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**TOTAL  
MARKS**

NATIONAL SENIOR CERTIFICATE EXAMINATION  
MAY 2021

**MATHEMATICAL LITERACY: PAPER I**

**EXAMINATION NUMBER**

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Time: 3 hours

150 marks

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of 24 pages that include 1 page at the back for extra calculations or rough work.
2. Please check that your question paper is complete.
3. Answer ALL FIVE questions.
4. Answer questions in the space provided on this paper and hand it in at the end of the examination session.
5. A non-graphical, non-programmable calculator may be used.
6. ALL necessary calculations must be clearly shown.
7. Units of measurement must be included where applicable.
8. It is in your own interest to write legibly and to present your work neatly.
9. Maps and diagrams are not necessarily drawn to scale.

Question	1		2		3		4		5		Total	
	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod
<b>Mark</b>												
<b>Signature</b>												
<b>Total</b>	<b>32</b>		<b>19</b>		<b>23</b>		<b>30</b>		<b>46</b>		<b>150</b>	

**QUESTION 1**

1.1 According to [www.usatoday.com](http://www.usatoday.com), YouTube's 2018 top earner was a 7-year old, who made \$22 million playing with toys.



Ryan, of Ryan Toys Review, muscled his way to the top with his channel that had 17,3 million followers. He launched it in 2015. Ryan earned about \$21 million from pre-roll advertising on his channel.

1.1.1 Write 22 million out in full (without words).

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(2)

1.1.2 For every 1 000 views, the YouTuber earns \$2. On one particular video, Ryan had 1,6 billion views. How much money, in dollars, did he earn from YouTube for that video?

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(3)

- 1.1.3 (a) Calculate how much a YouTuber earns per 1 000 views in 2019 if the American inflation rate for 2018 was 1,9%.

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(3)

- (b) Convert your answer above to rand if the exchange rate in 2019 was \$1 = R14,38.

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(2)

- 1.1.4 If a South African YouTuber earned R27,46 per 1 000 views, how much less did a South African YouTuber earn than an American YouTuber in 2019?

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(2)

- 1.1.5 Forbes released its list of top-earning YouTube stars in 2016, with the world's most popular internet star taking home over \$15 million, which was R204 million in 2016. Calculate the exchange rate at the time this list was issued.

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(2)

1.2 If an American, in 2019, uses less than 3 GB (Gigabytes) of data per month, then the cheapest data option was Mintmobile where one paid in advance for 3 months, 6 months or 12 months.

A customer would pay \$45 up front and then pay \$15 per month for 3 months.



1.2.1 Calculate the total amount a customer would have paid for a 3 month contract.

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(2)

1.2.2 How much did 1 GB of data cost on this plan per month?

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(2)

1.2.3 (a) In South Africa, Vodacom charged R149 for 1 GB of data which lasted for 1 month. What was the cost of 3 GB of data?

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(2)

(b) If 3 GB of data cost R205,95, determine what 1 GB of data cost.

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(2)

(c) Determine the exchange rate at the time in the form of \$1 = R \_\_\_\_\_.

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(2)

(d) The exchange rate on 19/01/2020 was \$1 = R14,48. Calculate the percentage increase by which the rand had depreciated.

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(3)

1.3 The table below shows the percentage of annual tax Americans would have paid on their annual earnings in 2018.

**2018 Income Tax Brackets**

Rate	Individuals	Married Filing Jointly
10%	Up to \$9 525	Up to \$19 050
12%	\$9 526 to \$38 700	\$19 051 to \$77 400
22%	\$38 701 to \$82 500	\$77 401 to \$165 000
24%	\$82 501 to \$157 500	\$165 001 to \$315 000
32%	\$157 501 to \$200 000	\$315 001 to \$400 000
35%	\$200 001 to \$500 000	\$400 001 to \$600 000
37%	over \$500 000	over \$600 000

[Source: <www.forbes.com>]

1.3.1 What did an American earning \$31 250 per month earn in one year?

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(2)

1.3.2 Calculate how much a single American, earning \$31 250 per month, would have paid towards tax for 2018.

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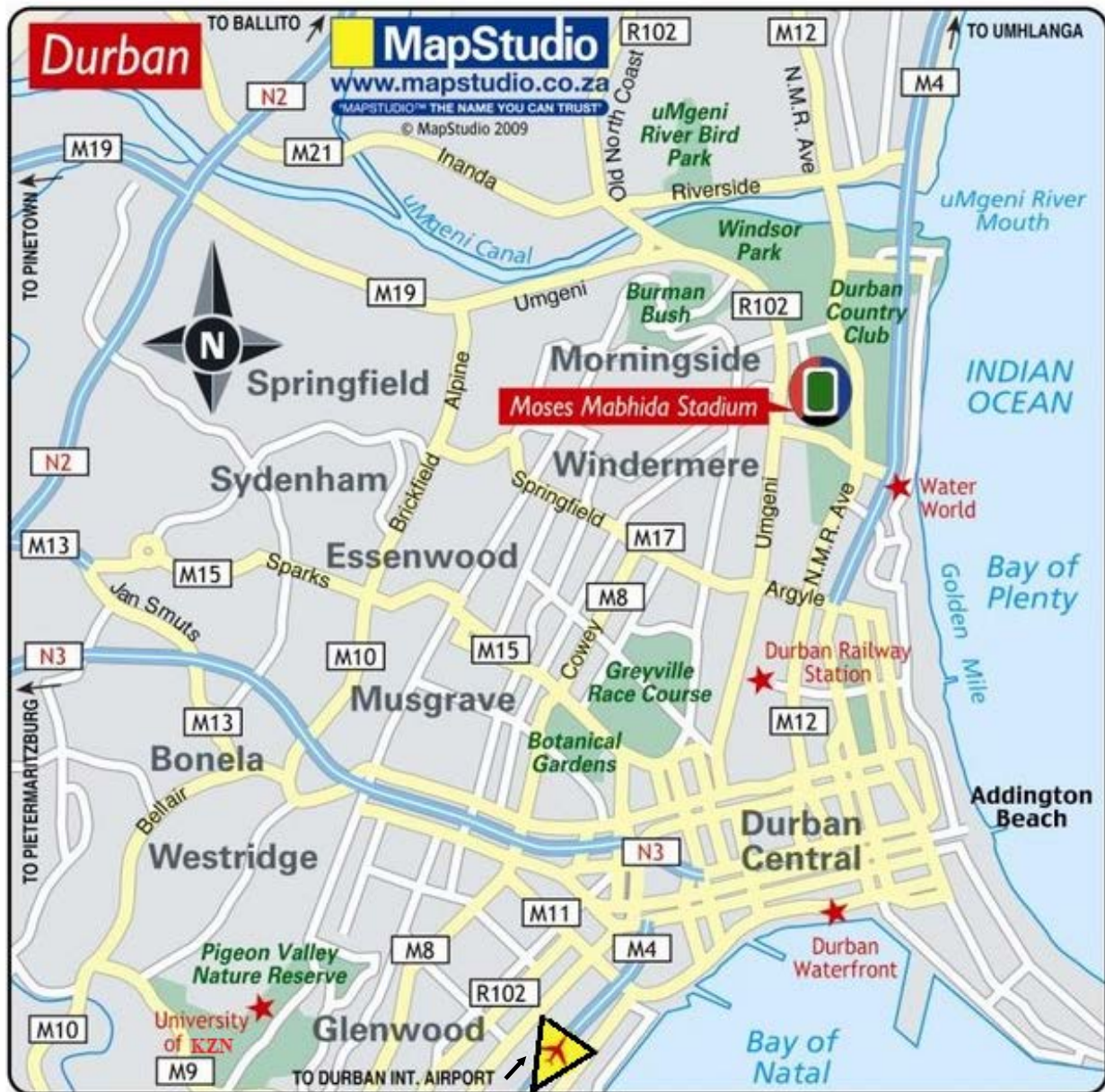
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(3)  
**[32]**

**QUESTION 2**

**Snake City** (also known as *Snakes in the City*) is a wildlife documentary television series that stars snake-catchers Simon Keys and his partner, Siouxsie Gillett. The show takes place in Durban, South Africa and has become valued for the series' entertainment and educational perspective on catching and releasing life-threatening snakes such as cobras, pythons and black mambas. [Wikipedia]

2.1 Study the map of Durban below and answer the questions that follow:



[Source: google images]

2.1.1 If Simon and Siouxsie are catching snakes in Durban Central, which National Road must they use to get to Pietermaritzburg?

(2)

2.1.2 In which general direction is the Moses Mabhida Stadium from the University of KZN (indicated by a ★)?

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(2)

2.1.3 Measure the distance, in cm, as the crow flies from the University of KZN to the centre of the Moses Mabhida Stadium.

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(2)

2.1.4 The scale of the map is given as 1,5 cm = 850 m.

(a) Convert 850 m to km.

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(2)

(b) If the distance on the map measures 12,3 cm, calculate the actual distance (in km), as the crow flies, between the Moses Mabhida Stadium and the University of KZN.

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(2)

2.1.5 The distance from the University of KZN to Moses Mabhida Stadium is 8,7 km. At what average speed (in km/h) must Simon drive if he needs to reach the Moses Mabhida Stadium within 5 minutes?

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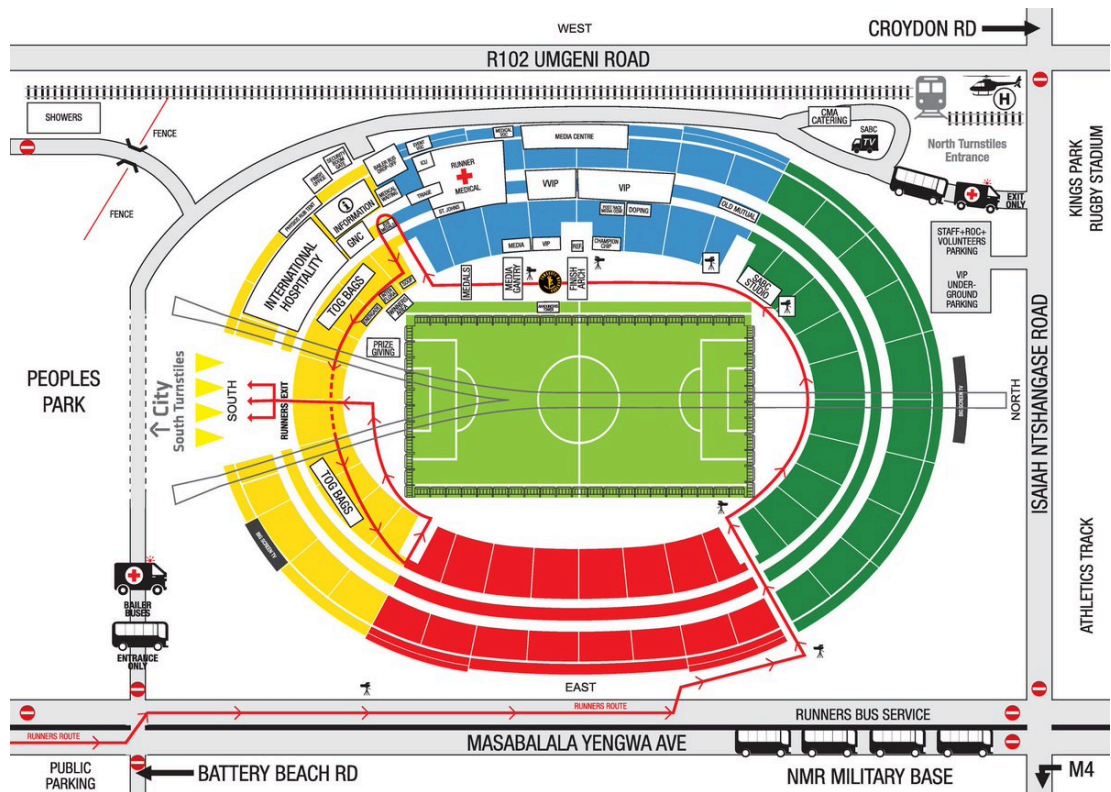
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(3)

2.2 Simon and Siouxsie were called out to find a snake at Moses Mabhida Stadium. Study the floorplan of the stadium below and answer the questions that follow:



[Source: Google Images]

2.2.1 The Moses Mabhida Stadium lies on the corner of which two roads?

\_\_\_\_\_ (2)

2.2.2 The stadium's 56 000 seats are divided equally into 4 quadrants. Determine how many seats there are in each quadrant.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)

2.2.3 There are 7 500 VIP seats in the stadium. Calculate the probability, as a percentage, that a snake hiding in the stadium is under a VIP seat, by completing the calculation below.

$$\frac{\quad}{56\ 000} \times 100 = \quad \%$$

(2)  
**[19]**

**QUESTION 3**

**Toxic Waste** is a line of sour candies. The Toxic Waste candy is packed in novelty drum containers, each holding 16 pieces of sour candy that come in five different flavours.

3.1 Study the drum container below and answer the questions that follow:



3.1.1 What is the height of the drum container in centimetres?

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(2)

3.1.2 What is the radius of the circular top of the drum container?

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(2)

3.1.3 Determine the volume of the drum container, to the nearest whole  $\text{cm}^3$ , using the following formula:

$$V = 3,142 \times \text{radius}^2 \times \text{height}$$

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(2)

3.1.4 The drum container weighs 1,7 oz (48,19 g). Determine how many grams (to two decimal places) there are in 1 ounce (oz).

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(2)

3.1.5 The Nutrition Facts on the back of the drum container states that a serving size of 5 sweets (15 g) contains 11 g of sugar.

(a) Determine the mass of one sweet.

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(2)

(b) What percentage of the serving size (5 sweets) is sugar?

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(3)

(c) If you eat all the sweets in the container, how many grams of sugar would you have consumed?

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(3)

3.2 Below is a wrapper for a rectangular Cherry Chew Bar.



3.2.1 State the length of the actual Cherry Chew Bar.

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(2)

3.2.2 The width of the wrapper is  $\frac{2}{5}$  of its length. State the width of the wrapper.

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(2)

3.2.3 Calculate the area of the wrapper.

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(3)  
[23]

**QUESTION 4**

Emojis are becoming increasingly popular and provide a rich source of data for companies to analyse and understand.

In total there were 2 823 emojis in the Unicode Standard as of June 2018. This included sequences for gender or skin tone, flags, and the components that are used to create keycap, flag, and other sequences.

[Source: <<https://emojipedia.org/stats>>]

4.1 www.cmo.com stated that there were 1 851 standard emojis by 14/03/2016.

4.1.1 On average how many emojis were designed **per month** from the beginning of March 2016 to the end of June 2018?

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(3)

4.1.2 The website also stated that emojis are used by 92% of the world's online population. If there were 3 424 971 237 online users worldwide, how many used emojis in 2016?

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(2)

4.2 The most popular emojis on Emojipedia in 2017 were:

-  Person Shrugging
-  Face With Tears of Joy
-  Red Heart
-  Smiling Face With Heart-Eyes
-  Thinking Face
-  Fire
-  Smiling Face With Smiling Eyes
-  Face Blowing a Kiss
-  Thumbs Up

From the statistics given above, what is the probability that the most popular emoji selected at random, would be a face showing an emotion?

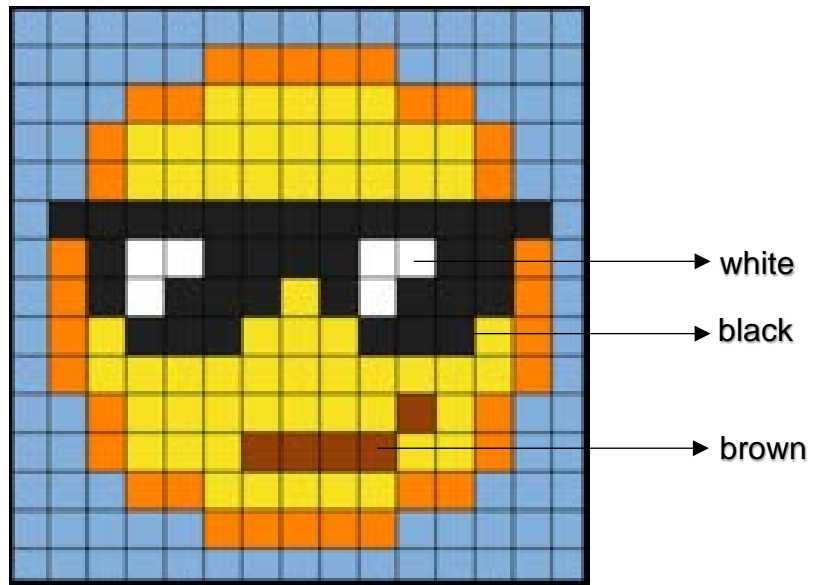
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(2)

4.3 The image of an emoji shown below was put together by 225 different coloured cards.



4.3.1 If the cards are shuffled and one card is picked up at random, what is the probability that the card would be white?

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(2)

4.3.2 If the remaining cards are shuffled again and one card is picked up at random, what is the probability that the card would be black or brown?

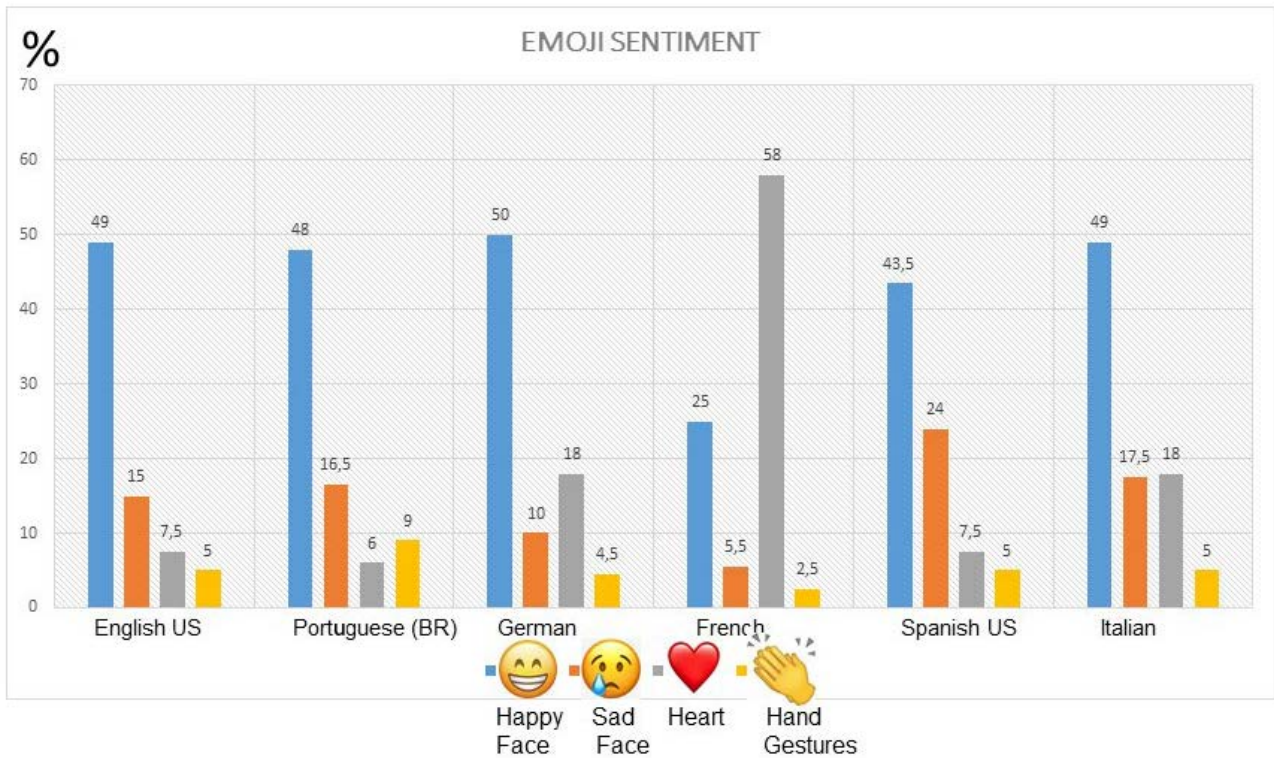
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(2)

4.4 The graph below illustrates the popularity, as a percentage, of four emojis used on WhatsApp in different language groups.



4.4.1 Which language uses sad faces as 15% of the emojis used in WhatsApp messages?

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(2)

4.4.2 Which emoji is the most popular amongst the French?

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(2)

4.4.3 Calculate the average percentage use of hearts by other languages.

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(3)

4.4.4 It is said that French speakers use the heart emoji four times more often than the average user.

With a calculation, determine if the above statement is true.

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(3)

4.5 www.emojistats.org illustrates a rolling-over total of the emojis used worldwide and which are the most popular. Study the top 14 ranked emojis and answer the questions that follow:



4.5.1 Calculate the range of the above data.

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(3)

4.5.2 Calculate the median of the top 14 emojis sent.

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(3)

4.5.3 If each number was rounded to the nearest million, what would the mode be?

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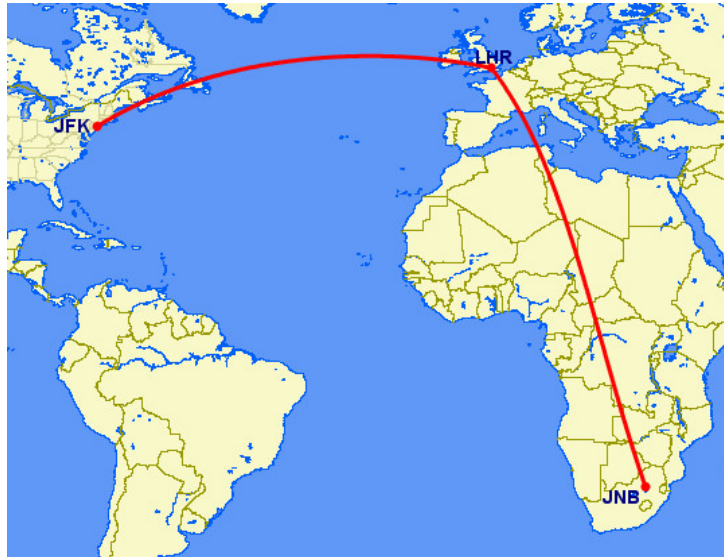


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(3)  
**[30]**

**QUESTION 5**

Nkosi is an actor who travelled from Johannesburg (JHB) to John F Kennedy International Airport (JFK) in New York, via London Heathrow International Airport (LHR), to rehearse and then perform in the Broadway show, *The Lion King*.



5.1 The flight from Johannesburg (ORT) to London covers a distance of 9 080 km at an average speed of 825,45 km/h. Calculate the duration of the flight.

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(2)

5.2 The flight from London to New York is 3 479 miles long. If this equates to 5 585 km, determine how many miles are covered in one kilometre.

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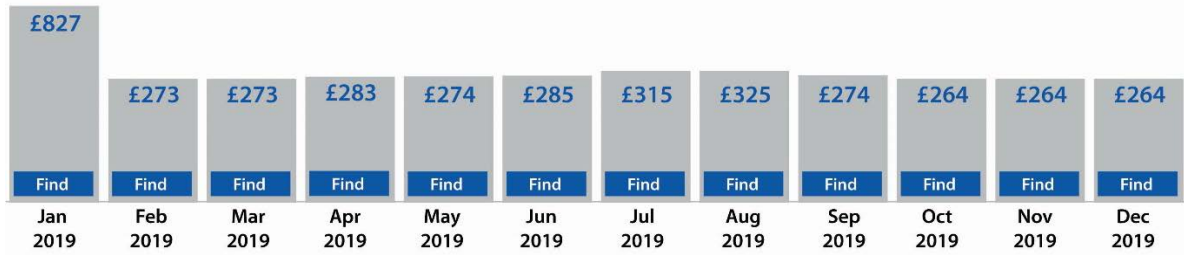


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(2)

5.3 Nkosi studied the bar graph, on [www.britishairways.com](http://www.britishairways.com), given below.

### Find our cheapest flights to New York from London



[Source: <[www.britishairways.com](http://www.britishairways.com)>]

5.3.1 In which month of the year were tickets the most expensive?

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(2)

5.3.2 What did a ticket cost in August 2019?

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(2)

5.3.3 Calculate the percentage decrease in cost between January 2019 and August 2019.

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(3)

5.4 Yellow taxi cabs are synonymous with New York Traffic. You can get from John F Kennedy Airport to New York by metro, shuttle, train, bus or taxi.

The infographic below shows how long it will take to travel from the airport to the city using the different methods of transport.

Nkosi used a taxi and was charged \$52 from the airport to his hotel in New York. The distance from John F Kennedy Airport to the city is 20 km.



[Source: <<https://kiwitaxi.com/blog/how-to-get/kennedy-airport-new-york>>]

5.4.1 How long did Nkosi spend in the taxi?

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(2)

5.4.2 If Nkosi walks out of the airport building at 09:34, at what time will he arrive at his hotel?

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(2)

5.4.3 Calculate what the cost per kilometre was for the taxi ride.

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(2)

5.4.4 If Nkosi had decided to take the train, what fraction of an hour (in simplest form) would he have had to wait at Jamaica Station if he waited the maximum length of time?

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(2)

5.4.5 Nkosi bought a model of a New York Taxi. The toy is made to a scale of 1:63.



[Source: Google Images]

If the actual length of a New York Taxi is 4,7 m, determine the length of the toy car in cm.

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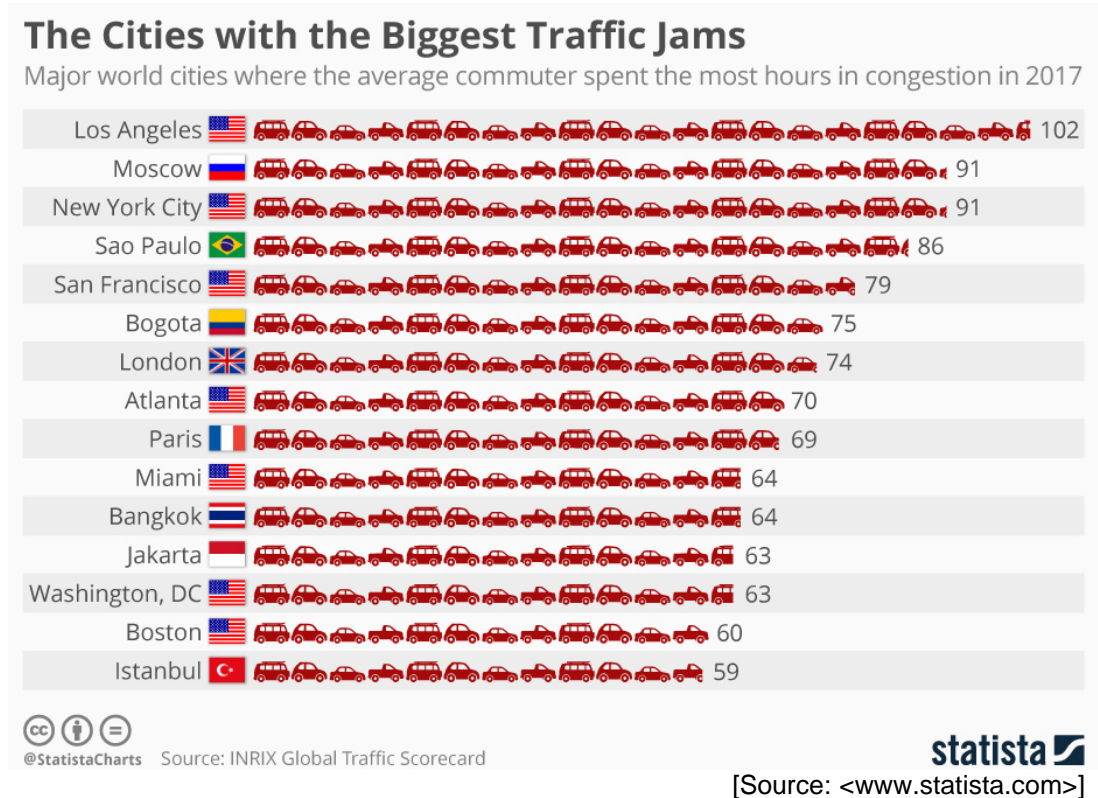
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(3)

5.4.6 New York City is the most populous city in the United States with an estimated 8 623 million people living in the city (2017). Consequently, the traffic can be very heavy.

This chart shows how many hours the average commuter spent in traffic in some of the major cities of the world.



(a) Which city is the most congested city in the world?

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(2)

(b) In the chart above, each vehicle represents a specific number of hours. How many hours does each vehicle represent?

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(2)

5.5 Nkosi performed in *The Lion King* in March 2019, Sunday to Saturday, as per the calendar below:

3	4	5	6	7	8	9
10	11	12	13 2:00pm 7:00pm	14 7:00pm	15 8:00pm	16 2:00pm 8:00pm
17 3:00pm	18	19 7:00pm	20 2:00pm 7:00pm	21 7:00pm	22 8:00pm	23 2:00pm 8:00pm
24 3:00pm	25	26 7:00pm	27 7:00pm	28 7:00pm	29 8:00pm	30 2:00pm 8:00pm
31 3:00pm	Apr 1	2	3	4	5	6

5.5.1 Each show is 1 hour and 20 minutes long which excludes an intermission (break) of 20 minutes. How much time did the cleaners have to clean the theatre before the second show started on Wednesday, 13 March 2019? The theatre needs to be ready an hour before the next show.

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(5)

5.5.2 On which day of the week was there no performance?

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(2)

5.5.3 How many shows of *The Lion King* were performed?

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(2)

5.5.4 According to [www.forbes.com](http://www.forbes.com), a Broadway musical costs \$15m to start, from then on it is about \$57 000 per show to run. How much did it cost to produce *The Lion King* in March 2019?

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(3)

5.5.5 The theatre can seat 1 620 guests at various ticket prices, dependent on where one sits. Complete the table below and hence determine the total income per show for *The Lion King* if it is sold out.

Seating	Cost per ticket	Number of seats	Income
Mezzanine	\$139	580	
Orchestra	\$175		\$94 500
Premium Orchestra		500	\$163 500
<b>TOTAL INCOME PER SHOW</b>			

(4)

5.5.6 Calculate the total income for the month of March if every show was sold out.

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(2)

5.5.7 How many shows must be performed to break even?

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(2)  
**[46]**

**Total: 150 marks**

