	26
6 – 8	59
9 – 11	46
12 – 14	35
15 – 17	6
18 - 20	3



a) How many students waited for less than 9 minutes?

students

b) Identify where the median wait time lies:

- A. Between 0 minutes and 2 minutes
- B. Between 3 minutes and 5 minutes
- C. Between 6 minutes and 8 minutes
- D. Between 9 minutes and 11 minutes

c) A claim is made that 40% of the students must queue for more than 10 minutes.

Is this a reasonable statement? Justify your answer using the information in the table and graph.

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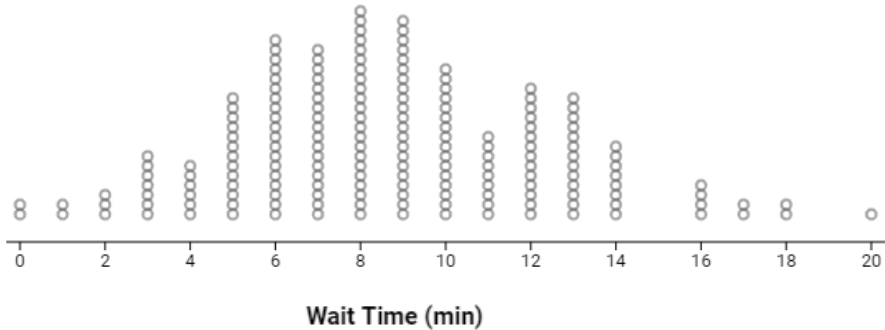
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Wait Time (min)	No. of Students
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9 - 11	46
12 - 14	35
15 - 17	6
18 - 20	3



- a)

How many students waited for less than 9 minutes?

Evidence	Process	Content
93	A	1 & 6
- b)

Identify where the median wait time lies:
A. Between 0 minutes and 2 minutes
B. Between 3 minutes and 5 minutes
C. Between 6 minutes and 8 minutes
D. Between 9 minutes and 11 minutes

Evidence	Process	Content
C	B	6
- c)

A claim is made that 40% of the students must queue for more than 10 minutes.

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Is this a reasonable statement? Justify your answer using the information in the table and graph.		
Evidence	Process	Content
No. 40% of 183 is 73.2. However, only 53 students waited for MORE than 10 minutes (using both table and dot plot to find this number). Accept other reasonable answers.	C	1 & 6

QUESTION FOUR – HUNGER BUSTER

Anita, Clare, and Sam decide to get lunch at Super Burger.



Super Burger Menu
Super Bacon Burger
\$9.70 (With all the super flavour and seasoning!)

They each order a Super Bacon Burger.

- a) Sam has the Super Burger App on his phone. The App gives him a 20% discount on his burger

Calculate the total price of their order with the discount:

- A. \$29.10
- B. \$ 27.16
- C. \$ 23.28
- D. \$ 21. 46

- b) There are 16 625 Super Burger stores worldwide. Each store sells one Super Bacon Burger a minute. Calculate how many Super Bacon Burgers are sold in the world in one hour.

- c) Bumper Burger sells a Bumper Bacon Burger for \$12.90.

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OPENING SPECIAL!

Bumper Bacon Burger

Now \$9.50

Which of these statements is correct?

- A. Their opening special is at least 25% off the regular price
- B. Their opening special is exactly 25% off the regular price
- C. Their opening special is no more than 25% off the regular price

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Super Burger Menu

Super Bacon Burger

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Calculate the total price of their order with the discount:

A. \$29.10 B. \$27.16 C. \$23.28 D. \$21.46

Evidence	Process	Content
B	B	1 & 6

b) There are 16 625 Super Burger stores worldwide. Each store sells one Super Bacon Burger a minute. Calculate how many Super Bacon Burgers are sold in the world in one hour.

Evidence	Process	Content
997 500 Super Bacon Burgers	B	1

c) Bumper Burger sells a Bumper Bacon Burger for \$12.90.



OPENING SPECIAL!
Bumper Bacon Burger
Now \$9.50

Which of these statements is correct?

A. Their opening special is at least 25% off the regular price

B. Their opening special is exactly 25% off the regular price

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C. Their opening special is no more than 25% off the regular price		
Evidence	Process	Content
A	A	1

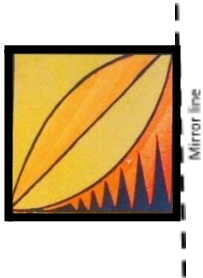
QUESTION FIVE – BLUE SEAS CATERING

Manaia is opening a catering business – called Blue Seas Catering - that specialises in Pasifika cuisine.

a) Manaia needs to create a logo for her new business. She likes these two images.



Blue image



Yellow image

To make her logo, she will rotate the blue image clockwise 270 degrees (about A) and reflect the yellow image (along the mirror line) and then combine them.

Which logo below is correct?

A.



B.



C.



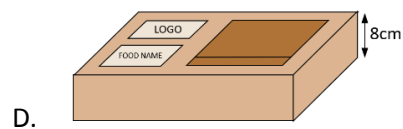
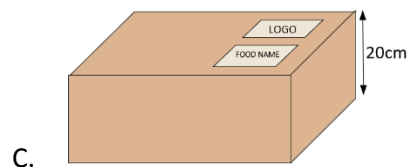
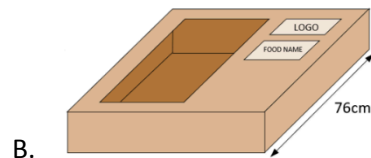
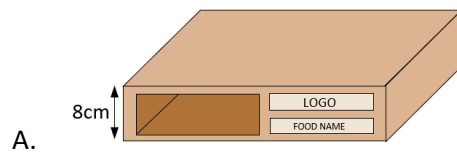
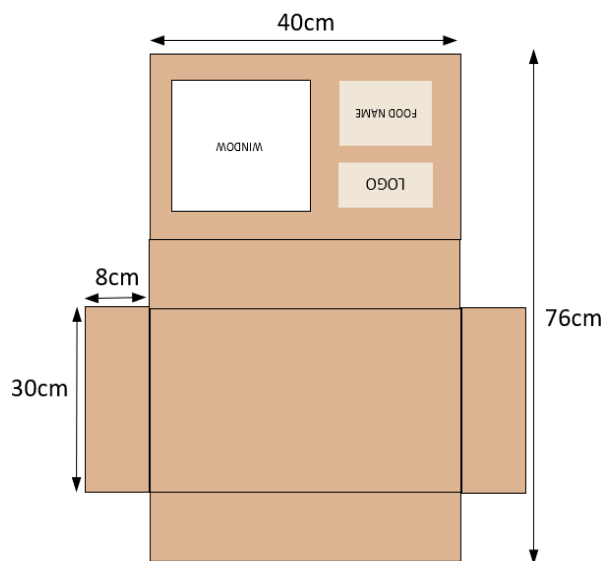
D.



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- b) Manaia wants to make re-useable containers to serve her food in. She is looking at using this box on the left.

What will the made-up box look like?



- c) Manaia has been talking to the manufacturer and they have rectangular sheets that are 1.15m x 0.8m.

Manaia is adamant that one sheet can be used to make two of her boxes.

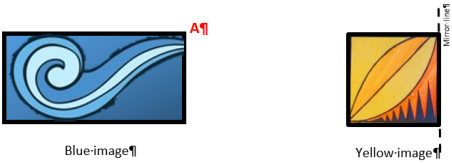
Is this a reasonable statement? Explain your answer using the information provided on box size.

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QUESTION FIVE – BLUE SEAS CATERING

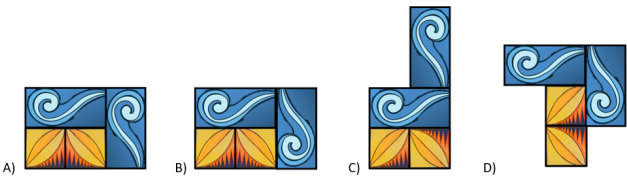
Manaia is opening a catering business – called Blue Seas Catering - that specialises in Pasifika cuisine.

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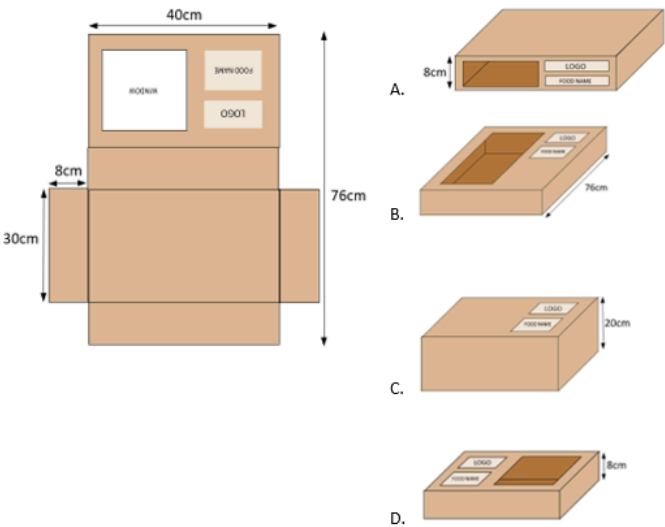
To make her logo, she will rotate the blue image clockwise 270 degrees (about A) and reflect the yellow image (along the mirror line) and then combine them.

Which logo below is correct?



Evidence	Process	Content
B	B	3

b) Manaia wants to make re-useable containers to serve her food in. She is looking at using this box on the left. What will the made-up box look like?



Evidence	Process	Content
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D	B	3
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c) Manaia has been talking to the manufacturer and they have rectangular plastic sheets that are 1.15m x 0.8m.

Manaia is adamant that one sheet can be used to make two of her boxes.

Is this a reasonable statement? Explain your answer using the information provided on box size.

Evidence	Process	Content
Yes. The area of one box is 3520cm^2, so two boxes are 7040cm^2. The area of the sheet is 0.92m^2 (converted is 9200cm^2). Students may have also considered that the box width (56cm) does indeed fit side by side on the sheet (112cm wide compared to 115cm sheet). Accept other correct reasons.	C	5

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QUESTION SIX – PROTECTING KŌKAKO

Te Urewera is home to the North Island kokako. Kōkako are an endangered New Zealand bird.



To help protect the kōkako, Kahukura places traps to catch and remove rats, stoats, and possums.

- a) After a week, Kahukura visits her traps, and records the contents in each trap:

Rat	8
Stoat	5
Possum	4
Empty	3

- Based on Kahukura’s data, what is the probability that a trap is empty?
- b) Select the graphs that are suitable for displaying Kahukura’s data.

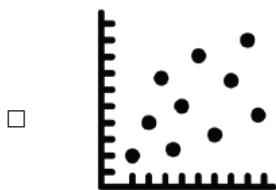
There is more than one correct answer.



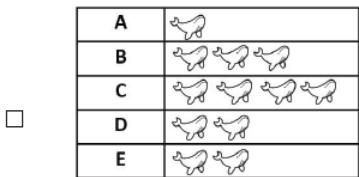
Line graph



Strip graph

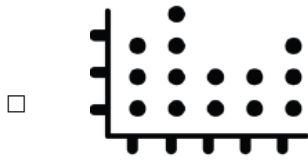


Scatter graph



Pictograph

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Dot plot

- c) Matiu claims that the next week Kahukura goes to check her traps, the probability that she catches a possum will be $\frac{1}{5}$.

Kahukura thinks that the number of possums caught in one week does not affect the number of possums she will catch next week.

Who is correct? Explain your answer using the information in this question.

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Stoat	5
Possum	4
Empty	3

Based on Kahukura's data, what is the probability that a trap is empty?

Evidence	Process	Content
$\frac{3}{20}$	B	7

- b) Select the graphs that are suitable for displaying Kahukura's data.

There is more than one correct answer.

- ☐ Line graph
- ☐ Scatter graph
- ☐ Dot plot
- ☐ Strip graph
- ☐ Pictograph

Evidence	Process	Content
Dot plot, Strip graph, Pictograph	A	6

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c) Matiu claims that the next week Kahukura goes to check her traps, the probability that she catches a possums will be $\frac{1}{5}$.

Kahukura thinks that the number of possums caught in one week does not affect the number of possums she will catch next week.

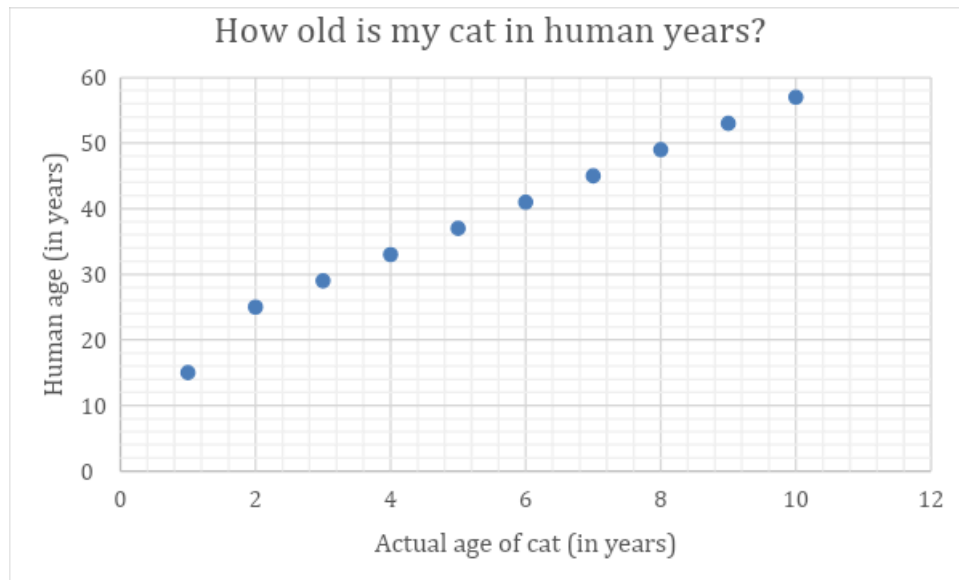
Who is correct? Explain your answer using the information in this question.

Evidence	Process	Content
Accept one of: Matiu is correct because this week, 4 out of the 20 traps had a possum in it this week. $\frac{4}{20} = \frac{1}{5}$, the fractions are equivalent. Kahukura is correct because what was trapped this week does not affect what is caught the following week (independent events)	C	7

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QUESTION SEVEN – DEBORAH’S CAT

While Deborah is at the vet with her cat, she notices a poster on the wall:



- a) Deborah’s cat is currently 6 years old. How would Deborah use the graph to estimate her cat’s human age is 40 years old?

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- b) If Deborah was looking for a cat that had a human age older than 24 years old but younger than 34 years old, what would the cat’s actual age be?

- A. The cat needs to be older than 2 and younger than 5 in cat years.
- B. The cat needs to be 2 or older and younger than 5 in cat years.
- C. The cat needs to be older than 2 and 5 or younger in cat years.
- D. The cat needs to be 2 or older and 5 or younger in cat years.

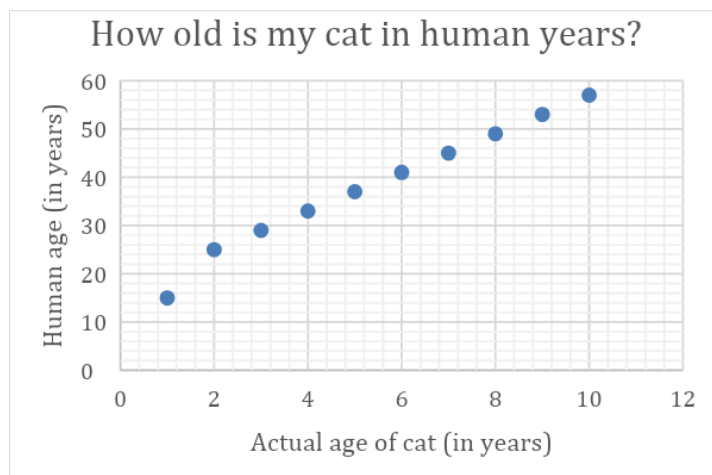
- c) Explain what the point (8, 49) on the graph means in context.

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- a) Deborah’s cat is currently 6 years old. How would Deborah use the graph to estimate her cat’s human age is 40 years old?

Evidence	Process	Content
Deborah locates the point (6, 41). The x-value of 6 is the current age of her cat, and the y-value of 41 is the equivalent human age.	A	2

- b) If Deborah was looking for a cat that was older than 24 years old but younger than 34 years old in human years, how old would the cat need to be in cat years?

- A. The cat needs to be older than 2 and younger than 5 in cat years
 B. The cat needs to be 2 or older and younger than 5 in cat years
 C. The cat needs to be older than 2 and 5 or younger in cat years
 D. The cat needs to be 2 or older and 5 or younger in cat years

Evidence	Process	Content
B.	B	2

- c) Explain what the point (8, 49) on the graph means in context.

Evidence	Process	Content
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If a cat is 8 years old, then in human years, the cat is 49 years old.	B	2
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QUESTION EIGHT – LIGHT YEARS AWAY

Compared to other star clusters, [Matariki](#) is relatively close to the earth, but still light years away.

A light year is measured as 9460 billion km per year.

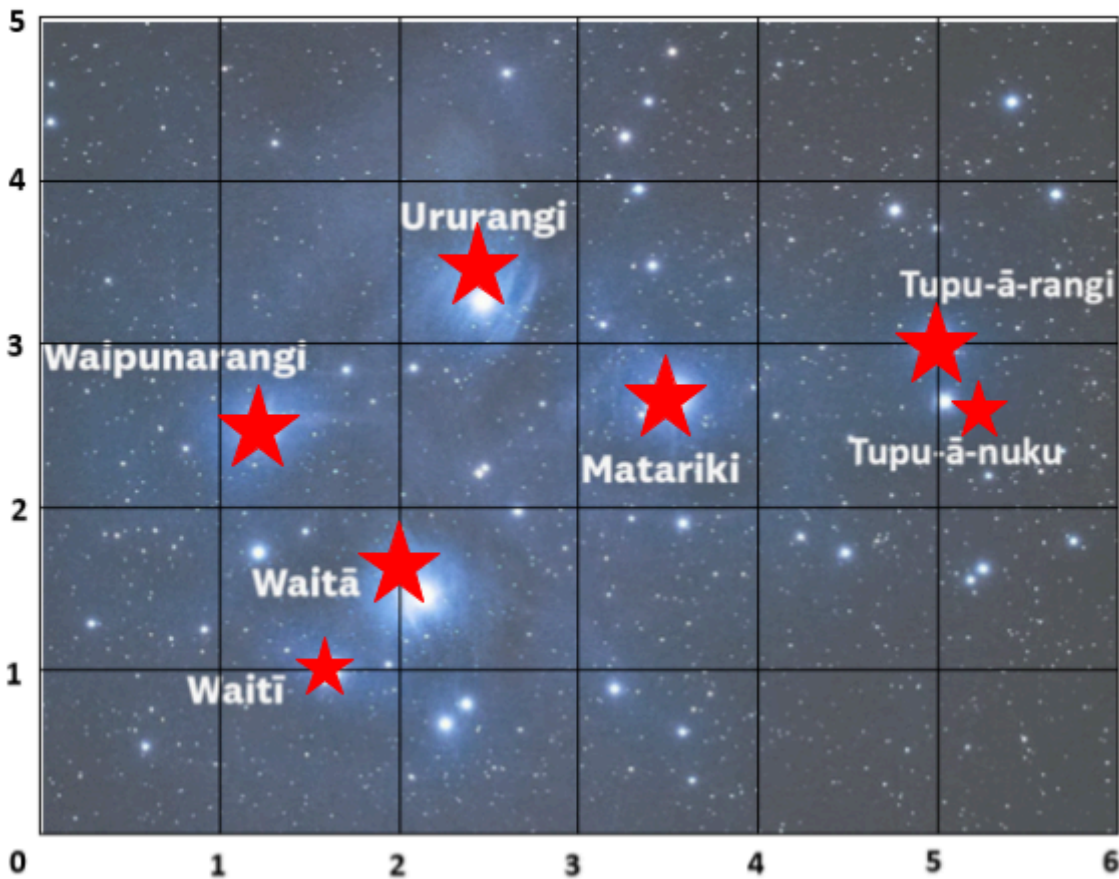
- a) Which number is equivalent to a light year?
- A. 9 460 000 000 B. 9.460 x 1 000 000 C. 94 600 000 D. 9 460 000 × 1 000 000
- b) There are 500 stars in the Matariki cluster. Only seven stars are visible without a telescope.

What percentage of the star cluster can we see with the naked eye?

A. 14% B. 1.4% C. 0.014% D. 71%

- c) Here, the seven visible Matariki stars are shown on a grid.

What are the co-ordinates of Tupu-ā-rangi?



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A light year is measured as 9460 billion km per year.

- a) Which number is equivalent to a light year?

A. 9 460 000 000 B. $9.460 \times 1\,000\,000$ C. 94 600 000 D. $9\,460\,000 \times 1\,000\,000$

Evidence	Process	Content
D	B	1

- b) There are 500 stars in the Matariki cluster. Only seven stars are visible without a telescope.

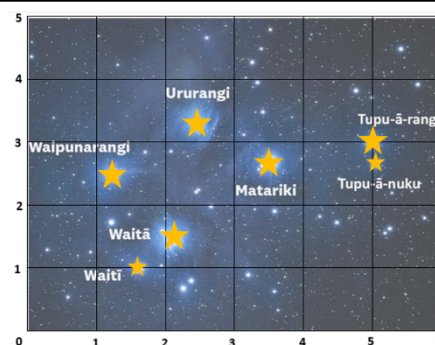
What percentage of the star cluster can we see with the naked eye?

A. 14% B. 1.4% C. 0.014% D. 71%

Evidence	Process	Content
B	A	1

- c) Here, the seven visible Matariki stars are shown on a grid.

What are the co-ordinates of Tupu-ā-rangi?



Evidence	Process	Content
(5,3)	B	4

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QUESTION NINE – FERRY TIMES

Here is a timetable for ferries between Picton and Wellington:

Departs Picton	Arrives Wellington	Vessel	Additional Information
2:30am	6:00am	Strait Feronia	Freight-only sailing. Not available for passengers
7:45am	11:30am	Straitsman	
2:00pm	5:30pm	Strait Feronia	
7:15pm	11:00pm	Straitsman	

All passengers must arrive to check in one hour before the departure time.

- a) Mark is driving from Greymouth to Picton to catch the 7:45am ferry to Wellington.

It takes 4.5 hours to drive from Greymouth to Picton.

What is the latest time Mark can leave home and make the ferry?

- A. 2:15am
- B. 2:45am
- C. 3:15am
- D. 3:45am

- b) Mark estimates the ferry trip from Picton to Wellington will take three hours.

Is this a reasonable estimate? Explain your answer using the information on the ferry timetable.

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- c) The 7:45am ferry costs Marks \$223. If he took the 2pm ferry instead, he would need to pay $\frac{2}{5}$ ths more.
Calculate the price of a ticket for the 2pm ferry.

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\$

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It takes 4.5 hours to drive from Greymouth to Picton.

What is the latest time Mark can leave home and make the ferry?

- A. 2:15am
- B. 2:45am
- C. 3:15am
- D. 3:45am

Evidence	Process	Content
2:15am	A	5

- b) Mark estimates the ferry trip from Picton to Wellington will take three hours.

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Is this a reasonable estimate? Explain your answer using the information on the ferry timetable.		
Evidence	Process	Content
No, it is not a reasonable estimate, as the Ferry takes approximately 3.5 – 3.75 hours and will be longer in bad weather (Accept other versions of time – 3 and a half hours etc)	B	5

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c)

The 7:45am ferry costs Marks \$223. If he took the 2pm ferry instead, he would need to pay $\frac{2}{5}$ ths more. Calculate the price of a ticket for the 2pm ferry.		
Evidence	Process	Content
\$312.20	B	1

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QUESTION TEN - FLIGHTS

DEPART	ARRIVE	AIRLINE	FLIGHT NO	PRICE
06:00 → 07:25	 Air New Zealand	NZ 582	\$48	
06:30 → 07:50	 Jetstar	JQ 226	\$40	
07:00 → 08:25	 Air New Zealand	NZ 584	\$48	
08:00 → 09:25	 Air New Zealand	NZ 526	\$48	
08:30 → 09:50	 Jetstar	JQ 228	\$40	
09:00 → 10:25	 Air New Zealand	NZ 530	\$52	
09:40 → 11:00	 Jetstar	JQ 232	\$45	
10:00 → 11:25	 Air New Zealand	NZ 580	\$48	
11:00 → 12:25	 Air New Zealand	NZ 538	\$61	

The above timetable shows flights and prices from Christchurch to Auckland.

- a) How long does it take to fly from Christchurch to Auckland in hours?

hours

- b) Anaru has a meeting in Auckland at the Sky Tower at 11am. The shuttle from the airport takes approximately one hour and 40 minutes to get to the Sky Tower. What flights would be suitable?

- c) The distance from Christchurch to Auckland is 765km. A website claims that a plane travels 805km per hour. Anaru thinks the plane he is on is slower than this.

Is Anaru correct? Explain your answer using the information in this question.

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QUESTION TEN - FLIGHTS

DEPART	ARRIVE	AIRLINE	FLIGHT NO	PRICE
06:00 → 07:25		Air New Zealand	NZ 582	\$48
06:30 → 07:50		Jetstar	JQ 226	\$40
07:00 → 08:25		Air New Zealand	NZ 584	\$48
08:00 → 09:25		Air New Zealand	NZ 526	\$48
08:30 → 09:50		Jetstar	JQ 228	\$40
09:00 → 10:25		Air New Zealand	NZ 530	\$52
09:40 → 11:00		Jetstar	JQ 232	\$45
10:00 → 11:25		Air New Zealand	NZ 580	\$48
11:00 → 12:25		Air New Zealand	NZ 538	\$61

The above timetable shows flights and prices from Christchurch to Auckland.

a) How long does it take to fly from Christchurch to Auckland in hours?

Evidence	Process	Content
1.42 hours	B	5

b) Anaru has a meeting in Auckland at the Sky Tower at 11am. The shuttle from the airport takes approximately one hour and 40 minutes to get to the Sky Tower. What flights would be suitable?

Evidence	Process	Content
Any of the first 3 flights 6, 6:30 or 7am	A	5

b) The distance from Christchurch to Auckland is 765km. A website claims that a plane travels 805km per hour. Anaru thinks the plane he is on is slower than this.

Is Anaru correct? Explain your answer using the information in this question.

Evidence	Process	Content
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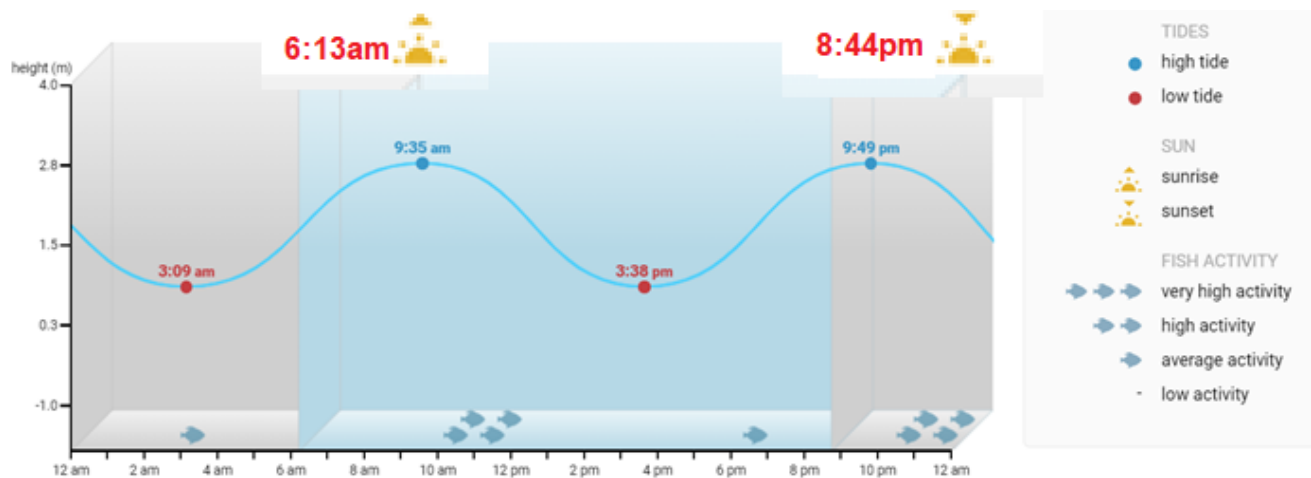
Anaru is correct. If the plane travelled at 805km in one hour, he would arrive in Auckland in under an hour since the distance between Christchurch and Auckland is 765km (which is a smaller distance). This is not the case because the flight time is over an hour.	C	1
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QUESTION ELEVEN – SURF’S UP

Raglan is a great beach to go surfing.

This 3D infographic above shows the tidal times at Raglan.



Source: <https://tides4fishing.com/nz/waikato/raglan> accessed 10/01/2022

The best time to surf is at sunrise or sunset when the height of the tide is increasing (incoming tide).

a) Which of the following times would you recommend going surfing?

- A. 0935 – 1236
- B. 1236 – 1538
- C. 1538 – 1843
- D. 1843 – 2149

b) Calculate how long it takes to go from low tide at 3:09am to high tide at 9:35am.

hours and minutes

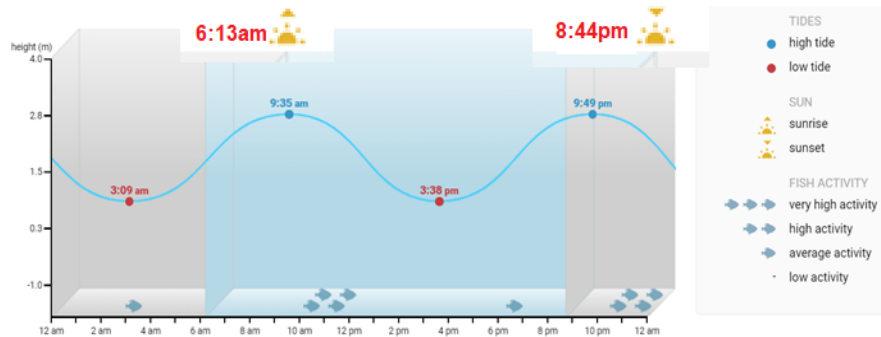
c) Walter says that the segment of the graph from 3:09am to 9:35am is repeated from 3:38pm.

Is he correct? Explain your answer using the graph.

QUESTION ELEVEN – SURF’S UP

Raglan is a great beach to go surfing.

This 3D infographic above shows the tidal times at Raglan.



Source: <https://tides4fishing.com/nz/waikato/raglan> accessed 10/01/2022

The best time to surf is at sunrise or sunset when the height of the tide is increasing (incoming tide).

- a) Which of the following times would you recommend going surfing?

A. 0935 – 1236 B. 1236 – 1538 C. 1538 – 1843 D. 1843 – 2149

Evidence	Process	Content
C or D	A	5

- b) Calculate how long it takes to go from low tide at 3:09am to high tide at 9:35am.

Evidence	Process	Content
6 hours and 26 minutes	B	5

- c) Walter says that the segment of the graph from 3:09am to 9:35am is repeated from 3:38pm.

Is he correct? Explain your answer using the graph.

Evidence	Process	Content
No, Walter is incorrect.	C	3, 5

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The segment from 3:09am to 9:35am takes 6 hours and 26 minutes. The segment from 3:38pm to 9:49pm takes 6 hours and 11 minutes, so the graph would look slightly different.		
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QUESTION TWELVE- A TOWER OF DICE

Adapted from the 2012 PISA assessment (p.64)

In the picture below a tower has been made using seven identical dice with their faces numbered from 1 to 6. When the tower is viewed from the top, only 5 dice can be seen.

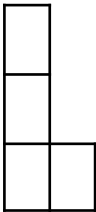


a) How many dots in total can be seen when this tower is viewed from the top?

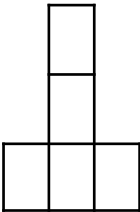
- A. 16
- B. 17
- C. 19
- D. 29

b) Which of these views is **not** a correct picture of this dice tower?

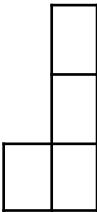
A.



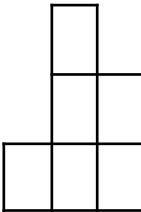
B.



C.



D.



c) Katrina believes that the probability of selecting a die with a value of five or higher visible in the photo is extremely likely.

Is Katrina correct? Explain your answer using the dice in the photo.

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QUESTION TWELVE- A TOWER OF DICE

In the picture below a tower has been made using seven identical dice with their faces numbered from 1 to 6. When the tower is viewed from the top, only 5 dice can be seen.



a) How many dots in total can be seen when this tower is viewed from the top?
A. 16
B. 17
C. 19
D. 29

Evidence	Process	Content
B	B	3

b) Which of these views is **not** a correct picture of this dice tower?

A.

B.

C.

D.

Evidence	Process	Content
D	A	3

c) Katrina believes that the probability of selecting a die with a value of five or higher visible in the photo is extremely likely.

Is Katrina correct? Explain your answer using the dice in the photo.

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Evidence	Process	Content
It is unclear what Katrina means by “extremely likely.” Of the six dice in the photo, three of them have a 5 or higher visible. This means there is a half chance of selecting a die with a value five or higher, but I cannot claim whether this is what Katrina means when she says “extremely likely.”	C	7

QUESTION THIRTEEN- DELIVERING FLYERS

Adapted from the [2012 PISA](#) assessment (p.77)

Ofa wants to earn money by delivering flyers. Here are two companies Ofa could choose to work for:

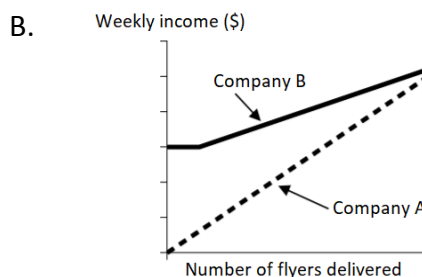
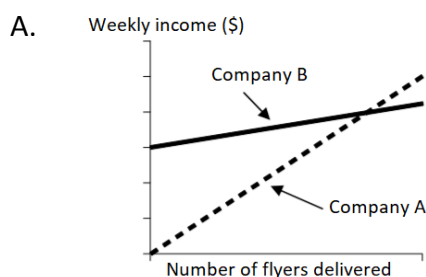
Company A

Ofa is paid \$0.20 per flyer for the first 240 flyers delivered in a week plus \$0.40 for each additional flyer delivered

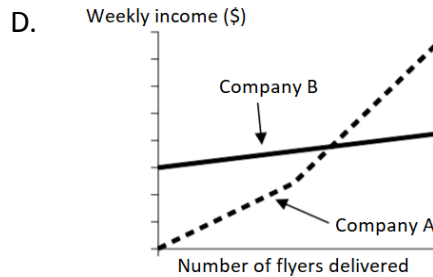
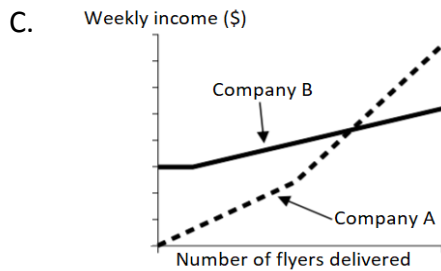
Company B

Ofa is paid \$60 per week and an extra \$0.05 per flyer he delivers

- a) If Ofa delivers 350 flyers in a week for company A, how much money would he earn?
- A. \$70
B. \$92
C. \$140
D. \$188
- b) If Ofa made \$74 for company B in a week, how many flyers would he have delivered?
- A. 148
B. 180
C. 232
D. 280
- c) Which one of the following graphs is a correct representation of how the two companies would pay Ofa?



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QUESTION THIRTEEN- DELIVERING FLYERS

Ofa wants to earn money by delivering flyers. Here are two companies Ofa could choose to work for:

Company A

Ofa is paid \$0.20 per flyer for the first 240 flyers delivered in a week plus \$0.40 for each additional flyer delivered

Company B

Ofa is paid \$60 per week and an extra \$0.05 per flyer he delivers

- a) If Ofa delivers 350 flyers in a week for company A, how much money would he earn?

A. \$70 B. \$92 C. \$140 D. \$188

Evidence	Process	Content
B \$92	A	1

- b) If Ofa made \$74 for company B in a week, how many flyers would he have delivered?

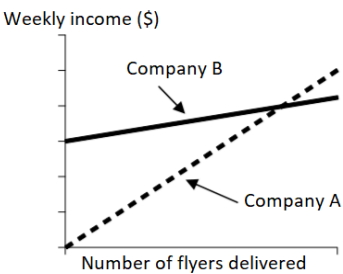
A. 148 B. 180 C. 232 D. 280

Evidence	Process	Content
D	B	1 & 2

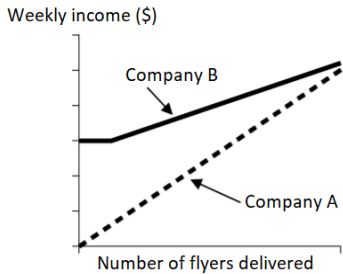
- c) Which one of the following graphs is a correct representation of how the two companies would pay Ofa?

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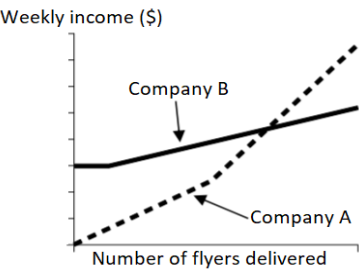
A.



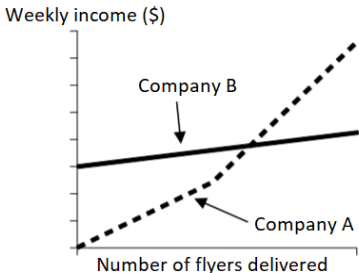
B.



C.



D.



Evidence	Process	Content
D	A	2

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QUESTION FOURTEEN - HIKING IN TONGARIRO NATIONAL PARK

Adapted from the [2012 PISA](#) assessment (p.19)

The Tongariro National Park has many walks and hikes, including the Tongariro Alpine Crossing and Taranaki Falls Loop.

- a) The winter hiking season is from 1 May to 31 October.

About 18,000 hike the Tongariro Alpine Crossing during this time.

On average, how many people hike the Tongariro Alpine Crossing in the winter hiking season each day?

- A. 98
- B. 100
- C. 852
- D. 3000

- b) The Taranaki Falls Loop in Tongariro National Park is a walking trail 6km long.

Walkers need to return from the 6km walk by sunset. Sunset is at 5pm during the winter hiking season.

Toshi estimates that he can walk at 4.5km per hour. He says that if he leaves for the walk at 3:30pm or earlier, he will safely return before sunset.

Is he correct? Explain your answer using the information in this question.

--

- c) Toshi uses a walking app to count his steps on his walk along the Taranaki Falls Loop.

His pedometer showed that he walked 8965 steps on the walk.

Estimate Toshi's average step length for his 6km walk on the Taranaki Falls Loop.

- A. 66.9cm
- B. 14.9cm
- C. 1.49m
- D. 0.77m

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QUESTION FOURTEEN- HIKING IN TONGARIRO NATIONAL PARK

- a) The winter hiking season is from 1 May to 31 October.

About 18,000 hike the Tongariro Alpine Crossing during this time.

On average, how many people hike the Tongariro Alpine Crossing in the winter hiking season each day?

A. 98 B. 100 C. 852 D. 3000

Evidence	Process	Content
A	A	1, 5

- b) The Taranaki Falls Loop in Tongariro National Park is a walking trail 6km long.

Walkers need to return from the 6km walk by sunset. Sunset is at 5pm during the winter hiking season.

Toshi estimates that he can walk at 4.5km per hour. He says that if he leaves for the walk at 3:30pm or earlier, he will safely return before sunset.

Is he correct? Explain your answer using the information in this question.

Evidence	Process	Content
Toshi is correct. If the walk is 6km long, and he walks 4.5km per hour, it would take him approximately 1.33 hours. Sunset is at 5pm, 1.33 hours prior to sunset is 3:40pm.	C	1, 5

- c) Toshi uses a walking app to count his steps on his walk along the Taranaki Falls Loop.

His pedometer showed that he walked 8965 steps on the walk.

Estimate Toshi's average step length for his 6km walk on the Taranaki Falls Loop.

A. 66.9cm B. 14.9cm C. 1.49m D. 0.77m

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Evidence	Process	Content
A	A	1.

QUESTION FIFTEEN- HOLIDAY HOMES

Isla is a Holiday Homes member. This means Isla can rent holiday homes at a cheaper rate:

Cost per day of rental for non-member	Cost per day of rental for member
\$190	\$170

To become a member Isla pays a \$50 annual fee.

- a) Last year, Isla spent \$1,580 which includes the membership fee.

How much would Isla have spent if she had not been a member but had rented the holiday home for the same number of days?

- A \$1,330
- B \$1,520
- C \$1,650
- D \$1,710

- b) What is the minimum number of days a member needs to rent to cover the cost of the membership fee? Justify your solution with the appropriate calculation(s).

- c) If non-members agree to do a promotional post for Holiday Homes on social media, they are given a 15% discount.

Calculate how much a non-member will save per day if they promote Holiday Homes.

\$

QUESTION FIFTEEN- HOLIDAY HOMES

Isla is a Holiday Homes member.

To become a member Isla pays a \$50 annual fee.

The rental fee for a holiday home for a member is lower than the fee for non-members, as shown in the following table:

Cost per day of rental for non-member	Cost per day of rental for member
\$190	\$170

- a) Last year, Isla spent \$1,580 which includes the membership fee.

How much would Isla have spent if she had not been a member but had rented the holiday home for the same number of days?

A. \$1,330 B. \$1,520 C. \$1,650 D. \$1,710

Evidence	Process	Content
D	A	1

- b) What is the minimum number of days a member needs to rent to cover the cost of the membership fee? Justify your solution with the appropriate calculation(s).

Evidence	Process	Content
The difference is \$20. It takes 2.5 days to get to \$50, so in full days this is 3 days. Accept correct alternative reasoning.	C	1

- c) If non-members agree to do a promotional post for Holiday Homes on social media, they are given a 15% discount.

Calculate how much a non-member will save per day if they promote Holiday Homes.

Evidence	Process	Content
\$28.50	B	1

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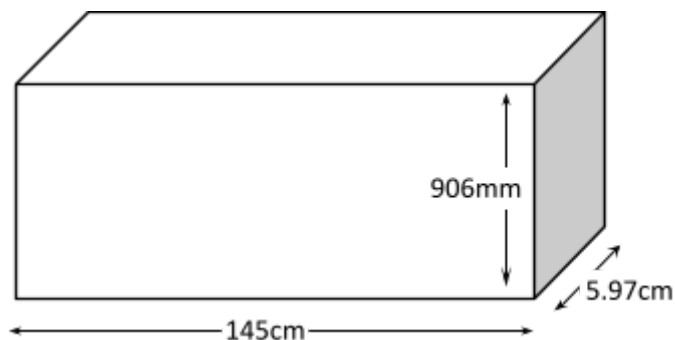
QUESTION SIXTEEN – JOE’S TV BOX

Joe buys a new TV.

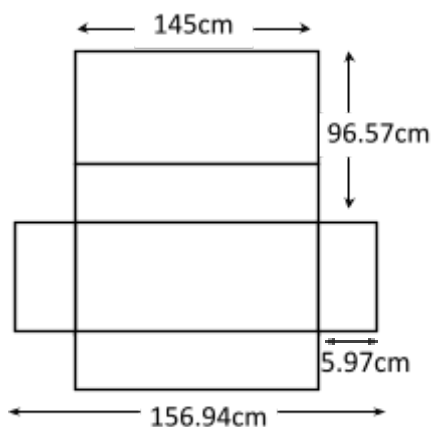
- a) It is in a cardboard box with these dimensions:

What is the volume of the TV box?

- A. 8310.24mm^3
- B. $784,27.9\text{mm}^3$
- C. $8,310.24\text{cm}^3$
- D. $784,27.9\text{cm}^3$



- b) When Joe flattens the box his TV came in, it looks like this:



Joe wants to use this cardboard to line the bottom of his guinea pigs' hutch. He doesn't mind if the cardboard is in pieces.

The bottom of the guinea pig hutch is 7200cm^2 .

Joe thinks that the TV cardboard can line the bottom of his guinea pigs' hutch at least four times. Is he correct?

Justify your solution using the appropriate calculation(s).

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- c) Joe buys a 90 day subscription to a new streaming service called Zonama Composite on 3 March. What date does his subscription to Zonama run out?

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Day:

Month:

QUESTION SIXTEEN – JOE’S TV BOX

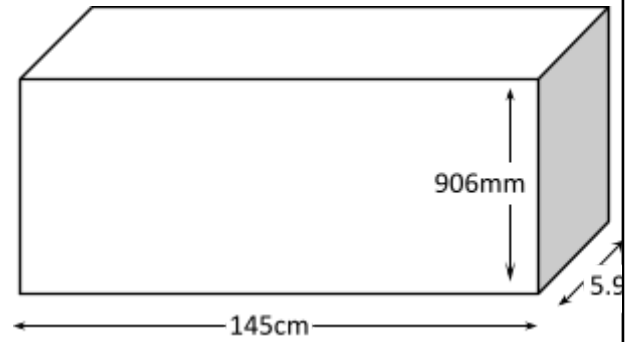
Joe buys a new TV.

a)

It is in a cardboard box with these dimensions:

What is the volume of the TV box?

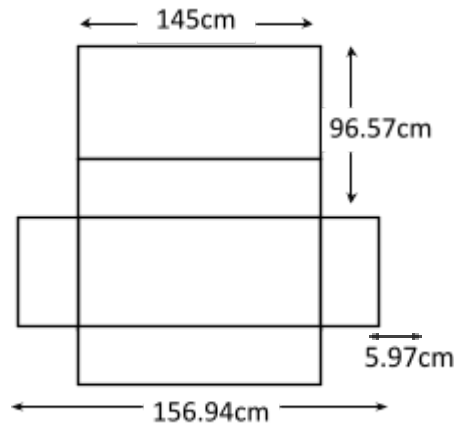
- A. 8310.24mm^3
- B. $784,27.9\text{mm}^3$
- C. $8,310.24\text{cm}^3$
- D. $784,27.9\text{cm}^3$



Evidence	Processes	Content
D	B	5.

b)

When Joe flattens the box his TV came in, it looks like this:



Joe wants to use this cardboard to line the bottom of his guinea pigs' hutch. He doesn't mind if the cardboard is in pieces.

The bottom of the guinea pig hutch is 7200cm^2 .

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Joe thinks that the TV cardboard can line the bottom of his guinea pigs' hutch at least four times. Is he correct?

Justify your solution using the appropriate calculation(s).

Evidence	Process	Content
Yes, because the total area of the box is $29,087.064\text{cm}^2$. $29,087.064 \div 7,200 = 4.03$ which is bigger than four.	C	5.

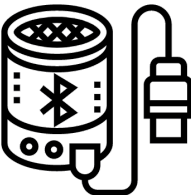
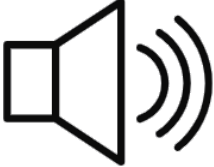
- c) Joe buys a 90 day subscription to a new streaming service called Zonama Composite on 3 March. What date does his subscription to Zonama run out?

Evidence	Processes	Content
1 June	B	5.

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QUESTION SEVENTEEN – MUSIC MADNESS

Adapted from the [2012 PISA](#) assessment (p.51)

Headphones	Bluetooth speaker	Music Streaming Service (Subscription)
		
\$270	\$170	\$165

- a) Martine added the prices for the headphones, the speaker and music streaming service on her calculator. The answer she got was \$456.

Does this answer sound correct? Explain how Martine calculated this price.

- b) Music City has a sale.

When you buy two or more items are purchased at the sale, Music City takes 20% off the normal selling prices of these items.

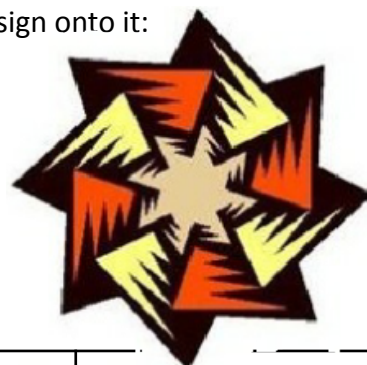
Tevita has \$350 to spend. At the sale, what can he afford to buy?

Circle “Yes” or “No” for each of the following options.

i)	Headphones and bluetooth speaker	Yes/No
ii)	Headphones and music streaming service	Yes/No
iii)	Bluetooth speaker and music streaming service	Yes/No

- c) If Tevita purchases the headphones, he wants to stick this design onto it:

What is the total rotational symmetry on this design?



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QUESTION SEVENTEEN – MUSIC MADNESS

Headphones	Bluetooth speaker	Music Streaming Service (Subscription)
\$270	\$170	\$165

- a) Martine added the prices for the headphones, the speaker and music streaming service on her calculator. The answer she got was \$456.

Does this answer sound correct? Explain how Martine calculated this price.

Evidence	Process	Content
No. The answer is incorrect. She left off the last digit in one of the prices	C	1.

- b) Music City has a sale.

When you buy two or more items are purchased at the sale, Music City takes 20% off the normal selling prices of these items.

Tevita has \$350 to spend. At the sale, what can he afford to buy?

Circle “Yes” or “No” for each of the following options.

i)	Headphones and bluetooth speaker	Yes/No
ii)	Headphones and music streaming service	Yes/No
iii)	Bluetooth speaker and music streaming service	Yes/No

Evidence	Process	Content
i) No ii) Yes iii) Yes	A	1.

- c) If Tevita purchases the headphones, he wants to stick this design onto it:

What is the total rotational symmetry on this design?



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Evidence	Process	Content
4	B	3

QUESTION EIGHTEEN- TILLY’S COOKIES

Tilly is inviting five friends to a sleepover at her house and wants to bake some cookies for them.



Here is a recipe for 15 shortbread cookies.

Butter	220g
Sugar	100g
Flour	270g

a) If a 375g block of butter costs \$9.20, how much is 220g of butter worth?

\$

b) How much flour would Tilly need if she made 20 shortbread cookies?

- A. 202.5g
- B. 360g
- C. 420g
- D. 505.5g

c) Tilly is expecting her friends to start arriving at 5:15pm.

She starts baking at 4:48pm.

If it takes her 8 minutes to mix the ingredients together and 16 minutes for the shortbread cookies to bake in the oven, will her shortbread cookies be ready when her friends first start arriving?

Justify your solution using the information in this question.

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QUESTION EIGHTEEN- TILLY'S COOKIES

Here is a recipe for 15 shortbread cookies.

Butter	220g
Sugar	100g
Flour	270g

- a) If a 375g block of butter costs \$9.20, how much is 220g of butter worth?

Evidence	Process	Content
\$5.40	B	1

- b) How much flour would Tilly need if she made 20 shortbread cookies?

A) 202.5g B) 360g C) 420g D) 505.5g

Evidence	Process	Content
B) 360g	A	1

- c) Tilly is expecting her friends to start arriving at 5:15pm.

She starts baking at 4:48pm.

If it takes her 8 minutes to mix the ingredients together and 16 minutes for the shortbread cookies to bake in the oven, will her shortbread cookies be ready when her friends first start arriving?

Justify your solution.

Evidence	Process	Content
Yes, the shortbread cookies will be ready, because the total prep time and baking time is 24 minutes. 4:48pm to 5:15pm is 27 minutes. Accept correct alternative answers	C	5

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QUESTION NINETEEN – DRIPPING TAP

Adapted from the task Dripping Tap in the [Assessment Resources Bank](#)

Francis noticed that his tap was dripping at a rate of 20mL per minute. He called the plumber who said he would be there in 2.25 hours.



- a) What is 20mL in litres?

litres

- b) How many minutes are there in 2.25 hours?

minutes

- c) Francis writes $\frac{20 \times 135}{1000}$ on his calculator. What is he calculating?

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- d) Francis has a one-litre jug available to catch the water before the plumber arrives and wants to know if it will be big enough.

Will the jug be large enough to collect the water? Explain your answer using the appropriate calculation(s).

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- e) A week later the tap has started dripping again at a rate of 1.8 litres of water per hour. Is the tap dripping worse than before? Justify your answer with the appropriate calculation(s).

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QUESTION NINETEEN – DRIPPING TAP

Francis noticed that his tap was dripping at a rate of 20mL per minute. He called the plumber who said he would be there in 2.25 hours.

a) What is 20mL in litres?

Evidence	Process	Content
0.02L	B	5

b) How many minutes are there in 2.25 hours?

Evidence	Process	Content
135 minutes	B	1 & 5

c) Francis writes $\frac{20 \times 135}{1000}$ on his calculator. What is he calculating?

Evidence	Process	Content
He is finding the amount of water in litres that he loses before the plumber arrives.	A	1 & 5

d) Francis has a one-litre jug available to catch the water before the plumber arrives and wants to know if it will be big enough.

Will the jug be large enough to collect the water? Explain your answer using the appropriate calculation(s).

Evidence	Process	Content
No because the water is dripping at a rate where you would need 2.7 litres	C	1 & 5

e) A week later the tap has started dripping again at a rate of 1.8 litres of water per hour. Is the tap dripping worse than before? Justify your answer with the appropriate calculation(s).

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Evidence	Process	Content
Yes. Before it was dripping at the rate of 20x60/1000 or 1.2 litres per hour. Now it is 1.8 litres per hour which is worse.	C	1 & 5

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QUESTION TWENTY – WHICH CAR?

Adapted from the [2012 PISA](#) assessment (p.26)

Aoife has just received her driver's licence and wants to buy her first car. This table below shows the details of four cars she finds at a local car dealer.

Model	Alphas	Beedford	Caroll	Discovery
Year	2015	2011	2009	2010
Advertised price (\$)	\$12 450	\$12 589	\$10 989	\$12 479
Distance travelled (km)	102 100	101 491	66 000	63 910
Engine capacity (L)	1.702	1.07	1.7	1.77

- a) Aoife wants a car that meets all of these conditions:
- The advertised price is not higher than \$12,500.
 - The distance travelled is not higher than 102,000 kilometres.
 - It was made in the year 2010 or a later year.

Which car meets Aoife's conditions?

- A. Alphas B. Beedford C. Caroll D. Discovery

- b) Which car's engine capacity is the smallest?

- A. Alphas B. Beedford C. Carroll D. Discovery

- c) Two other vehicles that meet Aoife's conditions are offered to her:

Etron Originally \$11 000 5% off!	Fiord Originally \$11 505 8% off!
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Which vehicle is the better deal for Aoife? Justify your response with the appropriate calculations.

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QUESTION TWENTY – WHICH CAR?

Aoife has just received her driver's licence and wants to buy her first car. This table below shows the details of four cars she finds at a local car dealer.

Model	Alphas	Beedford	Caroll	Discovery
Year	2015	2011	2009	2010
Advertised price (\$)	\$12,450	\$12,589	\$10,989	\$12,479
Distance travelled (km)	102,100	101,491	66,000	63,910
Engine capacity (L)	1.702	1.07	1.7	1.77

- a) Aoife wants a car that meets all of these conditions:
- The advertised price is not higher than \$12,500.
 - The distance travelled is not higher than 102,000 kilometres.
 - It was made in the year 2010 or a later year.

Which car meets Aoife's conditions?

A. Alphas B. Beedford C. Caroll D. Discovery

Evidence	Process	Content
D	B	1

- b) Which car's engine capacity is the smallest?

A. Alphas B. Beedford C. Caroll D. Discovery

Evidence	Process	Content
B	A	1

- c) Two other vehicles that meet Aoife's conditions are offered to her:

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Etron
Originally \$11 000
5% off!

Fiord
Originally \$11 505
8% off!

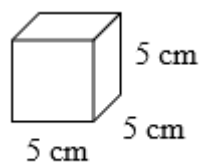
Which vehicle is the better deal for Aoife? Justify your response with the appropriate calculations.

Evidence	Process	Content
The Etron is a better deal as it costs \$10 450 while the Fiord costs \$10 584. The Etron costs \$134 less than the Fiord.	C	1

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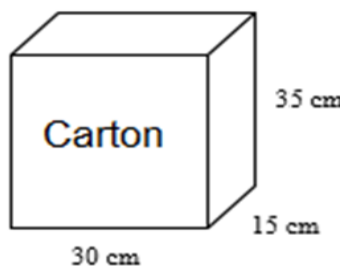
QUESTION TWENTY- ONE – SOAP CARVINGS

Bea was making soap carvings. Each carving is placed in a box with sides 5cm.



She makes 110 carvings for an order she has received.

She finds a carton with the following dimensions to pack the order.



a) Will the 110 boxes fit into this carton? Explain your answer using the diagrams above.

--

b) The carton is being sent overseas so will need to be wrapped. Calculate the total area in cm^2 that needs to be covered.

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c) It costs Bea \$7.50 to make each soap.

Her fixed costs, which stay the same no matter how many soaps she makes is \$50.

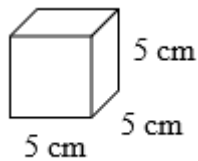
What is the total cost to Bea when she makes 110 soaps?

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QUESTION TWENTY- ONE– SOAP CARVINGS

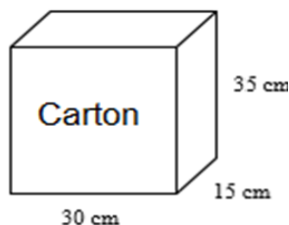
Bea was making soap carvings. Each carving is placed in a box with sides 5cm.



She has made 110 carvings for an order she has received.



She has found a carton with the following dimensions to pack the order.



- a) Will the 110 boxes fit into this carton? Explain your answer using the diagrams above.

Evidence	Process	Content
Yes. The carton can fit 6 boxes across, 3 deep and by 7 high which means it can fit 126 boxes, so 110 will easily fit	C	3 & 5

- b) The carton is being sent overseas so will need to be wrapped. Calculate the total area in cm^2 that needs to be covered.

Evidence	Process	Content
$2 \times 30 \times 35 + 2 \times 15 \times 35 + 2 \times 30 \times 15 = 4050 \text{ cm}^2$ (Must include units in the answer)	A	1 & 5

- c) It costs Bea \$7.50 to make each soap.

Her fixed costs, which stay the same no matter how many soaps she makes is \$50.

What is the total cost to Bea when she makes 110 soaps?

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Evidence	Process	Content
\$875	A	1

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QUESTION TWENTY TWO - TEMPERATURE



The lowest temperature in 2021 was recorded as -7.4°C on 19 June in Middlemarch.¹

Here are some of the temperatures from that day around the country:

Auckland 8.0°C

Christchurch 2.3°C

Dunedin -1.4°C

Wellington 6.9°C

Whangaparāoa 8.2°C

Queenstown -1.2°C

a) What was the average temperature on 19th June at these seven locations in New Zealand?

- A. 5.1°C
- B. 2.2°C
- C. 3.8°C
- D. 4.7°C

b) Mikaere estimates that the difference between the warmest and coldest place was about 16°C . Is he correct? Explain your answer using the information in this question.

c) Another way that temperature can be measured is in degrees Fahrenheit using:

$$F = \frac{9}{5}C + 32$$

where C = temperature in degrees Celsius

F = temperature in degrees Fahrenheit

MiddleMarch's temperature was -7.4°C . Calculate this in degrees Fahrenheit.

¹ Source <https://niwa.co.nz>

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QUESTION TWENTY-TWO – TEMPERATURE



The lowest temperature in 2021 was recorded as -7.4°C on 19 June in Middlemarch.

Here are some of the temperatures from that day around the country:

Auckland 8.0°C

Christchurch 2.3°C

Dunedin -1.4°C

Wellington 6.9°C

Whangaparāoa 8.2°C

Queenstown -1.2°C

- a) What was the average temperature on 19th June at these seven locations in New Zealand?

A. 5.1°C B. 2.2°C C. 3.8°C D. 4.7°C

Evidence	Process	Content
B	B	1

- b) Mikaere estimates that the difference between the warmest and coldest place was about 16°C . Is he correct? Explain your answer using the information in this question.

Evidence	Process	Content
Hottest was 8.2°C and the coolest was -7.4°C. The difference between these two temperatures is 15.6°C. Yes - As this is only an estimate then 16°C is a good estimate. No – as the results were already rounded the real difference could be lower than 15.6°C. Accept alternative correct methods and explanations.	C	1 & 5

- c) Another way that temperature can be measured is in degrees Fahrenheit using:

$$F = \frac{9}{5}C + 32$$

where C = temperature in degrees Celsius

F = temperature in degrees Fahrenheit

MiddleMarch's temperature was -7.4°C . Calculate this in degrees Fahrenheit.

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Evidence	Process	Content
18.68°F	A	1

QUESTION TWENTY THREE – CRICKET

Question adapted from Indoor Cricket Scores on [Assessment Resources Bank](#)

- a) In a game of indoor cricket, one point is given for every run and five points are taken off each time a wicket is lost.

Graeme's team is on -10 points. They get 30 more runs but lose another 5 wickets.

Which is the right calculation for working out the final score?

- A. $5 \times 5 + 30 - 10$
- B. $-10 + 30 - 5 \times 5$
- C. $-10 + 30 - 5$
- D. $(-10 + 30 - 5) \times 5$



- a) An indoor cricket court is rectangular.

It must have a minimum length of 28m and a minimum width of 10.5m

The maximum length the cricket court can be is 30m and the maximum width is 12m.

What is the difference in m^2 between the smallest possible indoor cricket court and the largest possible cricket court?

- b) The indoor cricket competition Graeme and his team is part of lasts for 17 games. Each game costs Graeme and his team \$104. Only eight players are allowed on the court in a game, but there are 12 people on Graeme's team. Graeme claims that each person should pay \$148 to play in the competition.

Is this fair? Explain your answer using the information available in this question.

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QUESTION TWENTY-THREE – CRICKET

- a) In a game of indoor cricket, one point is given for every run and five points are taken off each time a wicket is lost.

Graeme's team is on -10 points. They get 30 more runs but lose another 5 wickets.

Which is the right calculation for working out the final score?

A. $5 \times 5 + 30 - 10$ B. $-10 + 30 - 5 \times 5$ C. $-10 + 30 - 5$ D. $(-10 + 30 - 5) \times 5$

Evidence	Process	Content
B	A	1

- b) An indoor cricket court is rectangular.

It must have a minimum length of 28m and a minimum width of 10.5m

The maximum length the cricket court can be is 30m and the maximum width is 12m.

What is the difference in m^2 between the smallest possible indoor cricket court and the largest possible cricket court?

Evidence	Process	Content
$66m^2$	A	5

- c) The indoor cricket competition Graeme and his team is part of lasts for 17 games. Each game costs Graeme and his team \$104. Only eight players are allowed on the court in a game, but there are 12 people on Graeme's team. Graeme claims that each person should pay \$148 to play in the competition.

Is this fair? Explain your answer using the information available in this question.

Evidence	Process	Content
Total cost of competition is $17 \times 104 = \$1\,768$. There are 12 players in his team, so $1\,768 \div 12 = \$147.30$	C	1

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This is fair, because each player pays the same amount.

Alternatively: I cannot say, because some people may not play every game, which is what this calculation assumes.

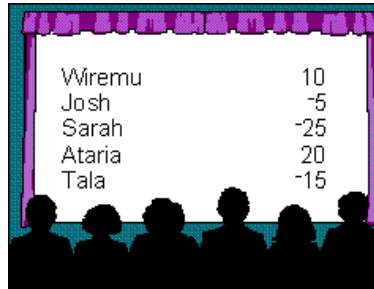
Accept other appropriate responses.

QUESTION TWENTY FOUR – THE GAME SHOW

Question adapted from TV game show on [Assessment Resources Bank](#)

Contestants on a TV game show call out their names to answer a question. They get 10 points for a correct answer and have 5 points taken away for an incorrect answer.

Here are the scores at the end of round one:



Wiremu	10
Josh	-5
Sarah	-25
Ataria	20
Tala	-15

a) Tala is on a score of -15 points.

If he gets 4 questions right and 2 wrong, what will his new score be?

b) There are a total of 50 questions asked in round two of the game show.

Sarah claims that if she answers the first five questions correctly, she will take the lead.

Is she correct? Explain your answer using the information provided about the scoring.

c) At the end of round two, Josh has answered 2 questions correctly and 5 questions incorrectly. What is the right calculation for working out his final score?

A. $10 \times 2 - 5 \times 5 + 5$

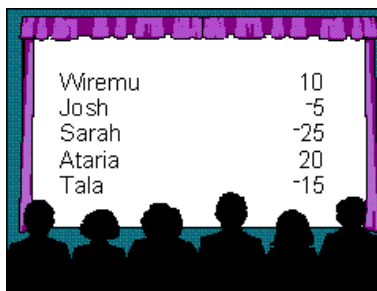
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- B. $(-5 + 10) \times 2 - (5 \times 5)$
 C. $-5 + 2(10) - 5(5)$
 D. $-5 \times 5 + 10 \times 2 + 5$

QUESTION TWENTY-FOUR – THE GAME SHOW

Contestants on a TV game show call out their names to answer a question. They get 10 points for a correct answer and have 5 points taken away for an incorrect answer.

Here are the scores at the end of round one:



Wiremu	10
Josh	-5
Sarah	-25
Ataria	20
Tala	-15

- a) Tala is on a score of -15 points.
 If he gets 4 questions right and 2 wrong, what will his new score be?

Evidence	Process	Content
15	B	1

- b) There are a total of 50 questions asked in round two of the game show.
- Sarah claims that if she answers the first five questions correctly, she will take the lead.
- Is she correct? Explain your answer using the information provided about the scoring.

Evidence	Process	Content
Sarah is correct. If she answers the first five questions correctly, she gets 50 points. $-25 + 50 = 25$ points, which is greater than Ataria who is currently in the lead	C	1

- c) At the end of round two, Josh has answered 2 questions correctly and 5 questions incorrectly. What is the right calculation for working out his final score?

A. $10 \times 2 - 5 \times 5 + 5$

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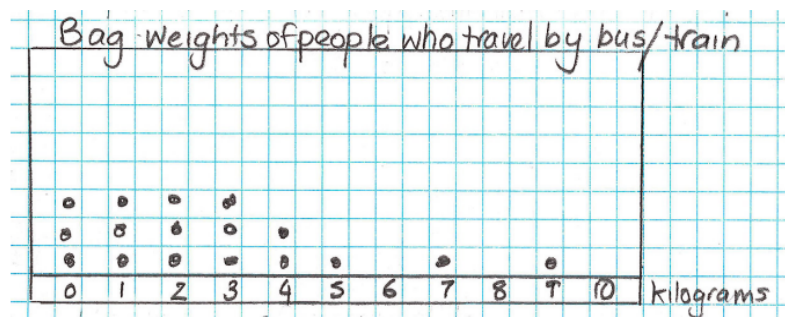
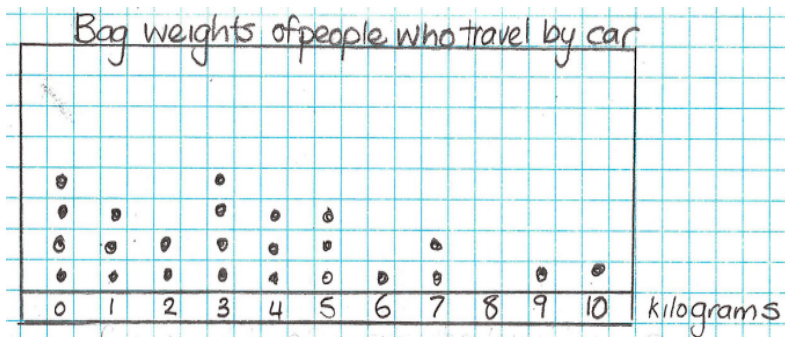
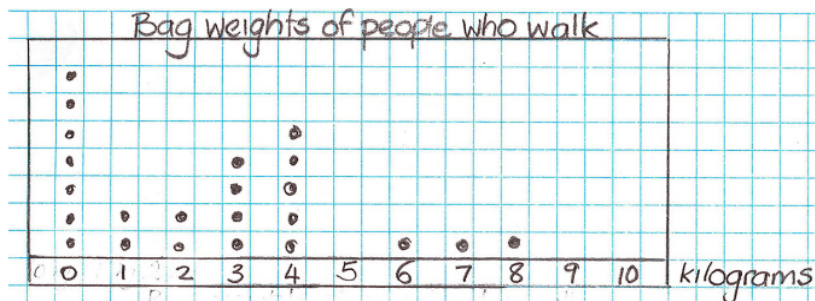
- B. $(-5 + 10) \times 2 - (5 \times 5)$
 C. $-5 + 2(10) - 5(5)$
 D. $-5 \times 5 + 10 \times 2 + 5$

Evidence	Process	Content
C	A	1

QUESTION TWENTY- FIVE - HOW HEAVY?

Adapted from <https://curriculumprogressertools.education.govt.nz/lpf-tool/>

Rahera was working on the problem “Do Year 8 students in New Zealand who walk to school tend to carry lighter bags than Year 8 students in New Zealand who go by car or bus/train?” She drew these dot plots:



a) Calculate the mean bag weight of the people who walk

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b) Which measure of average for bag weights would support the statement “The average bag weight of people who walk is zero kg.”

- ☐ Mean
- ☐ Median
- ☐ Mode

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c) Which one of the following statements is **incorrect** and explain why it is wrong.

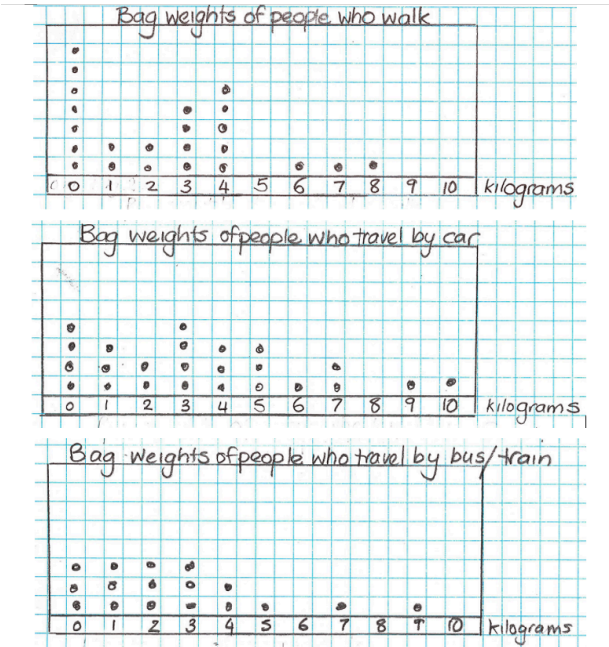
- A. The biggest spread of bag weights are carried by those travelling by car
- B. Most of the bag weights of students who went by bus/train seem to be clustered at the lower end of the bag weights
- C. The median bag weight of the students who walk, is the biggest median bag weight of all three groups
- D. The bag weights of those that travel by car has two modal values of 0kg and 3kg

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QUESTION TWENTY- FIVE - HOW HEAVY?

Rahera was working on the problem “Do Year 8 students in New Zealand who walk to school tend to carry lighter bags than Year 8 students in New Zealand who go by car or bus/train?”

She drew these dot plots:



a) Calculate the mean bag weight of the people who walk		
Evidence	Process	Content
2.56kg	A	1

b) Which measure of average for bag weights would support the statement “The average bag weight of people who walk is zero kg.”		
☐ Mean ☐ Median ☐ Mode		
Evidence	Process	Content
Mode	A	6

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c) Which one of the following statements is **incorrect** and explain why it is wrong.

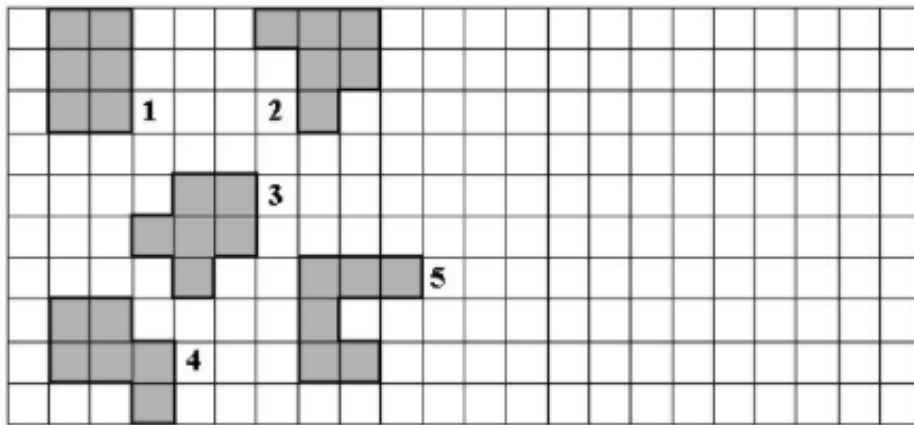
- A. The biggest spread of bag weights is carried by those travelling by car
- B. Most of the bag weights of students who went by bus/train seem to be clustered at the lower end of the bag weights.
- C. The median bag weight of the students who walk, is the biggest median bag weight of all three groups.
- D. The bag weights of those that travel by car has two modal values of 0kg and 3kg.

Evidence	Process	Content
C. The median bag weight of the students who walk, is the biggest median bag weight of all three groups This is because the median bag weight for walking and travelling by car are both 3kg, whilst the median bag weight for those travelling by bus/train is 2kg	C	6

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QUESTION TWENTY SIX – PERIMETER

Question is adapted from Finding the Perimeter in [Assessment Resource Bank](#)



On the squared paper, five different shapes, each made up of 6 unit squares, have been shaded in.

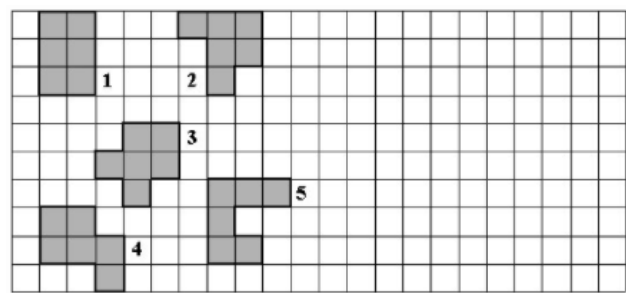
- a) What is the difference between the shape with the greatest perimeter and the shape with the smallest perimeter?
- A. 2 units
B. 3 units
C. 4 units
D. 5 units
- b) On the squared paper above, draw two shapes each of 9 square units, one with a perimeter of 12 units, and the other with a perimeter of 20 units.
- c) Innes says that rotating any of these shapes 180° is the same as drawing its reflection.

Is he correct? Explain your answer using the shapes above.

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QUESTION TWENTY SIX – PERIMETER



On the squared paper, five different shapes, each made up of 6 unit squares, have been shaded in.

a) What is the difference between the shape with the greatest perimeter and the shape with the smallest perimeter?

A. 2 units B. 3 units C. 4 units D. 5 units

Evidence	Process	Content
The largest perimeter is 14 and the smallest is 10. Answer C.	B	5

b) On the squared paper above, draw two shapes each of 9 square units, one with a perimeter of 12units, and the other with a perimeter of 20 units.

Evidence	Process	Content
 Accept any correct versions	A	5

c) Innes says that rotating any of these shapes 180° is the same as drawing its reflection.

Is he correct? Explain your answer using the shapes above.

Evidence	Process	Content
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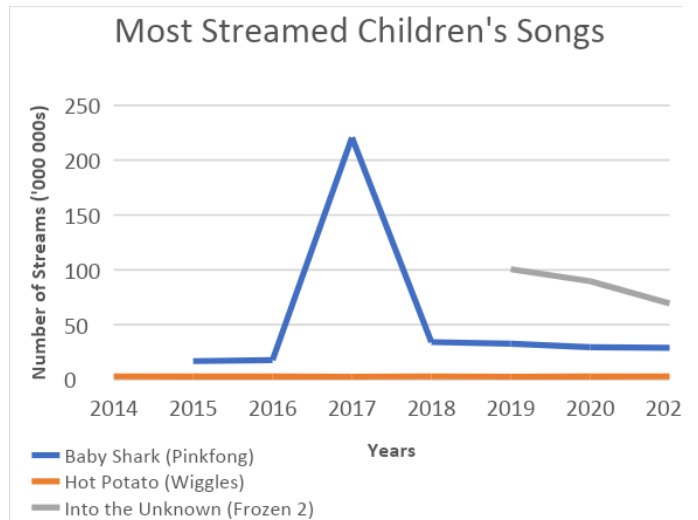
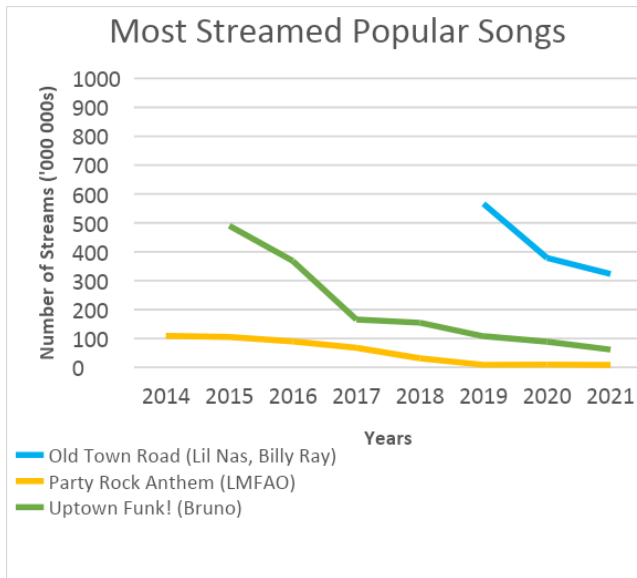
Innes is correct. When a shape is rotated, it faces the object, and stays the same size which are properties of reflection.	C	3
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QUESTION TWENTY SEVEN – TRUE OR FALSE?



a) A newspaper claims “Baby shark most popular song ever”



Is this a reasonable headline? Explain your answer using information from the graphs.

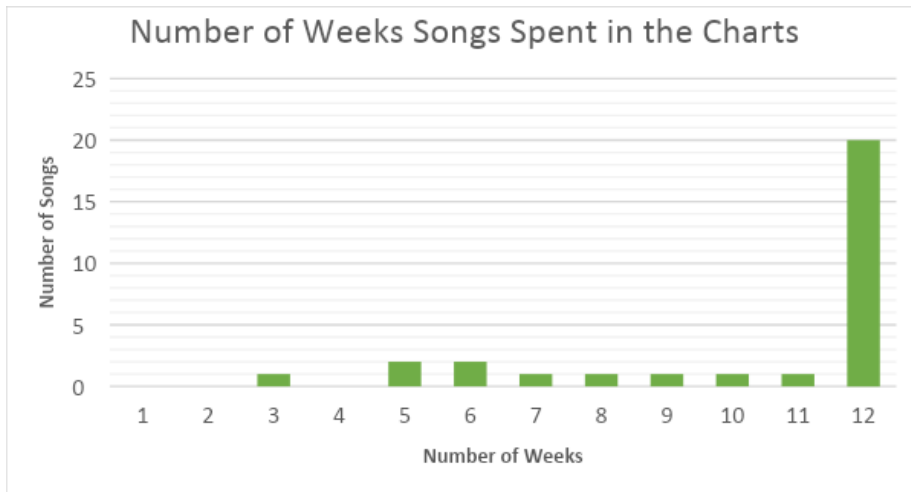
b) How would you describe the number of streams Baby Shark had in 2017?

- A. Cluster
- B. Spread
- C. Unusual Feature
- D. Median

c) Sophia is interested in how long songs stay ‘popular’ for. She looked at the current Top **30** songs in Aotearoa New Zealand and recorded how many weeks each song had been in the charts for.

The results are shown in the graph below.

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What is the mean number of weeks a song remains in the charts for?

- A. 10.33
- B. 12
- C. 310
- D. 9.33

d) Adele has currently released four albums. The title of each album has been:

19, 21, 25 and 30

Another newspaper says, “Adele’s next album to be titled ‘45’.

Do you agree with this headline? Explain your answer using info in this question.

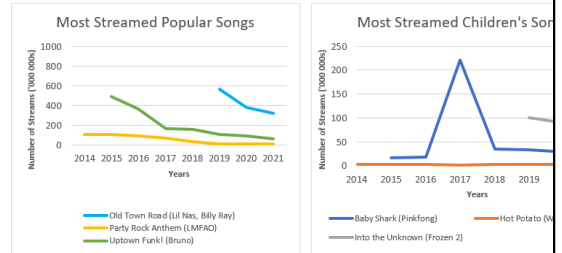


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QUESTION TWENTY SEVEN – TRUE OR FALSE?

- a) A newspaper claims “Baby shark most popular song ever”.

Is this a reasonable headline? Explain your answer using information from the graphs.



Evidence	Process	Content
No, it is not reasonable. While Baby Shark has a clear peak this does not make it the most popular song because (suggested answers): - Only Children's songs are shown on this graph – not songs on any/all genres - The scale on the Baby Shark graph is small (50, 100, 150 etc). The scale on the other graph however is much larger (200, 400, 600 etc). So in fact Most of the songs on the other graph have had more streams than Baby Shark - The viewer does not know when this data was recorded, where is what recorded, what countries contributed to the data etc. Only ONE reason is required. Accept any other reasonable and correct answers.	C	

- b) How would you describe the number of streams Baby Shark had in 2017?

- Cluster
- Spread
- Unusual Feature
- Median

Evidence	Process	Content
C	B	6

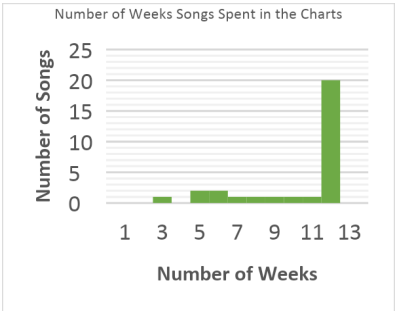
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- c) Sophia is interested in how long songs stay ‘popular’ for. She looked at the current Top **30** songs in Aotearoa New Zealand and recorded how many weeks each song had been in the charts for.

The results are shown in the graph below.

What is the mean number of weeks a song remains in the charts for?

- A. 10.33
- B. 12
- C. 310
- D. 9.33



Evidence	Process	Content
A	A	1

- d) Adele has currently released four albums. The title of each album has been:

19, 21, 25 and 30

Another newspaper says “Adele’s next album to be titled ‘45’.

Another newspaper says, “Adele’s next album to be titled ‘45’.

Do you agree with this headline? Explain your answer using info in this question.

Evidence	Process	Content
It is fake news (not correct) Her existing albums increase in number by 2, then 4, and then 5. So her next album is as likely to increase by 6 or 7. This would make the title of her next album ‘36’ or ‘37’ Accept other correct reasons.	C	2

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QUESTION TWENTY EIGHT – SIMPLE INTEREST

Irihapeti is going flatting and needs to buy a few things.

Her kuia will lend her \$5000. She will charge Irihapeti simple interest of 3.5% per annum for 3 years on the \$5000.



a) Which of the following will give the total amount Irihapeti pays back to her kuia?

- A. $\$5000 + 3 \times 5000 \times 0.035$
- B. $\$5000 \times 1.035 \times 3$
- C. $(\$5000 \times 3) \times 0.35$
- D. $\$5000 + 3 \times \5000×0.35

b) Based on your answer to part a) how much does Irihapeti need to pay her kuia every month?

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c) Irihapeti is confident that she can pay her kuia back in 2.5 years by paying \$45 per week from her wages. Investigate if this is enough for her kuia. (Hint: There are not always 4 weeks in a month)

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a) Which of the following will give the total amount she pays back to her kuia?

- A. $\$5000 + 3 \times 5000 \times 0.035$
- B. $\$5000 \times 1.035 \times 3$
- C. $(\$5000 \times 3) \times 0.35$
- D. $\$5000 + 3 \times \5000×0.35

Evidence	Process	Content
A	B	1

b) Based on your answer to part a) how much does Irihapeti need to pay her kuia every month?

Evidence	Process	Content
\$153.47 (accept reasonable rounding)	A	1

c) Irihapeti is confident that she can pay her kuia back in 2.5 years by paying \$45 per week from her wages. Investigate if this is enough for her kuia. (Hint: There are not always 4 weeks in a month)

Evidence	Process	Content
Accept discussion $\$45 \times 130 \text{ weeks} = \5850 – total paid Which is enough $\$5000 + 2.5 \times 5000 \times 0.035 = \5437.50 – total owed in 2.5 years. *Students may consider how much earlier Irihapeti can pay back her Kuia.	B & C	1

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QUESTION TWENTY NINE – PO-TAY-TOE, PO-TAH-TOE

Adapted from Assessment Resource Bank- Different weights

Matiu's marae is ordering 12 bags of potatoes for a hangi fundraiser. Each sack of potatoes weighs 5kg.



- a) If $1000\text{kg} = 1$ tonne, how many tonnes of potatoes has the marae ordered?

- b) Uncle Hemi picks up the potatoes on a truck. The truck weighs 2.3 tonnes. What is the weight of the truck with the potatoes in kg?

- c) Matiu thinks the weight of an average potato is about 450g. Is this a good estimate? Explain your answer using the information in this question.

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QUESTION TWENTY NINE – PO-TAY-TOE, PO-TAH-TOE

Matiu's marae is ordering 12 bags of potatoes for a hangi fundraiser. Each sack of potatoes weighs 5kg.



- a) If 1000kg = 1 tonne, how many tonnes of potatoes has the marae ordered?

Evidence	Process	Content
0.06 tonnes	B	1 & 5

- b) Uncle Hemi picks up the potatoes on a truck. The truck weighs 2.3 tonnes. What is the weight in kg of the truck with the potatoes?

Evidence	Process	Content
2 360kg	B	1 & 5

- c) Matiu thinks the weight of an average potato is about 450g. Is this a good estimate? Explain your answer.

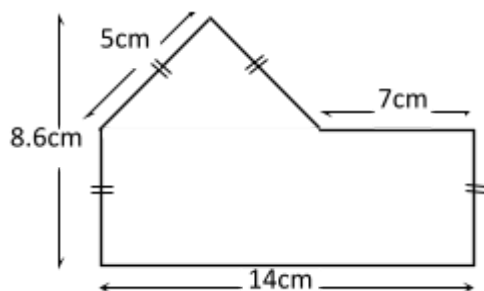
Evidence	Process	Content
No. If potatoes were 450g, this would mean there would be only 11 potatoes in a 5kg bag, which wouldn't make sense!	C	1 & 5

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QUESTION THIRTY – FAYE’S BIRTHDAY CARD

Faye wants to make a birthday card for her mother.

The base of her card looks like this:



- a) Faye wants to stick glitter-covered paper onto the entire base of the card. She has 80cm^2 of glitter-covered paper.

If Faye cuts up this glitter-covered paper, will she have enough to cover the entire base of the card?

Justify your answer using the measurements in this question.

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- b) Faye has decorative tape that she wants to stick as a border around the base of her card. How much tape would she need to create the border?

- A. 36cm
- B. 39.6cm
- C. 41cm
- D. 49.6cm

- c) Faye has letters she can place on her card.

The width of each letter in HAPPY BIRTHDAY is 8mm. She wants to leave a 1cm space between the word HAPPY and BIRTHDAY.

How much space is left on the side for Faye to add some drawings?

- A The letters will not all fit onto the card
- B Faye will have 2.6cm left on the sides
- C Faye will have 3.6cm left on the sides

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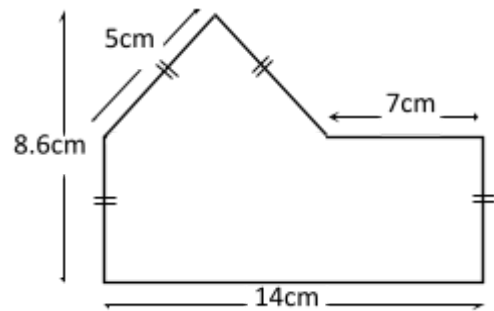
D Faye will have 306mm left on the sides

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QUESTION THIRTY – FAYE’S BIRTHDAY CARD

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The base of her card looks like this:



- a) Faye wants to stick glitter-covered paper onto the entire base of the card. She has 80cm^2 of glitter-covered paper.

If Faye cuts up this glitter-covered paper, will she have enough to cover the entire base of the card?

Justify your answer using the measurements in this question.

Evidence	Process	Content
The area of the glitter-covered paper is 80cm^2 . The area of the base of the card is 82.6cm^2 . This means that Faye will not have enough glitter-covered paper to cover the base of the card.	C	5

- b) Faye has decorative tape that she wants to stick as a border around the base of her card. How much tape would she need to create the border?

A. 36cm B. 39.6cm C. 41cm D. 49.6cm

Evidence	Process	Content
C	B	5

- c) Faye has letters she can place on her card.

The width of each letter in HAPPY BIRTHDAY is 8mm. She wants to leave a 1cm space between the word HAPPY and BIRTHDAY.

How much space is left on the side for Faye to add some drawings?

- A. The letters will not all fit onto the card
- B. Faye will have 2.6cm left on the sides
- C. Faye will have 3.6cm left on the sides
- D. Faye will have 306mm left on the sides

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Evidence	Process	Content
B	A	5

QUESTION THIRTY ONE – THE WĒTĀ



A wētā has to reach its home in the tree before sunrise at 6:00am. His home is 1.6 metres above ground. At 5.50am, he is 12cm above the ground on its tree. The wētā can climb 15cm every minute.

a) Complete the table below to show the progress of the wētā for the first three minutes of the climb.

Time	5.50am	5.51am	5.52am	5.53am
Distance	12cm	27cm		57cm

b) Will the wētā reach its home in time? Explain your decision using the information provided about the wētā’s movements.

c) When the wētā is awake, he can travel 23m every hour. If the wētā is moving for 10 hours and 20 minutes, how far has he travelled?

metres

QUESTION THIRTY ONE – THE WĒTĀ

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a)

Complete the table below to show the progress of the wētā for the first three minutes of the climb.

Time	5.50am	5.51am	5.52am	5.53am
Distance	12cm	27cm		57cm

Evidence	Process	Content
42cm	B	2

b)

Will the wētā reach its home in time? Explain your decision using the information provided about the wētā's movements.

Evidence	Process	Content
Yes. After a further 7 minutes, the wētā will have climbed a further 105 cm (7×15). This means it will have climbed $57 + 105 = 162$ cm. This is 2 cm higher than needed. Accept alternative correct methods and explanations.	C	2 & 5

c)

When the wētā is awake, he can travel 23m every hour. If the wētā is moving for 10 hours and 30 minutes, how far has he travelled?

Evidence	Process	Content
238m (Accept 237m or 237.7m)	A	1 & 5

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QUESTION THIRTY TWO – THE PHONE

Louise wants to buy a new Oppo phone, which costs \$400. She was given \$100 as birthday money, and she has now started delivering papers to earn money to save for the phone.



- a) She earns 4.5 cents a paper and delivers 250 papers each week. How much will she be able to save each week?

\$

- b) Louise estimates that she will be able to save for her phone in 27 weeks.

Is this reasonable? Explain your answer

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- c) Once Louise has brought a phone, she pays for a monthly \$20 basic plan, so she has calls, texts, and data. If she makes more calls, texts, and data than her plan allows, the cellphone company will charge her:

- \$0.60 for every extra call
- \$0.20 for every extra text
- \$1.05 for every extra MB of data used

In the first month, Louise makes an extra 4 calls, an extra 6 texts and uses 3.4MB more data than her plan allows. How much in total will Louise pay the cellphone company in the first month of phone use?

\$

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QUESTION THIRTY TWO – THE PHONE

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a)	She earns 4.5 cents a paper and delivers 250 papers each week. How much will she be able to save each week?		
Evidence		Process	Content
\$11.25		B	1

b)	Louise estimates that she will be able to save for her phone in 27 weeks. Is this reasonable? Explain your answer		
Evidence		Process	Content
Yes. The formula for the relationship is $\text{Savings} = 11.25 \times \text{weeks} + 100$ If we put 27 into the formula, we will see that she saves \$403.75. (<i>Extension answer which is not required:</i> However, this does mean that Louise cannot be ill and miss work and that the phone does not go up over the 27 week period) Accept alternative correct methods and explanations		C	2

c)	Once Louise has brought a phone, she pays for a monthly \$20 basic plan, so she has calls, texts, and data. If she makes more calls, texts, and data than her plan allows, the cellphone company will charge her: ▪ \$0.60 for every extra call ▪ \$0.20 for every extra text ▪ \$1.05 for every extra MB of data used In the first month, Louise makes an extra 4 calls and uses 3.4MB more data than her plan allows. How much in total will Louise pay the cellphone company in the first month of phone use?		
Evidence		Process	Content
$20 + 0.60 \times 4 + 6 \times 0.20 + 1.05 \times 3.4 = \27.17		A	1

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QUESTION THIRTY THREE – SHOOTING THE HOOP



Mele decided to practice her basketball shooting. Each practice, she shot 5 more goals than in her previous practice. On her first practice she shot 12 goals.

a) Which sentence best describes the relationship between the practice number and the number of goals shot? The number of goals shot is the same as:

- A. 12 plus 5 lots of the practice number
- B. 5 plus 12 lots of the practice number
- C. 5 plus 7 lots of the practice number
- D. 7 plus 5 lots of the practice number

b) Mele thinks that she will be shooting more than 60 goals after her 10th practice. Is this reasonable? Explain your answer.

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c) Mele makes 177 shots one day. How many days has she been practising?

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 days

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QUESTION THIRTY THREE – SHOOTING THE HOOP



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- D. 7 plus 5 lots of the practice number

Evidence	Process	Content
D	A	2

- b) Mele thinks that she will be shooting more than 60 goals after her 10th practice. Is this reasonable? Explain your answer

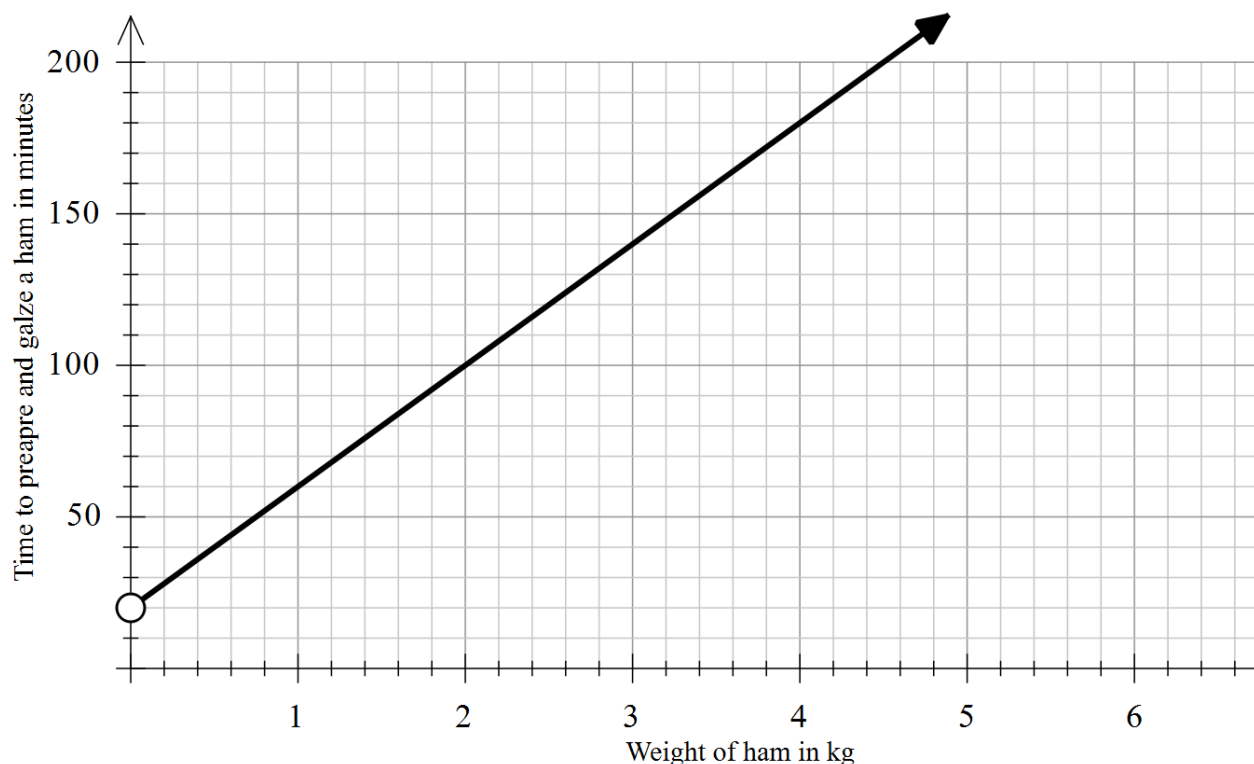
Evidence	Process	Content
Yes. After the 10 th practice she will be shooting $G = 5 \times 11 + 7 = 62$ goals but on her 10 th practice she will have only shot 57 goals Accept alternative correct methods and explanations that are consistent with part a)	C	2

- c) Mele makes 177 shots one day. How many days has she been practising?

Evidence	Process	Content
33 days	B	1

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QUESTION THIRTY FOUR – PREPARING AND COOKING A GLAZED HAM



The above graph shows the amount of time required to prepare and cook a glazed ham for Christmas.

a) What sentence best describes the linear graph above.

- A. The time to prepare and cook a glazed ham is 40 lots of the kilogram weight plus 20 minutes
- B. The time to prepare and cook a glazed ham is 20 lots of the kilogram weight plus 40 minutes
- C. The time to prepare and cook a glazed ham is 0.4 lots of the kilogram weight plus 20 minutes
- D. The weight of the ham is 20 lots of the time in minutes to prepare and cook plus 40 kg.

b) Explain clearly what point A represents in terms of the context.

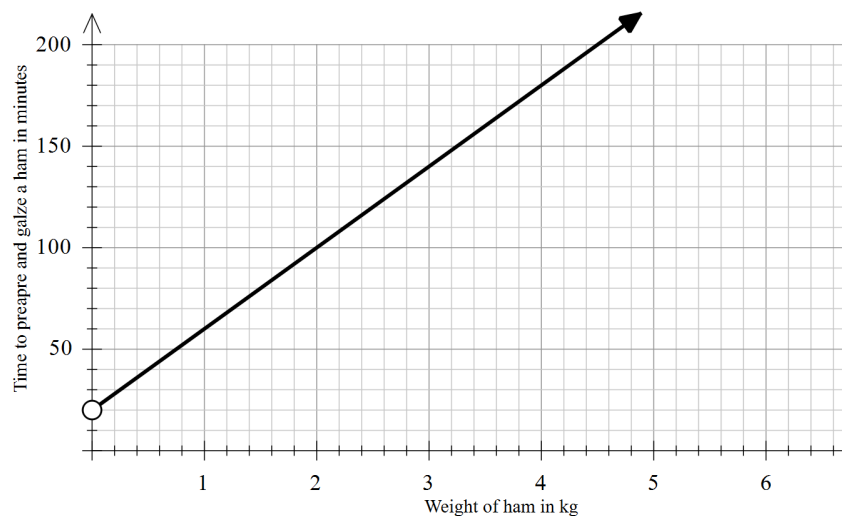
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c) How long, in hours, would a 4kg ham take to prepare and cook?

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- D. The weight of the ham is 20 lots of the time in minutes to prepare and cook plus 40 kg.

Evidence	Process	Content
A	A	2

b) Explain clearly what point A represents in terms of the context.

Evidence	Process	Content
A is the point (0,20). This indicates how long it will take to prepare the ham for cooking i.e.20 minutes	C	2

c) How long, in hours, would a 4kg ham take to prepare and cook?

Evidence	Process	Content
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180 minutes which is 3 hours	B	2
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QUESTION THIRTY FIVE – WUBER DELIVERY



a) Jeremiaiah wants to get some McDonalds delivered to him using Wuber Eats (food delivery system).

He lives on the corner of Bronte and Collingwood Streets (Point B).

If he orders from the McDonald's on Hardy Street (Point A), which of the following options is a correct route the Wuber Eats driver could take?

- A. South 1 block, East 2 blocks then South 3 blocks
- B. East 5 blocks, then South 8 blocks
- C. North 4 blocks, then East 3 blocks
- D. East 7 blocks, then North 1 block

b) A Wuber can travel 40km per hour.

McDonalds on Hardy Street (Point A) is 650m away from where Jeremiah lives at the corner of Bronte and Collingwood Streets (Point B).

If there is no traffic, how long does it take the Wuber driver to get from Point A to Point B?

minutes

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c) If you were travelling from Point B to Point A, as the bird flies, what direction would you be travelling in?

d) Nelson's MIT (university) is located at Point C. What are the coordinates of Nelson's MIT?

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QUESTION THIRTY FIVE – WUBER DELIVERY

- a) Jeremaiah wants to get some McDonalds delivered to him using Wuber Eats (food delivery system).

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If he orders from the McDonald's on Hardy Street (Point A), which of the following options is a correct route the Wuber Eats driver could take?



- A. South 1 block, East 2 blocks then South 3 blocks
- B. East 5 blocks then South 8 blocks
- C. North 4 blocks then East 3 blocks
- D. East 7 blocks then North 1 block

Evidence	Process	Content
B	A	4

- b) A Wuber can travel 40km per hour.

McDonalds on Hardy Street (Point A) is 650m away from where Jeremiah lives at the corner of Bronte and Collingwood Streets (Point B).

If there is no traffic, how long does it take the Wuber driver to get from Point A to Point B?

Evidence	Process	Content
0.98 minutes (or 58.5 seconds)	A	1

- c) If you were travelling from Point B to Point A, as the bird flies, what direction would you be travelling in?

Evidence	Process	Content
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Northwest (NW)	B	4
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d)

Nelson's MIT (university) is located at Point C. What are the coordinates of Nelson's MIT?		
Evidence	Process	Content
(8,7)	B	4

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