![ieb assessment matters logo]

MATHEMATICAL LITERACY: PAPER I

EXAMINATION NUMBER

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This question paper consists of 28 pages that include 3 pages at the back for extra calculations or rough work.

2.   Ensure 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
Mark						
Total	54	27	21	20	28	150

QUESTION 1

Sipho wants to buy a food franchise and does some research.

A franchise is an arrangement made with a specific company to sell that company's products in a particular area using that company's name. Sipho finds an interesting article on www.businesstech.co.za that provides him with valuable information.

This article was written on 26 May 2015.

> Franchising costs range from R500 000 for a brand like Chesa Nyama, to as much as R6 million for a global giant like McDonald's (all excluding VAT). Franchise set-up fees often include location, renovation and facility costs, with franchisees then paying an additional "joining fee" and monthly payments to the brand owner.
>
> Franchise fees can hit as high as R185 000 for a Nando's franchise or even R540 000 ($45 000) for McDonald's, while monthly royalty and marketing payments range between a combined 4% and 12% of net income.
>
> South Africa's biggest food chain, KFC, with 771 stores across the country, carries the second-highest start-up costs at R5,5 million.

1.1   Calculate how much more money Sipho would need to open a McDonald's store rather than a Chesa Nyama.

_____

_____

_____ (3)

1.2   A McDonald's franchise costs R6 million excluding VAT. Determine the price of a McDonald's franchise including 14% VAT.

_____

_____

_____

_____ (2)

1.3   If the cost of a McDonald's franchise increases by 4,6% every year, calculate what a franchise would cost in 2018.

2015	2016	2017	2018
6 000 000			

(4)

1.4   If each KFC store made a profitable income of R136 400 per month, determine what the total profitable income for 2015 was.

_____

_____

_____

_____

_____

_____   (3)

1.5   1.5.1   If McDonald's charges the minimum franchise fee for royalty and marketing, what percentage will they charge the franchisee?

_____   (2)

       1.5.2   How much would that franchisee have to pay the franchiser if its net income was R8 000 000?

_____

_____

_____   (2)

1.6   Sipho finds an income statement for a McDonald's franchise in the United States of America.

INCOME STATEMENT		
Profit and Loss account for McDonald's Franchise *Owner: Pete McIntosh*		
Sales		*$89,000*
Cost of Goods Sold		*$10,600*
NET INCOME		**$78,400**
Less expenses		
Wages	*$10,000*	
Rent	*$12,000*	
Insurance	*$1,000*	
Vehicles	*$5,000*	
Telephones	*$3,000*	
Utilities	*$5,000*	**$36,000**
NET PROFIT		**A**

1.6.1   Who is the owner of this store?

_____   (2)

1.6.2   State which expenses total to five thousand dollars.

_____

_____

_____   (2)

1.6.3   Calculate the value of A.

_____

_____

_____   (2)

1.6.4   Calculate the profit margin.

$$\text{Profit margin} = \text{percentage profit} = \frac{\text{profit}}{\text{income}} \times 100$$

_____

_____

_____

_____   (3)

1.7   A promotion at a McDonald's store in Singapore has an "Everyday Savers Menu" illustrated below.

Study the products and prices and answer the questions that follow.

[Source: <https:sg.everydayonsales.com>]

1.7.1 Calculate the total cost for a customer that purchases 2 McChicken burgers, 1 French fries and a Coca-Cola.

_____

_____

_____   (3)

1.7.2   On 04-01-2018 the rand to dollar exchange rate was 1 : 0,080944. Determine the cost of the meal purchased in **Question 1.7.1** in rand.

_____

_____

_____

_____   (2)

1.7.3   Sipho says the exchange rate given in **Question 1.7.2** is incorrect and that $1 is equivalent to R12,354192.

(a)   Use the exchange rate given by Sipho to determine the cost of the meal purchased in **Question 1.7.1** in rand.

_____

_____

_____

_____   (2)

(b)   Is the exchange rate given in **Question 1.7.2** incorrect?

_____   (2)

1.7.4   The customer has three meals to choose from, a 2pc McWing, a McDouble burger and a McChicken burger. What is the probability that the customer will choose a McChicken burger if he has an equal chance of choosing any one of the three meals?

_____

_____   (2)

1.7.5   The customer has 3 meals (a 2pc McWing, a McDouble burger and a McChicken burger) and 2 sides (fries and corn) to choose from.

Complete the tree diagram to illustrate the various options the customer has to choose from.
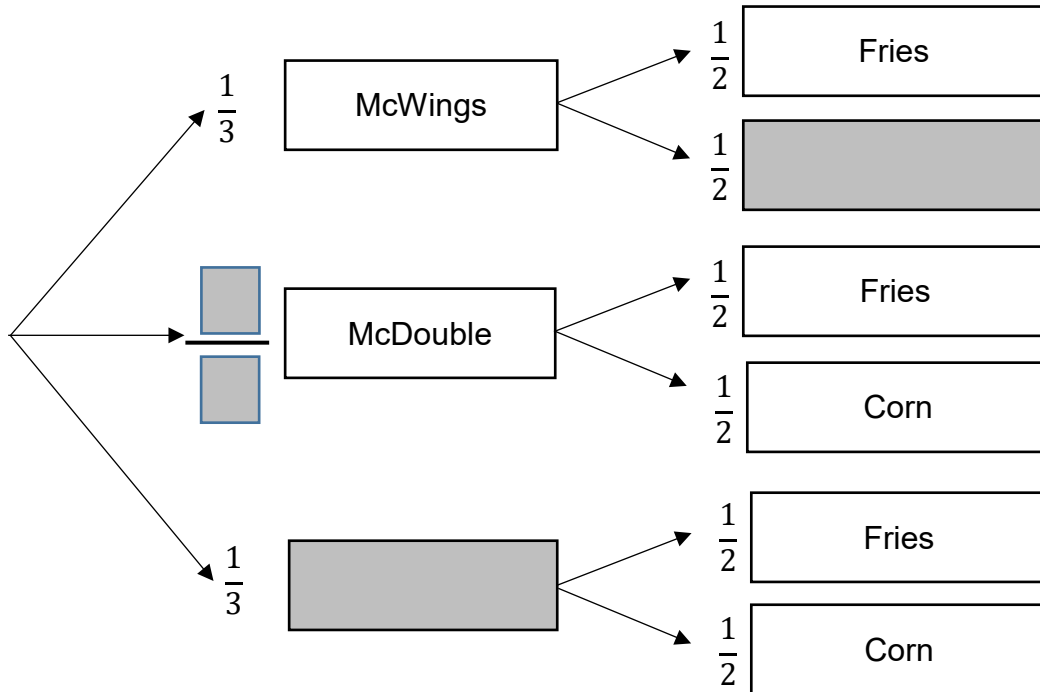
(3)

1.7.6   Using the tree diagram above, determine what the probability is that the customer will choose a McDouble burger and fries.

_____

_____

_____

(2)

1.8   Sipho finally started up his own McDonald's store. Below is a till slip from one of his customers. Study the till slip and answer the questions that follow.

```
                    2063
             McDonald's South Africa
    Restaurant #1970376            Mall at Carnival
    www.mcdonalds.co.za           Tel: 011 915 7639

    Crew id 31  NTINTILLI Z.        TAX INVOICE
    ORD #63 REG #20 – 02/05/2018      16:57:56

    QTY ITEM                            TOTAL
    1 Cajun Chicken                     30.00
    3 Cheeseburger                      49.50
    3 Ketchup                            0.00
    2 Chicken Burger                    32.00

    Subtotal                           111.50
    Take-out Total (incl VAT)          111.50
    Cash Tendered                      200.00
    Change                              88.50

    TOTAL INCLUDES VAT OF 15%           13.70
```

1.8.1 On which value was the VAT calculated?

_____

_____   (2)

1.8.2 The order takes exactly 13 minutes to complete. What time will the order be ready?

_____

_____

_____

_____

_____   (3)

1.9   Below is the Ekurhuleni electricity tariffs schedule for 2018–2019. Study the table given below and answer the questions that follow.

The following charges will be payable:

Fixed charge (rand/month)	
NOTE: A fixed amount is charged to all customers once a month per point of supply, whether electricity is consumed or not.	
Credit metering VAT exclusive	Prepayment metering VAT exclusive
R34,64	R10,00
Energy charge (R/kWh)	
VAT exclusive: R1,82	VAT exclusive: R1,82
Internet-based consumption display (rand/month)	
If the electricity consumption is displayed on the internet, on request of the customer, an additional monthly amount is charged:	
VAT inclusive R174,23	

1.9.1   Calculate Sipho's electricity bill including VAT (15%), if his McDonald's store uses an average of 12 425 kWh per month on the credit-metering basis.

(5)

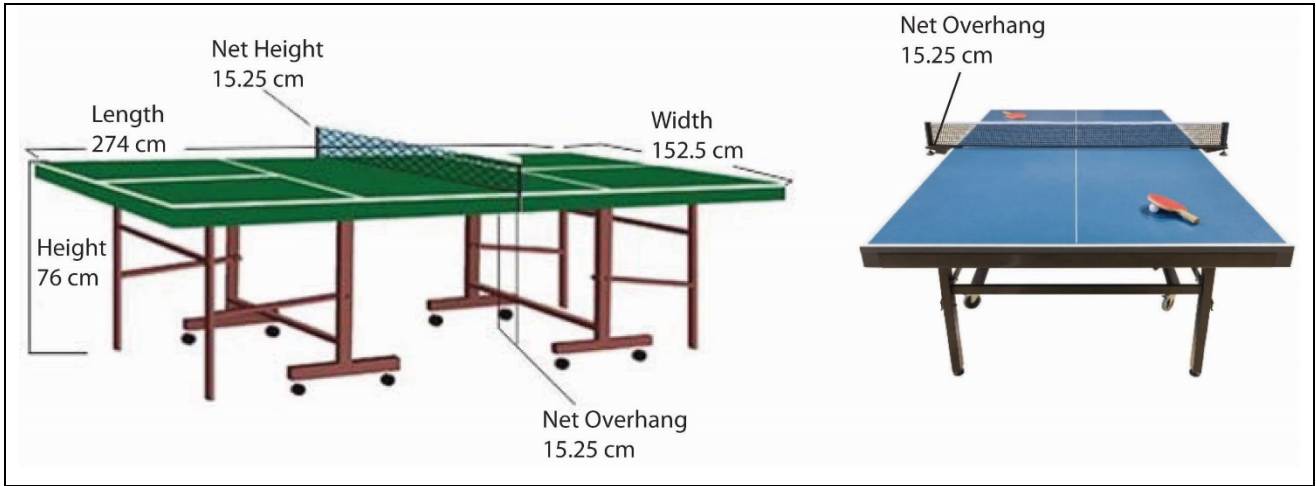1.9.2   Determine Sipho's total monthly electricity bill if he has requested to receive his electricity consumption displayed on the internet. Round off to the nearest rand.

(3)

[54]

QUESTION 2

Table tennis is a very popular sport at the Olympics Games.

2.1   Below is a diagram of the dimensions of a table tennis table.

[Source: <https://za.pinterest.com>]

2.1.1   Determine the length of the net.

_____

_____

_____

_____   (3)

2.1.2   Calculate the total surface area of the table in m^2.

_____

_____

_____   (3)

2.2   Below are the dimensions of a bat.
       Answer the questions that follow.

[Source: google images]

2.2.1 The bat is 10,24 inches in length. Determine how many centimetres
       are in one inch.

       _____

       _____

       _____

       _____

       _____   (4)

2.2.2 Write down the ratio of the length of the handle to that of the paddle
       in its simplest form.

       _____

       _____

       _____   (2)

2.3   Table tennis players, as all sports players, are serious about their fitness levels.

   2.3.1 A game started at 10:08 and lasted 1 hour and 58 minutes. What time did the game end?

   _____

   _____

   _____

   _____

   _____

   _____   (3)

   2.3.2 For social table tennis, a player who weighs 150 pounds will burn 272 calories during one hour.

   In competitive table tennis, the same person will burn approximately 500 calories in one hour.
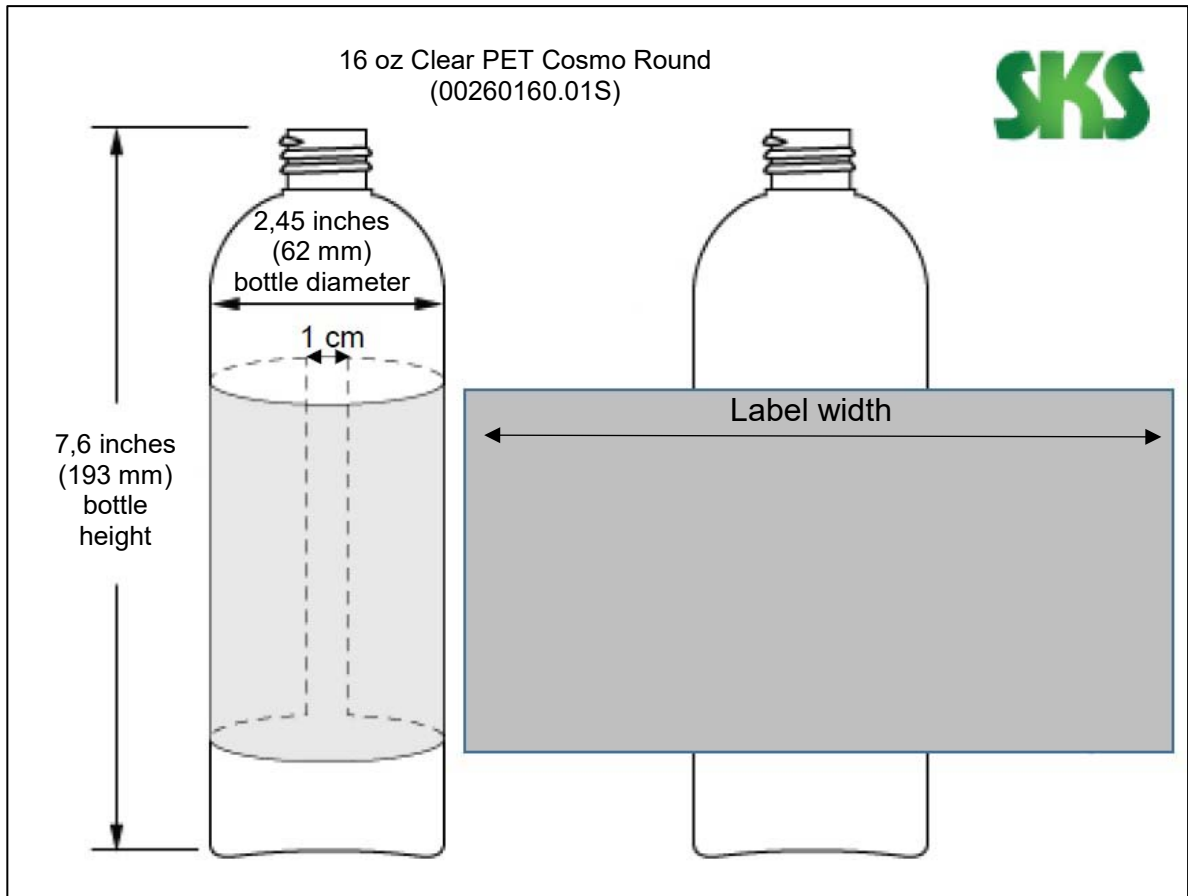
   One needs to burn 3 500 calories to lose 1 pound of weight.

   (a)   Determine how many calories will be burnt by a social player weighing 150 pounds, if a game lasts 1 hour and 30 minutes.

   _____

   _____

   _____   (3)

   (b)   How long must a competitive table tennis player play to lose 1 pound of weight?

   _____

   _____

   _____   (2)

2.4   As with any sport, it is vital to drink water while you play table tennis. Study the dimensions of the water bottle below to answer the questions that follow.

16 oz Clear PET Cosmo Round
(00260160.01S)

2,45 inches
(62 mm)
bottle diameter

1 cm

7,6 inches
(193 mm)
bottle
height

Label width

[Adapted from: <www.plastic-bottle-manufacturers.com>]

2.4.1   Determine the width of the label in *mm*. You may use the following equation:

$$Circumference\ of\ a\ circle = 3,142 \times diameter$$

OR

$$Circumference\ of\ a\ circle = 2 \times 3,142 \times radius$$

_____

_____

_____   (3)

2.4.2 The bottle has a volume of 582 680 mm³. The manufacturers only fill it to 85% of its capacity. Calculate how much water the bottle holds, in mm³.

_____

_____

_____

_____ (2)

2.4.3 If 1 litre = 1 000 cm³, convert your answer in **Question 2.4.2** above to litres.

_____

_____

_____

_____ (2)

[27]

QUESTION 3

The Baz Bus is a unique hop-on hop-off, door-to-door bus service between more than 200 accommodations in 40 different towns in South Africa. Their route runs between Cape Town and Johannesburg with stops along the coast and operates in both directions.

Our buses are 22-seater semi-luxury buses, all with on-board Wi-Fi, TV and DVDs, USB ports, air-conditioning and trailers capable of carrying surfboards and bicycles.

Perfect for travellers wanting to meet a bus load of people who share your passion for exploring and adventure.

[Source: <www.bazbus.com>]

3.1   A one-way ticket between Cape Town and Johannesburg costs R4 000. What would the total income for Baz Bus be if the bus was full?

_____

_____

_____   (2)

3.2   Ireen, a Dutch tourist, travels on the Baz Bus from Johannesburg to Cape Town. A section of her journey is illustrated below. Answer the questions that follow.
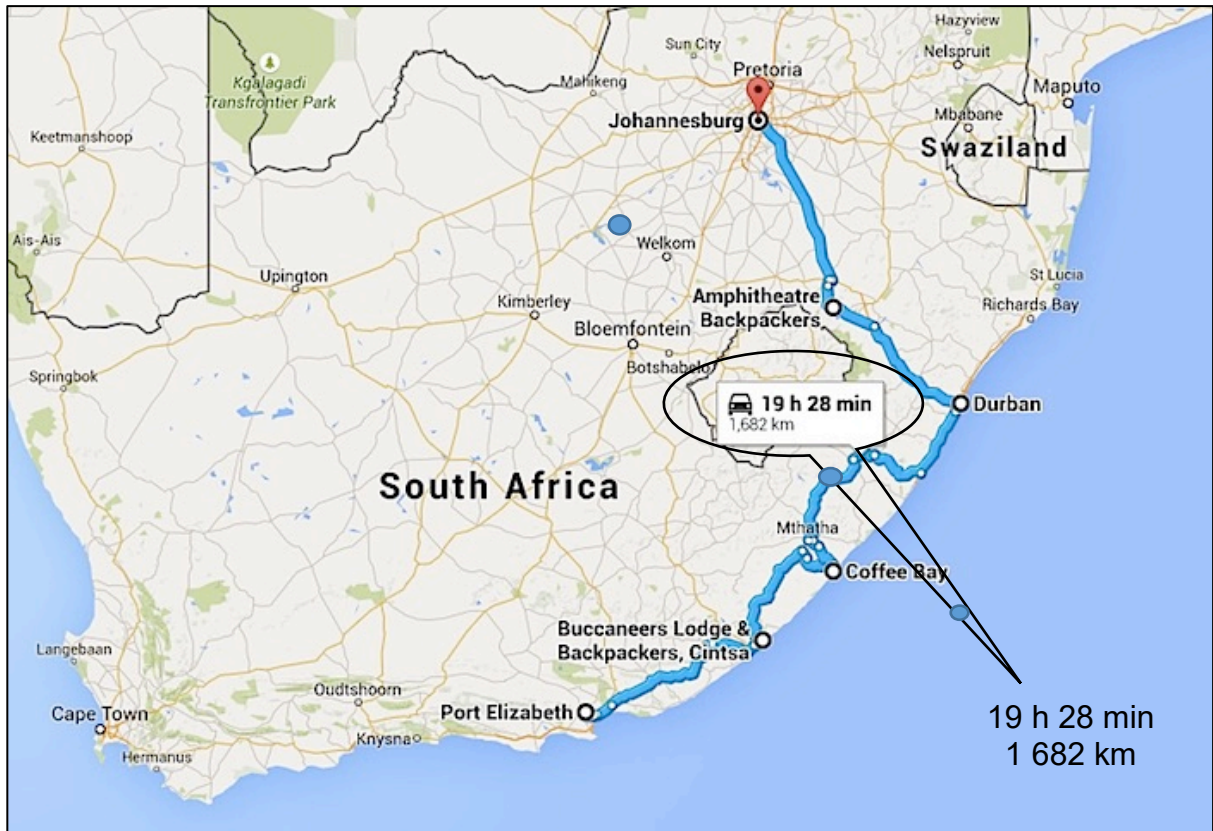
[Source: Google Maps]

3.2.1 Use your ruler to measure the distance from Johannesburg to Durban via the Amphitheatre Backpackers.

_____

_____

_____   (2)

3.2.2 The distance between Johannesburg and Durban is 567 km. Convert this distance to cm.

_____

_____

_____   (3)

3.2.3 Calculate the scale of the map. Round your answer off to the nearest million.

_____

_____

_____

_____

_____ (3)

3.2.4 Calculate the average speed of the bus for Ireen's trip.

_____

_____

_____

_____

_____ (3)

3.3   Below is a detailed map of the Baz Bus route from Johannesburg to Cape Town.
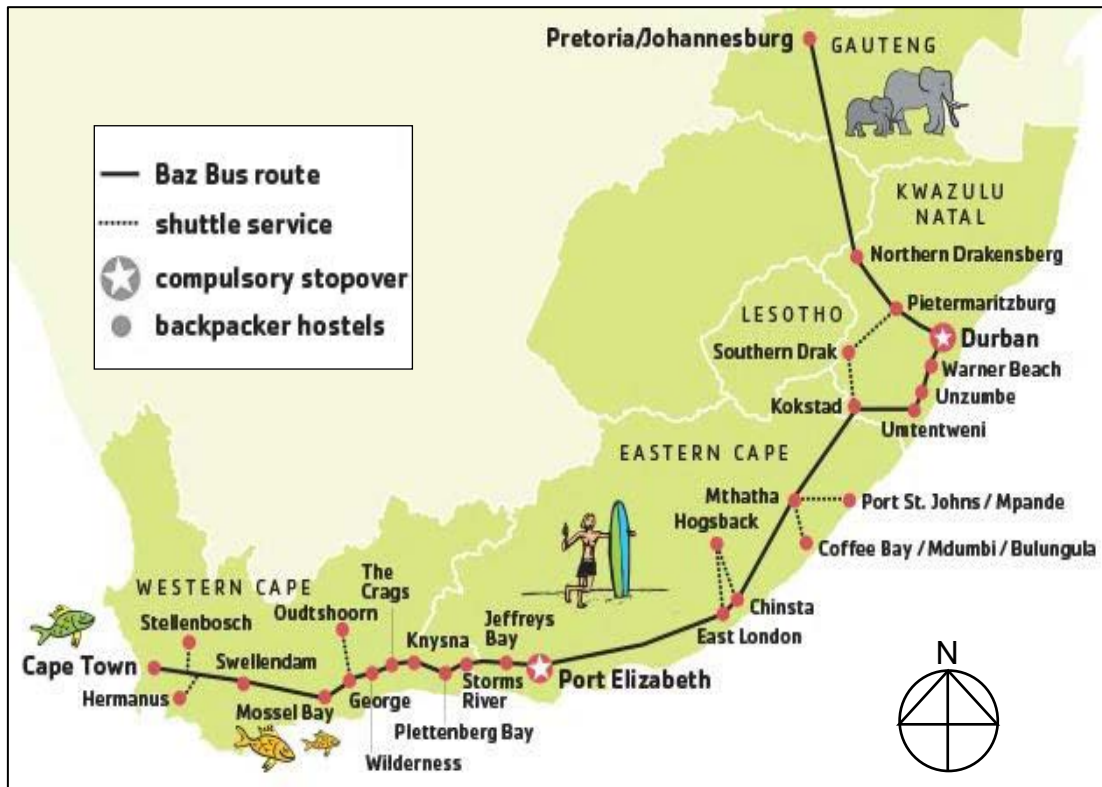
[Source: <www.bazbus.com>]

3.3.1 Which two towns indicated on the map are the closest to Cape Town?

_____

_____   (2)

3.3.2 If you travel from George to Oudtshoorn, would you take the Baz Bus or a shuttle service?

_____

_____   (2)

3.3.3 How many compulsory stop-overs are there on the route from Johannesburg to Cape Town?

_____

_____   (2)

3.3.4 In which general direction would you be travelling if you travelled from Port Elizabeth to Cape Town?

_____

_____   (2)

[21]

QUESTION 4

There are almost as many cellphone subscriptions as there are people on this earth.

4.1   In 2013, there were 96 cellphone service subscriptions for every 100 people in the world.

Write this ratio in unit form.

_____

_____

_____   (2)

4.2   Study the statistic given below and answer the question that follows.

It is estimated that at least 23% of all car accidents every year involve cell phone use – that is 1,3 million accidents.

23%
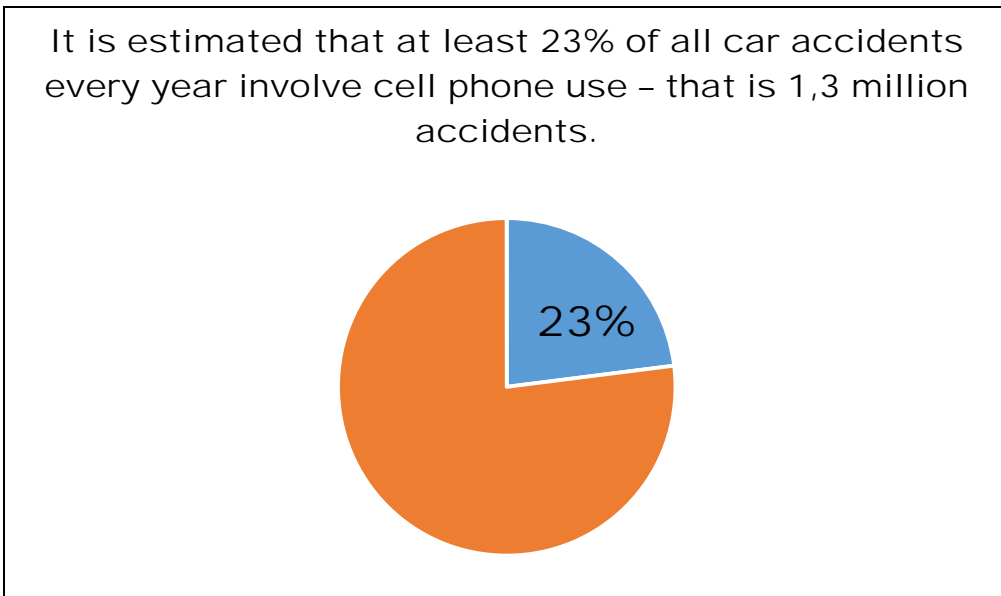
[Adapted from: <www.edgarsnyder.com>]

Calculate how many car accidents occur per year.

_____

_____

_____

_____   (3)

4.3   Below is a horizontal compound bar graph depicting the things drivers do that take their eyes and focus off the roads. This survey was conducted in 2016.

Things drivers do that take their eyes and focus off the road

Statement	Witnessed often or always	Makes a lot of difference to safety
The driver is talking on a cell phone.	57%	28%
The driver is selecting music while driving.	52%	13%
Music in the car is very loud.	46%	14%
The driver and passengers are dancing or singing along to the music.	33%	21%
The driver is text messaging, playing a video game, or using some other kind of handheld electronic device.	19%	79%

% of teens responding   0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Witnessed often or always   ■ Makes a lot of difference to safety

[Source: google images]

4.3.1   What is the most often (or always) witnessed distraction to drivers?

_____

_____

_____   (2)

4.3.2   Which distraction is most dangerous to drivers?

_____

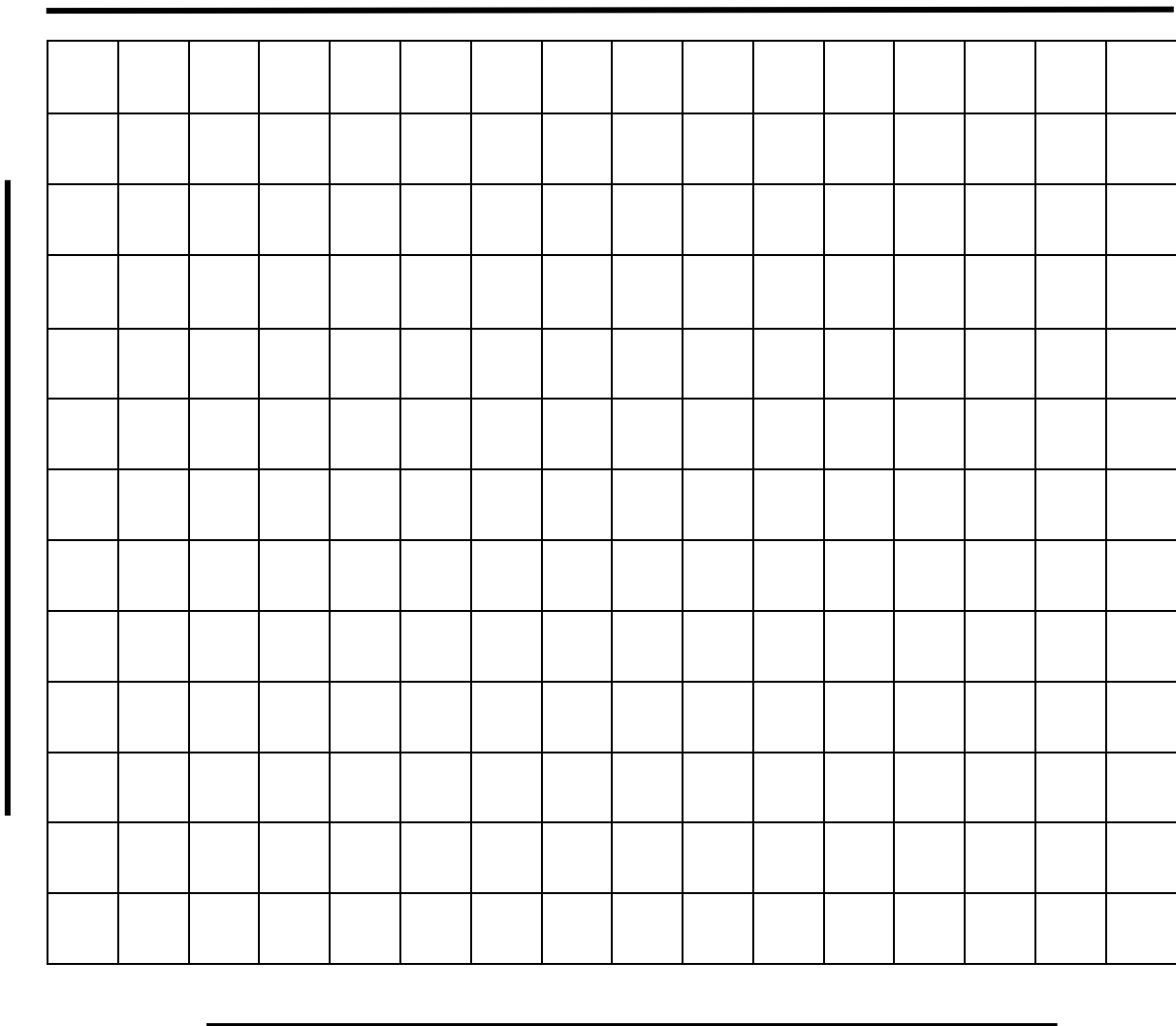_____

_____   (2)

4.3.3   Name another type of graph that would depict the data in the same light.

_____

_____

_____   (2)

4.4   Below is a table depicting the total number of South African road fatalities (people who died) from 2012 to 2016.

2012	13 528
2013	11 844
2014	12 702
2015	12 944
2016	14 071

Illustrate this information in a bar graph on the axis given below.

(9)
[20]

QUESTION 5

The Olympic games are held every four years. Their creation was inspired by the ancient Olympic Games, which were held in Olympia, Greece, from the 8th Century BC to the 4th Century AD. The last Olympic Games were held in Rio de Janeiro in 2016.
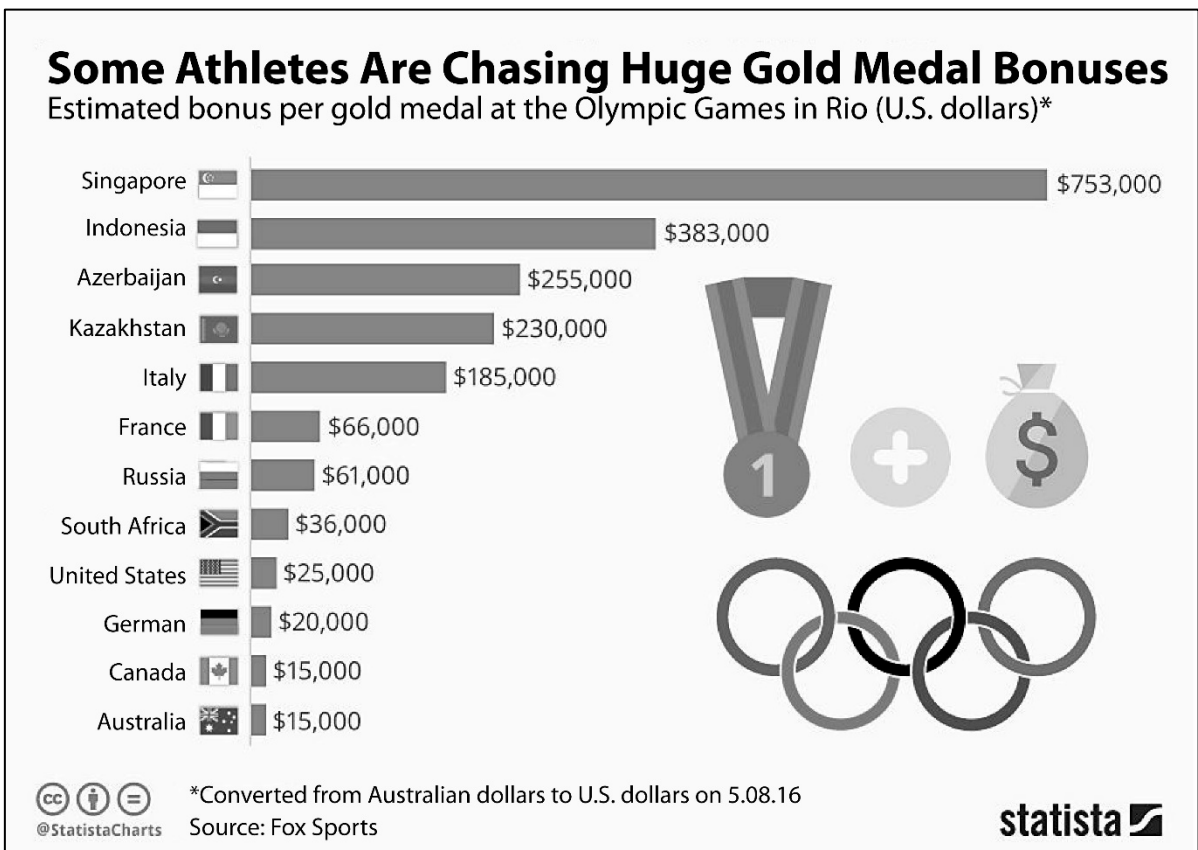
5.1   How many centuries have passed between the 8th Century BC to the 4th Century AD?

_____

_____

_____   (2)

5.2   When will the next Olympic Games be held?

_____

_____

_____   (2)

5.3   Athletes receive a bonus for every medal they win. The amount of money certain countries give the winner of a gold medal is shown in the graph below.

Some Athletes Are Chasing Huge Gold Medal Bonuses
Estimated bonus per gold medal at the Olympic Games in Rio (U.S. dollars)*

Country	Bonus
Singapore	$753,000
Indonesia	$383,000
Azerbaijan	$255,000
Kazakhstan	$230,000
Italy	$185,000
France	$66,000
Russia	$61,000
South Africa	$36,000
United States	$25,000
German	$20,000
Canada	$15,000
Australia	$15,000

*Converted from Australian dollars to U.S. dollars on 5.08.16
Source: Fox Sports

@StatistaCharts   statista

[Source: Fox Sports]

    5.3.1   Calculate the mean amount of money a gold medalist gets.

_____

_____

_____

_____ (3)

    5.3.2   Determine the range of the bonuses given to gold medalists.

_____

_____

_____ (2)

    5.3.3   Determine the median amount of money given to gold medalists.

_____

_____

_____

_____ (3)

    5.3.4   State the modal amount of money given to gold medalists.

_____

_____

_____ (2)

5.4   The South African Sports Confederation and Olympic Committee (SASCOC) rewarded Team SA for the 10 medals won at the Rio Olympics. Team SA won 2 gold medals, 6 silver medals and 2 bronze medals.

    A gold medalist earned R500 000, a silver medalist earned R250 000 and a bronze medalist earned R100 000.

    5.4.1   Calculate how much money SASCOC rewarded the team with.

_____

_____

_____ (3)

5.4.2   Write the Gold : Silver : Bronze medal earnings as a simplified ratio.

_____

_____

_____   (2)

5.5   If a South African athlete had won a gold medal at the Rio Olympics, his/her winnings would have been divided between the athlete and his/her coach in an 80 : 20 ratio.

5.5.1   How much money would a coach have earned if the athlete had won a gold medal?

_____

_____

_____

_____   (2)

5.5.2   If Wade van Niekerk and Caster Semenya had won one gold medal each, how much money would they have earned collectively from SASCOC?

_____

_____

_____   (3)

5.5.3 Use the table below to calculate how much tax Wade van Niekerk would have paid on the money he earned from his gold medal.

RATES OF TAX FOR INDIVIDUALS	
Taxable income (R)	Rates of tax (R)
0 – 188 000	18% of taxable income
188 001 – 293 600	33 840 + 26% of taxable income above 188 000
293 601 – 406 400	61 296 + 31% of taxable income above 293 600
406 401 – 550 100	96 264 + 36% of taxable income above 406 400

[Source: <www.sars.co.za>]

(4)

[28]

Total: 150 marks