NATIONAL SENIOR CERTIFICATE EXAMINATION
SUPPLEMENTARY EXAMINATION – MARCH 2018

MATHEMATICAL LITERACY: PAPER I

Time: 3 hours | 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 14 pages
   - 5 questions
   - An Answer Sheet of 2 pages
   - An Appendix of 1 page

   Remove the Answer Sheet from the middle of the question paper. Hand it in with your Answer Book.

2. Ensure that your question paper is complete.

3. Answer ALL the questions.

4. Start each question on a new page.

5. Number the answers exactly as the questions are numbered.

6. A non-graphical, non-programmable calculator may be used.

7. All necessary calculations must be clearly shown.

8. Units must be included where applicable.

9. Round off to two decimal places, unless stated otherwise OR where the context requires rounding up or down.

10. It is in your own interest to write legibly and to present your work neatly.

11. Maps and diagrams are not necessarily drawn to scale unless otherwise stated.

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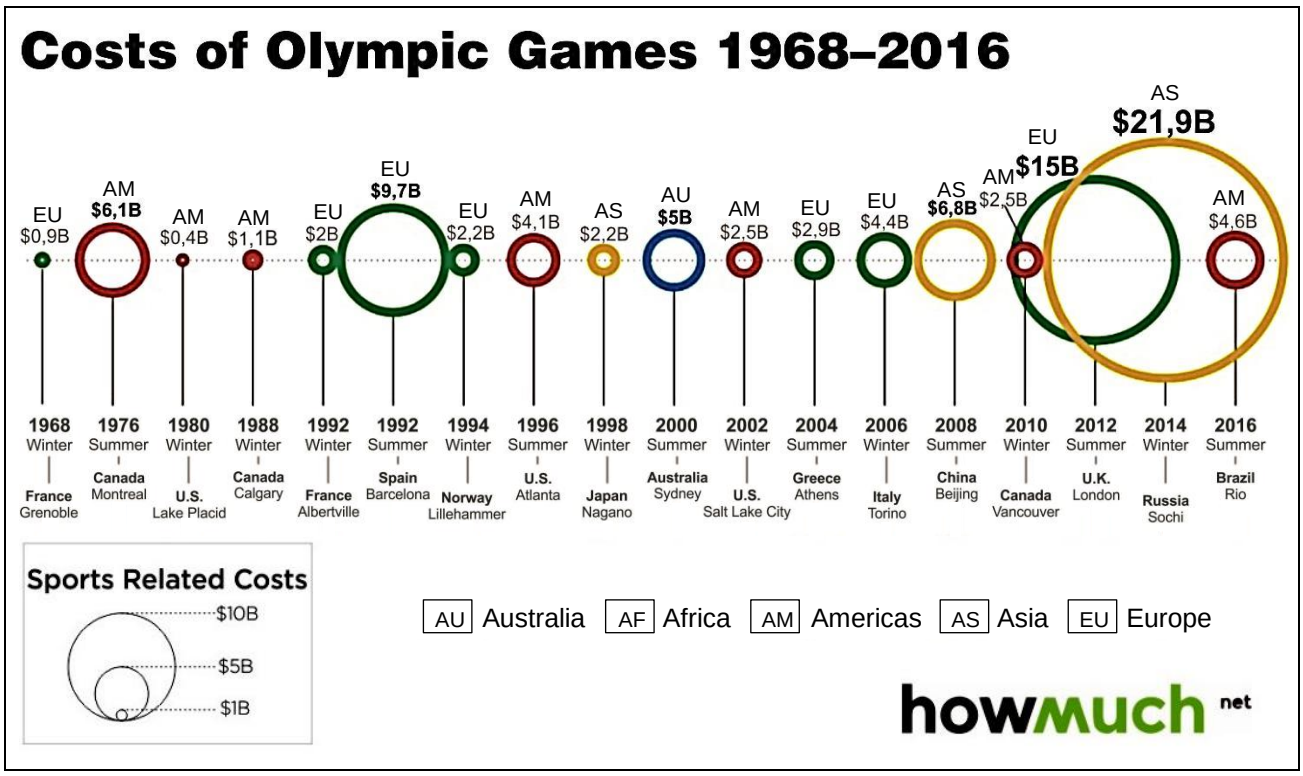
QUESTION 1

There are two types of Olympics, the summer and winter games. These are held in different years and each occurs 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.

1.1 Determine the year in which the next Winter Olympic Games will be held. (2)

1.2 Study the infographic below and answer the questions that follow.



1.2.1 State which country hosted the 1998 Winter Olympic Games. (2)

1.2.2 Write down the name of the continent that has not hosted any Olympic Games yet. (2)

1.2.3 Determine the probability of randomly selecting one of the following:

(a) A European country that hosted any of the Olympic Games. (2)

(b) An Olympic Games that was held in winter. (2)

(c) A Winter Olympic Games hosted by a European country. (2)

1.2.4 Calculate the total amount spent by the Americas over the last 18 games. (3)

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1.2.5 Calculate the percentage decrease in the amount spent in Montreal, Canada to the amount spent in Lake Placid, U.S. (4)

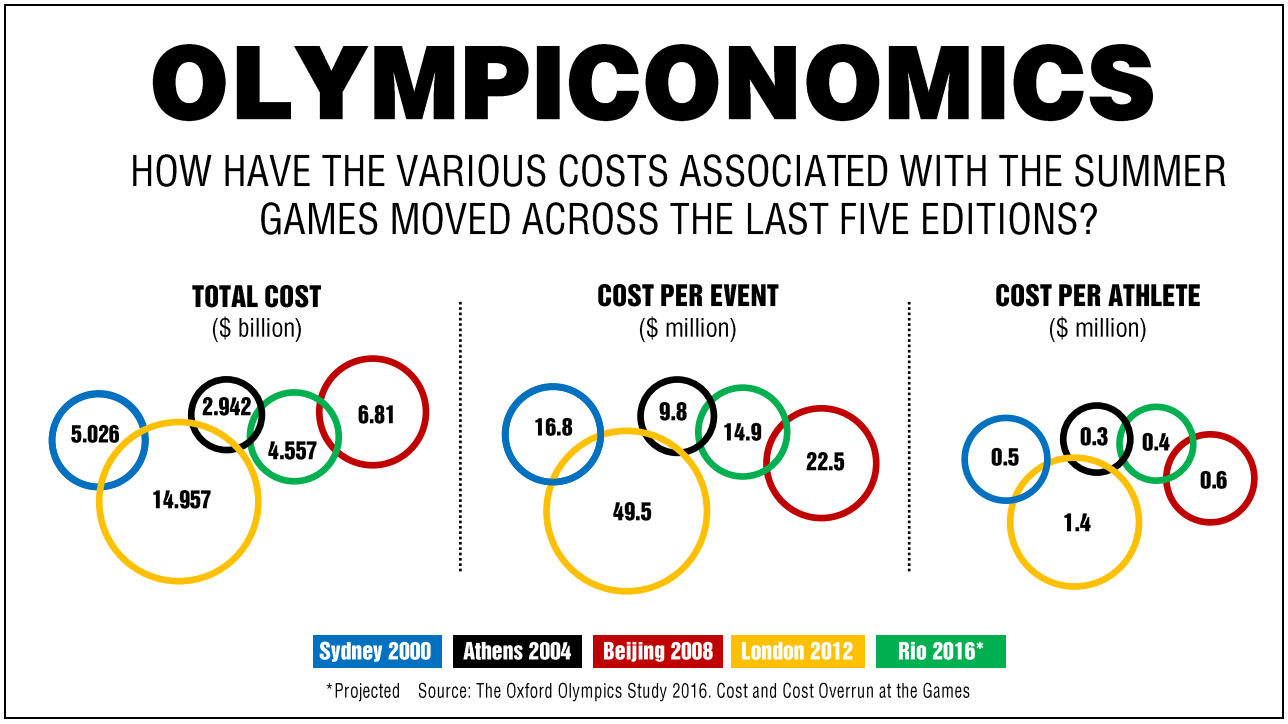
You may use the following formula:

$$Percentage\ decrease = \frac{difference}{Original} \times 100\%$$

1.2.6 On the 1st of November 2012 the exchange rate between the GBP (British Pound) to the USD (United States Dollar) was 1 GBP = 1,6133 USD. Determine the amount spent (in GBP) by Great Britain to host the 2012 Olympics. (3)

1.3 In 2012 the Olympics were held in London. The total cost was $14,957 billion at that stage.

Study the information given on the illustration below and answer the questions that follow.



[Source: The Oxford Olympics Study 2016]

1.3.1 Rewrite the number $14,957 billion in full, without using the word "billion". (2)

1.3.2 The total cost of the Rio Olympics in 2016 was $4,557 billion. If the average cost of inflation from 2016 to 2020 remained constant at 6,59% per annum, complete the following table, rounding off your answers to 1 decimal place.

Year	**Amount at the beginning of the year (in $ billion)**	**Inflation at 6,59% (in $ billion)**	**Amount at the end of the year (in $ billion)**
2017	4,557	0,3	4,9
2018	4,9	0,3	5,2
2019	5,2	0,3	*a*
2020	5,5	*b*	*c*

(6)

1.3.3 Use the grid provided on the Answer Sheet and the above table to draw a broken line graph, showing the amount spent at the end of the year for the years 2017 to 2020. (8)

1.4 Wayde van Niekerk and Caster Semenya each received four hundred thousand rand from the South African Sports Confederation and Olympic Committee (SASCOC) plus R100 000 bonus each for winning medals. SASCOC paid a total of R2,7 million to Team SA for the 10 medals won at the Rio Olympics.

1.4.1 Determine the amount of money Caster Semenya received from SASCOC. (2)

1.4.2 Calculate the amount received by Wayde van Niekerk as a percentage of the total amount paid out by SASCOC. (4)

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1.5 In addition to the income received from SASCOC, Wayde van Niekerk also received an amount of R700 000 in the form of sponsorships for the year. Use the income tax table below to answer the questions that follow.

2017 tax year (1 March 2016–28 February 2017)

Tax bracket	Taxable income (R)	Rates of tax (R)
1	0–188 000	18% of taxable income
2	188 001–293 600	33 840 + 26% of taxable income above 188 000
3	293 601–406 400	61 296 + 31% of taxable income above 293 600
4	406 401–550 100	96 264 + 36% of taxable income above 406 400
5	550 101–701 300	147 996 + 39% of taxable income above 550 100
6	701 301 and above	206 964 + 41% of taxable income above 701 300

Tax Rebates

Tax Rebate	
	2017
Primary	R13 500
Secondary (65 and older)	R7 407
Tertiary (75 and older)	R2 466

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

1.5.1 Determine Wayde's total income for the year. (2)

1.5.2 State which tax bracket Wayde falls into. (2)

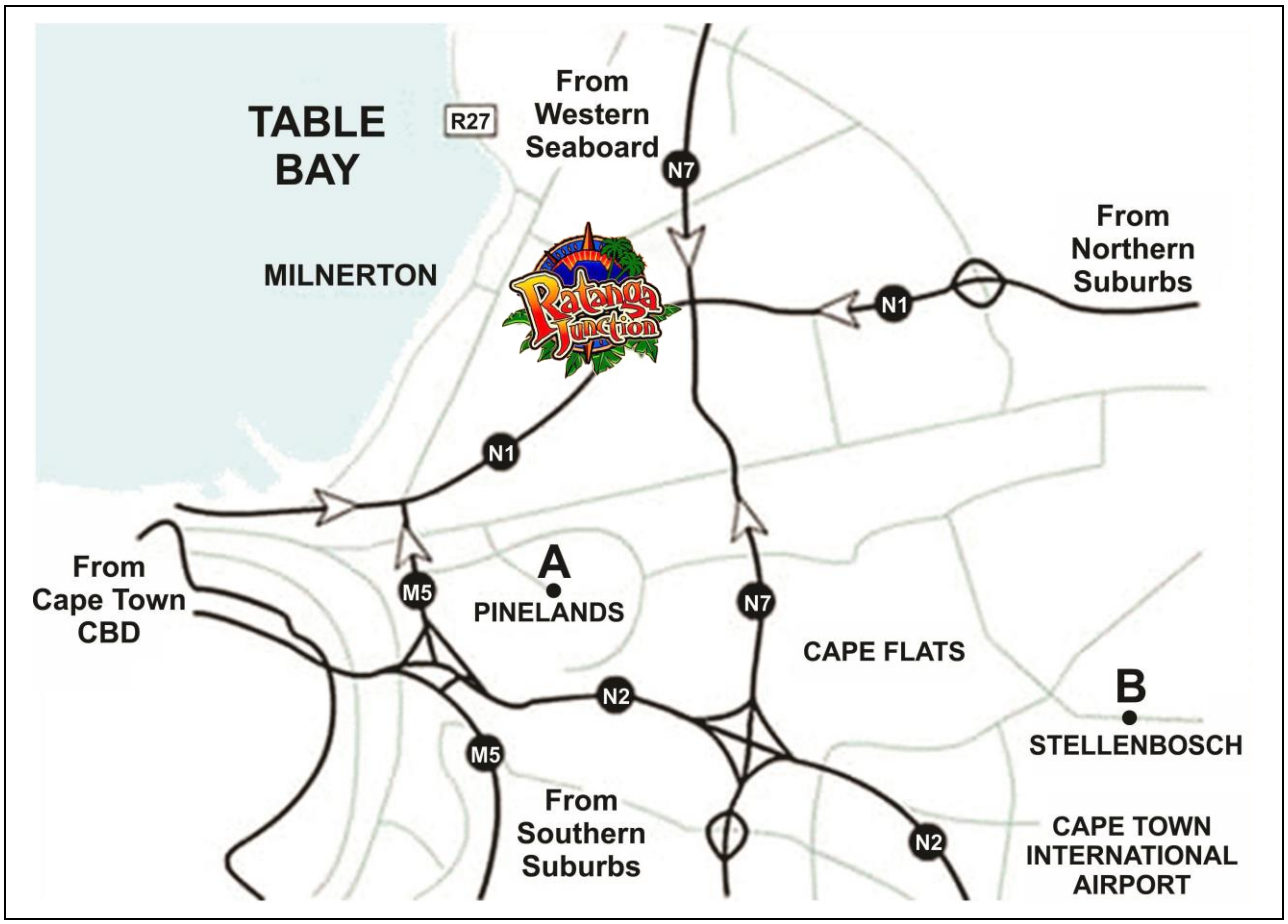
1.5.3 State which rebate Wayde qualifies for if he is 27 years old. (2)

1.5.4 Calculate Wayde van Niekerk's annual income tax payable. (5)

[55]

QUESTION 2

2.1 Cape Town is an ultimate tourist destination. Ratanga Junction is one of the many tourist attractions found in Cape Town. Study the map of Cape Town below and answer the questions that follow.



2.1.1 State which highway Ratanga Junction lies on. (The dark lines on the map indicate highways.) (2)

2.1.2 State the suburb in which Ratanga Junction is located. (2)

2.1.3 Measure (as the crow flies) the distance from Pinelands (A) to Stellenbosch (B). Give your answer in mm. (2)

2.1.4 Hence, use the scale 1 : 400 000 to calculate (rounded to nearest km) the actual distance from Pinelands to Stellenbosch. (4)

2.2 In the Appendix there is a layout map of Ratanga Junction. Carefully study the map that list the attractions at the theme park and answer the questions that follow.

2.2.1 Give the general compass direction from Congo Queen (10) to Ratanga Crossing (2). (2)

2.2.2 List the attractions found at Bushwacker (4). (2)

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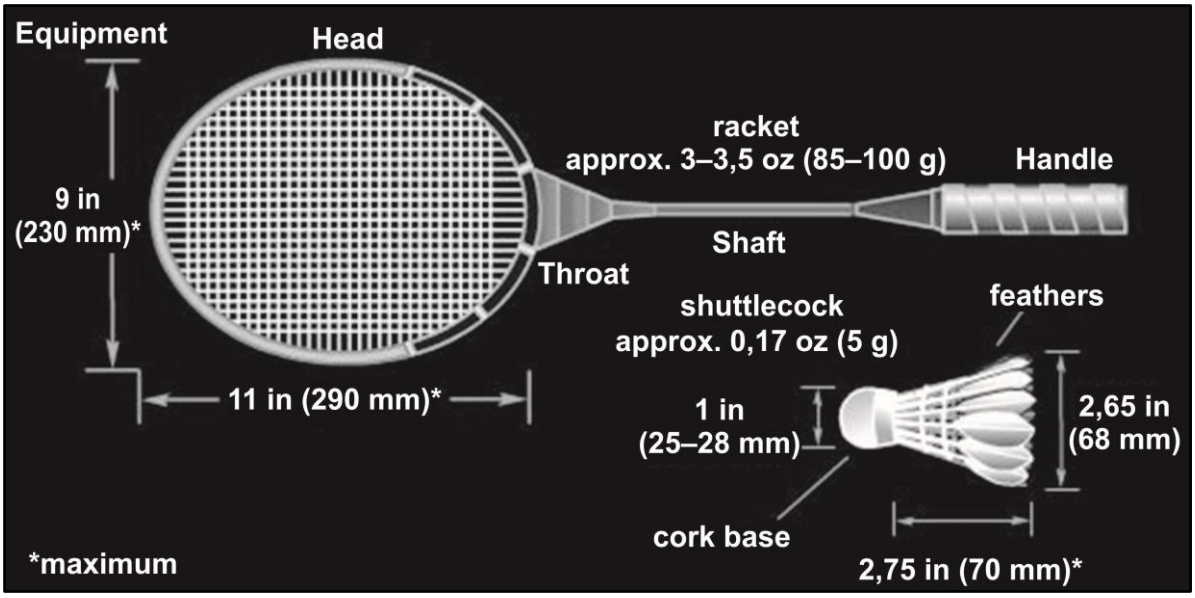
QUESTION 3

Badminton is a sport that involves the volleying of a shuttlecock over a net with the use of rackets. Badminton is a sport that can be played for pleasure or for competition. It is widely played in Britain, Denmark, Sweden, China, Indonesia, Malaysia and Korea. Britain alone has 4 million players, about 8% of Britain's population.

Glossary: A shuttlecock is the object which is struck back and forth over the net in badminton (see picture below).

3.1 Determine the total population of Britain. (3)

3.2 Below are the dimensions given of a racket and shuttlecock. Answer the questions that follow.



[Source: Pakistan Sports Board]

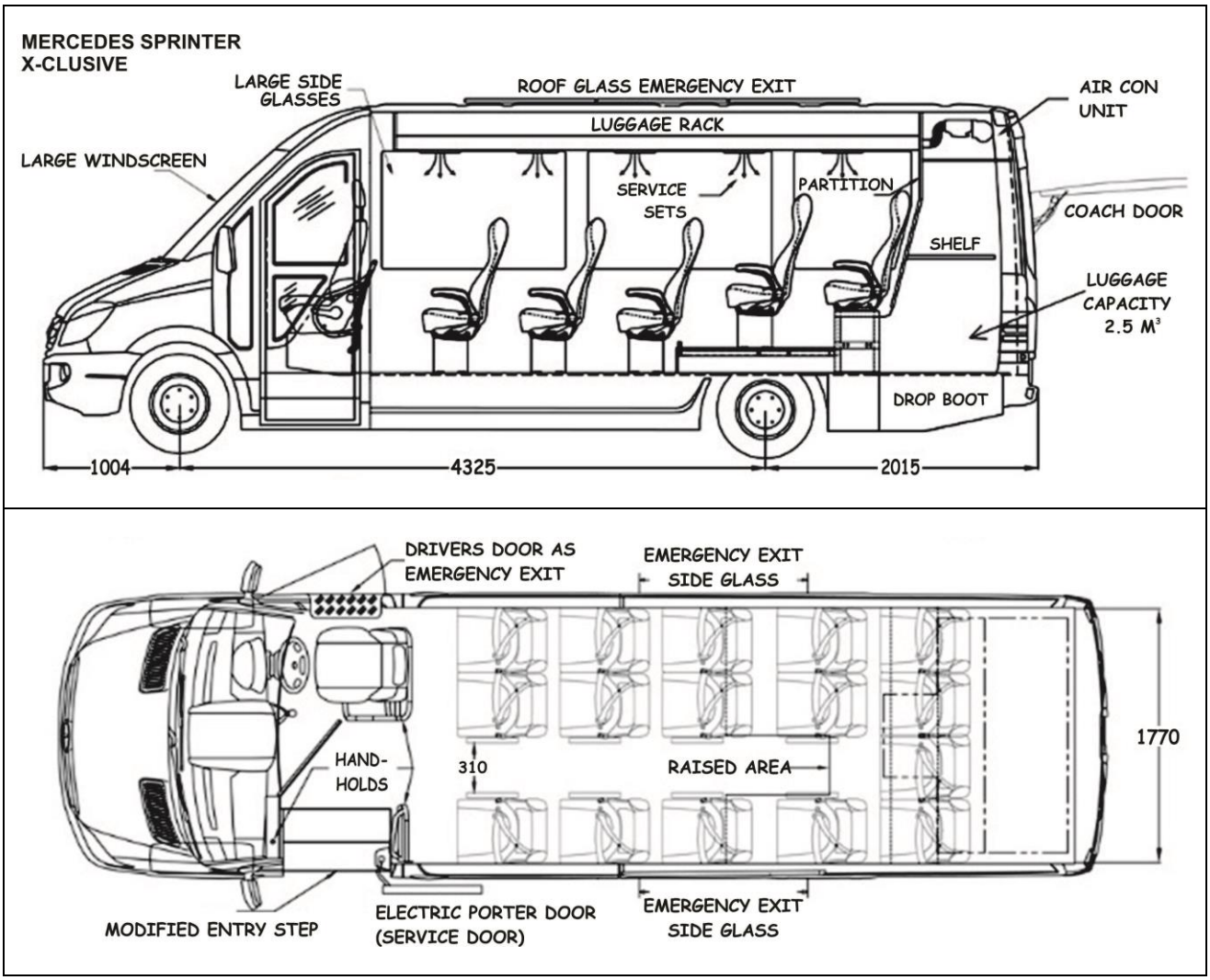
3.2.1 The racket has a maximum diameter of 9 inches or 230 mm. Determine how many millimetres there are in one inch. (2)

3.2.2 Using the answer you got in Question 3.2.1 determine the number of centimetres in an inch. (2)

3.2.3 A particular racket weighs 95,5 g and the shuttlecock weighs 5 g. Determine, in simplest form, the unit ratio of the weight of shuttlecock to the weight of the racket. (3)

3.2.4 Given the following ratio:
Diameter of the cork base of the shuttlecock : the height = 2 : 5.
Determine the height if the diameter is 27 mm. (3)

3.3 Below is a diagram of a tour bus that badminton teams can use for matches.



3.3.1 Determine the number of badminton players (excluding the driver) that can be seated on this tour bus. (2)

3.3.2 The measurements above are given in mm, determine the total length of the tour bus. (2)

3.3.3 Give the width of the tour bus in metres. (2)

3.3.4 The luggage capacity is 2,5 m^3. Convert this measurement to cm^3. (2)

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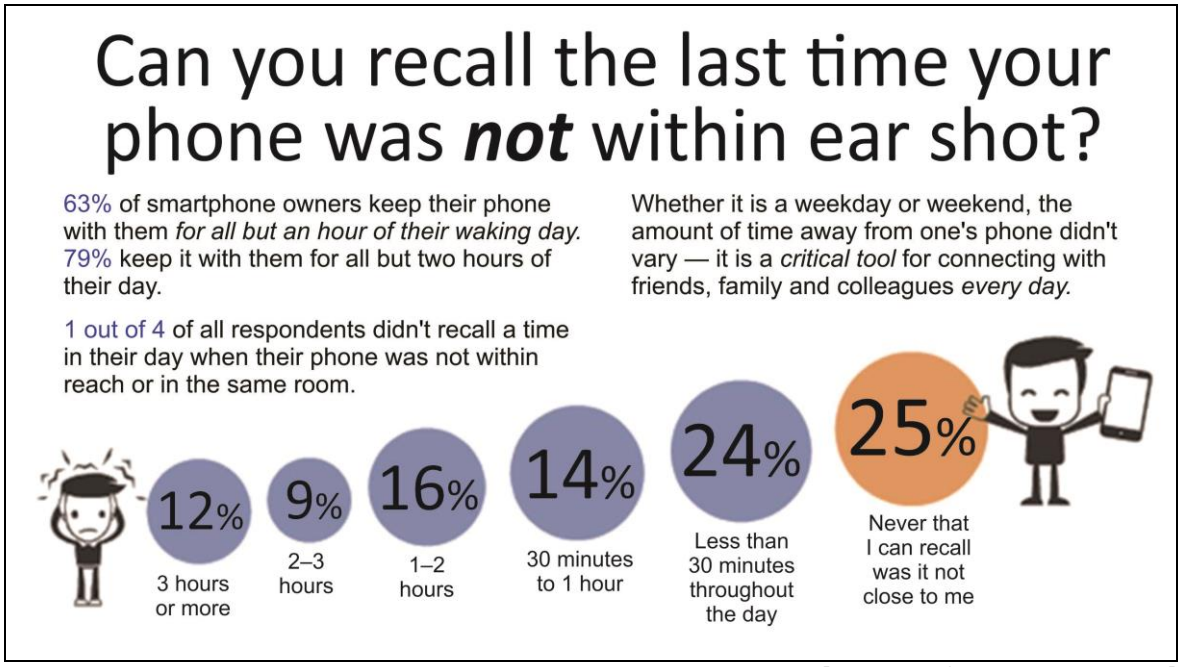
QUESTION 4

There are almost as many cellphone subscriptions (6,8 billion) as there are people on this earth (7,5 billion) and it took a little more than 20 years for this to happen. In 2013, there were some 96 cellphone service subscriptions for every 100 people in the world.

4.1 The information below also illustrates the amount of time people's phones are not within reach. Study the information below and answer the questions that follow.



[Source: <fastcompany.com>]

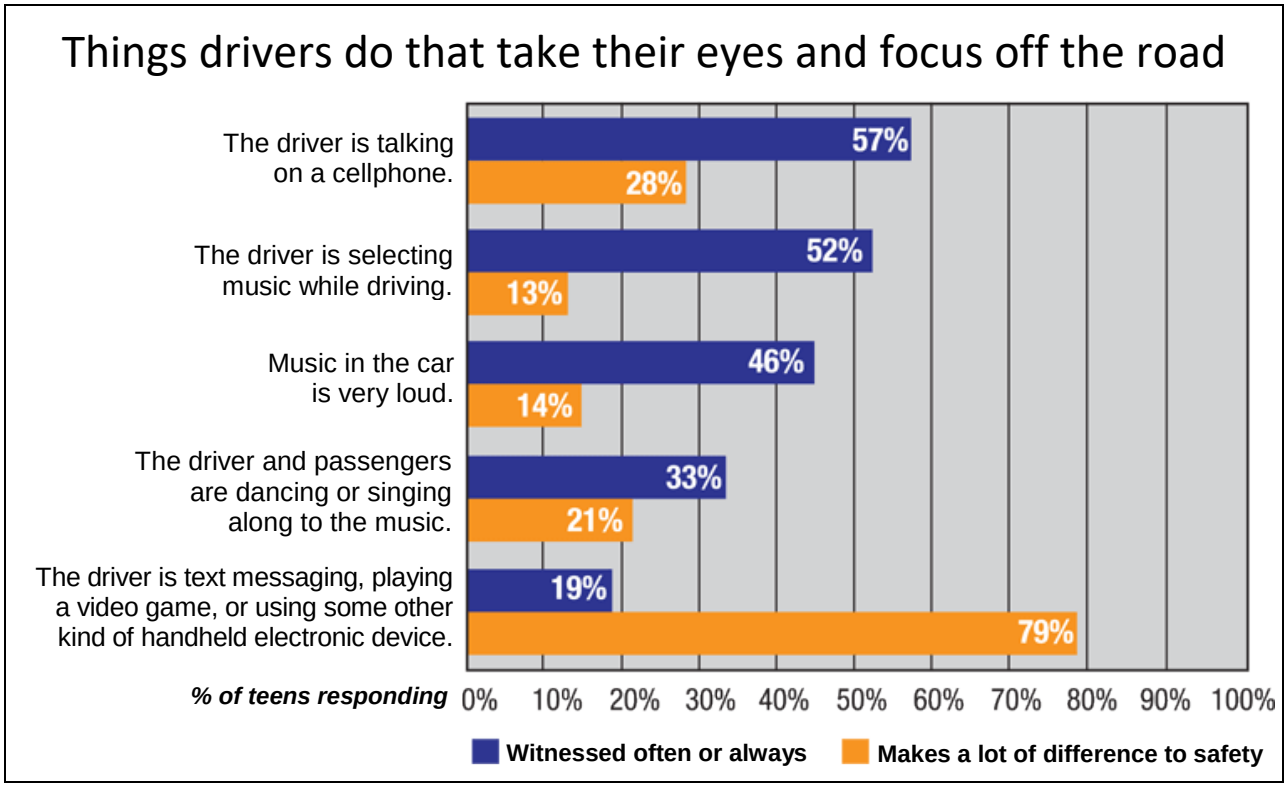
4.1.1 63% of cellphone users keep their phone with them for all but an hour of their waking day. Determine how many people this describes. (3)

4.1.2 1 out of 4 of all respondents didn't recall a time in their day when their phone was not within reach or in the same room. Show this fraction as a percentage. (2)

4.1.3 If there are 5 cellphones for every DVD player in existence and 6,8 billion cellphones in existence, how many DVD players are there? (3)

[Source: Communities dominate]

4.2 Below is a graph showing the things drivers do that take their eyes and focus off the roads. Study it carefully to answer the questions that follow. The drivers who participated in this survey (in 2016) were teenagers.



[Source: <teendriving.aaa.com>]

4.2.1 State the type of graph represented above. (2)

4.2.2 If there were 1 000 people interviewed for this survey determine the number of people (witnessed often or always) that were distracted by talking on a cellphone. (3)

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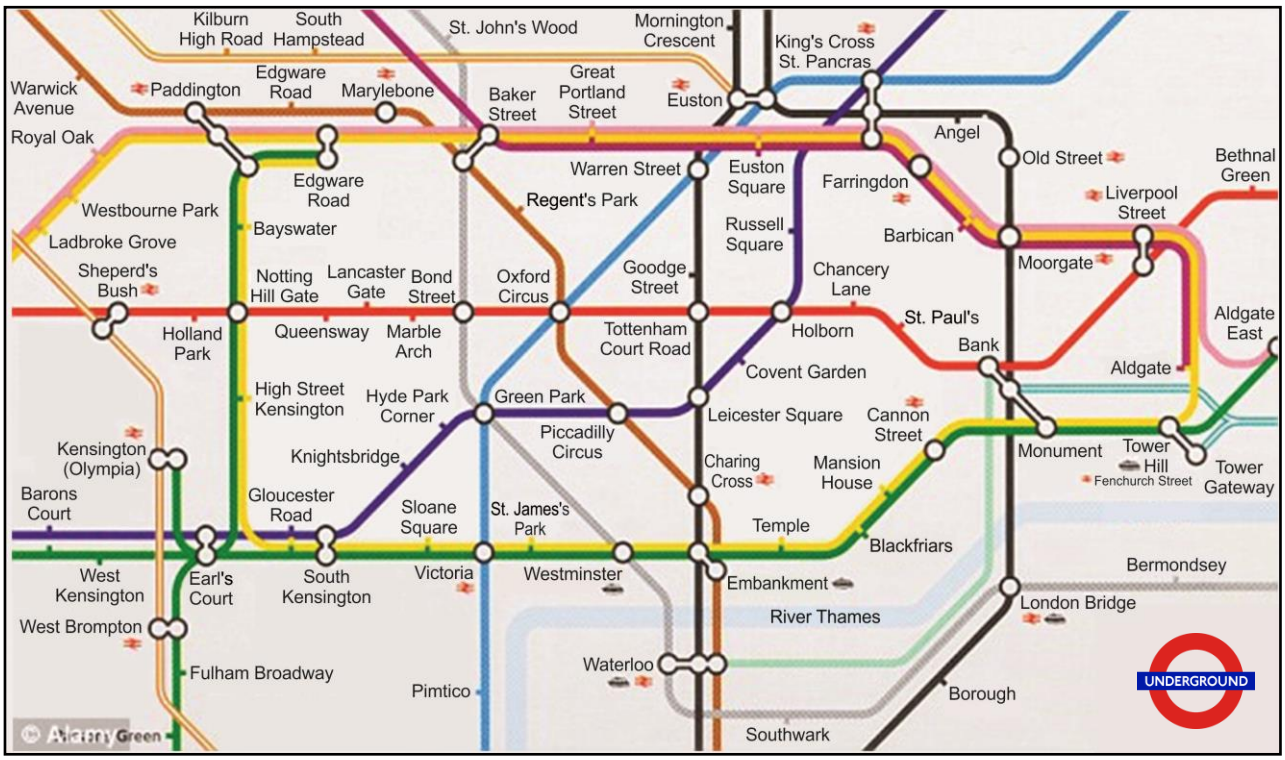
QUESTION 5

The London Underground (The Tube) is an extensive train system in London and is the main source of public transport in London as illustrated below. This is an extensive network of 12 lines and can get you to most places in the centre of the city quickly.



[Source: BBC – London Underground Map]

5.1 "The distance from Oxford Circus to Tottenham Court Road is $\frac{1}{2}$ mile and takes 3 minutes on the tube. It will take 9–10 minutes to walk between these two stations." – <www.londondrum.com>

5.1.1 If 1 mile = 1 609 metres, how many kilometres is the distance between Oxford Circus and Tottenham Court Road? (3)

5.1.2 Determine the speed of the train in km/h.

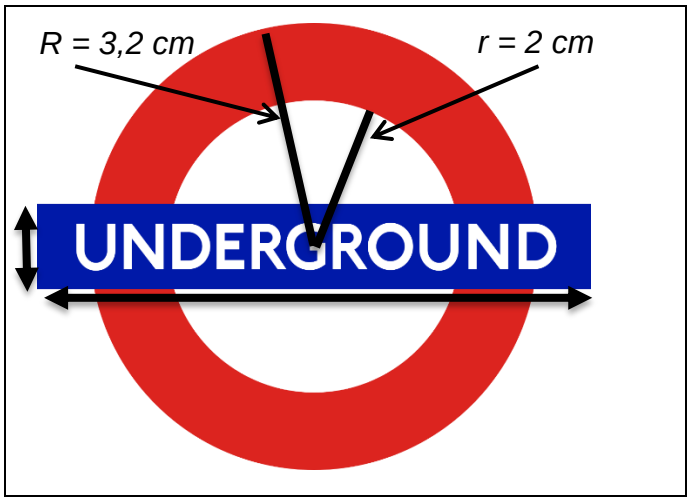
You may use the following formula:

$speed = distance \div time$ (3)

5.1.3 The distance between Tottenham Court Road and Notting Hill Gate is $3\frac{1}{2}$ times that of the distance between Tottenham Court Road and Oxford Circus. Determine how long in minutes a trip on the tube would take from Tottenham Court Road to Notting Hill Gate using the speed of the train calculated in Question 5.1.2. (2)

5.1.4 Which station would you pass when travelling from Piccadilly Circus to Embankment? (2)

5.2 The Logo below (not drawn to scale) is shown at train stations and on maps of the underground.



[Source: London's Underground]

5.2.1 Determine the width of the circular ring (the shaded portion) of the logo. (2)

5.2.2 Calculate the inner circumference of the unshaded circle of the logo.

You may use the following formula:

$Circumference = 2\pi r$ (let π = 3,14) (2)

5.2.3 Determine the area of the circular ring (the shaded portion) of the logo.

You may use the following formula:

$Area_{circle} = \pi r^2$ (let π = 3,14) (4)

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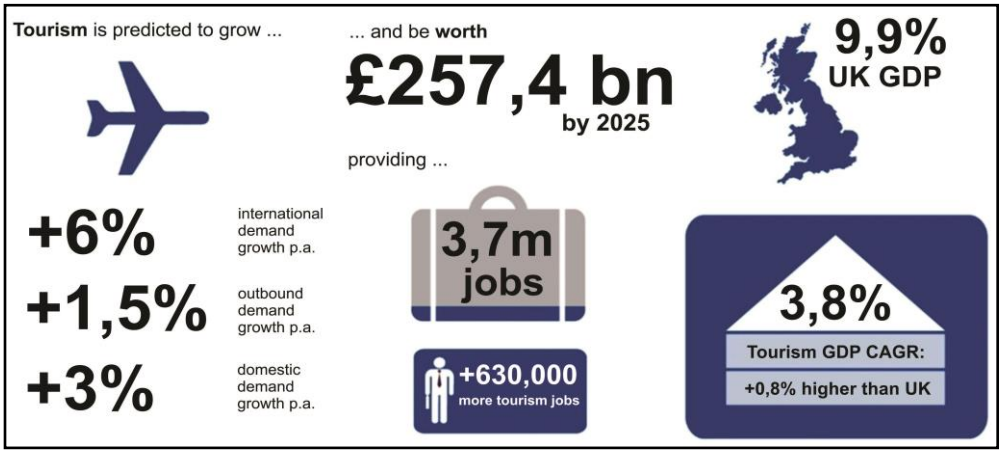
5.3 Tourism is a big source of income in the United Kingdom (UK). Below is an infographic that illustrates the predicted growth of tourism by 2025. By 2025 tourism will be worth £257,4 billion – just 9,9% of UK GDP (Gross Domestic Product) and supporting 3,7 million jobs, which is around 11% of the total UK number of people with jobs.

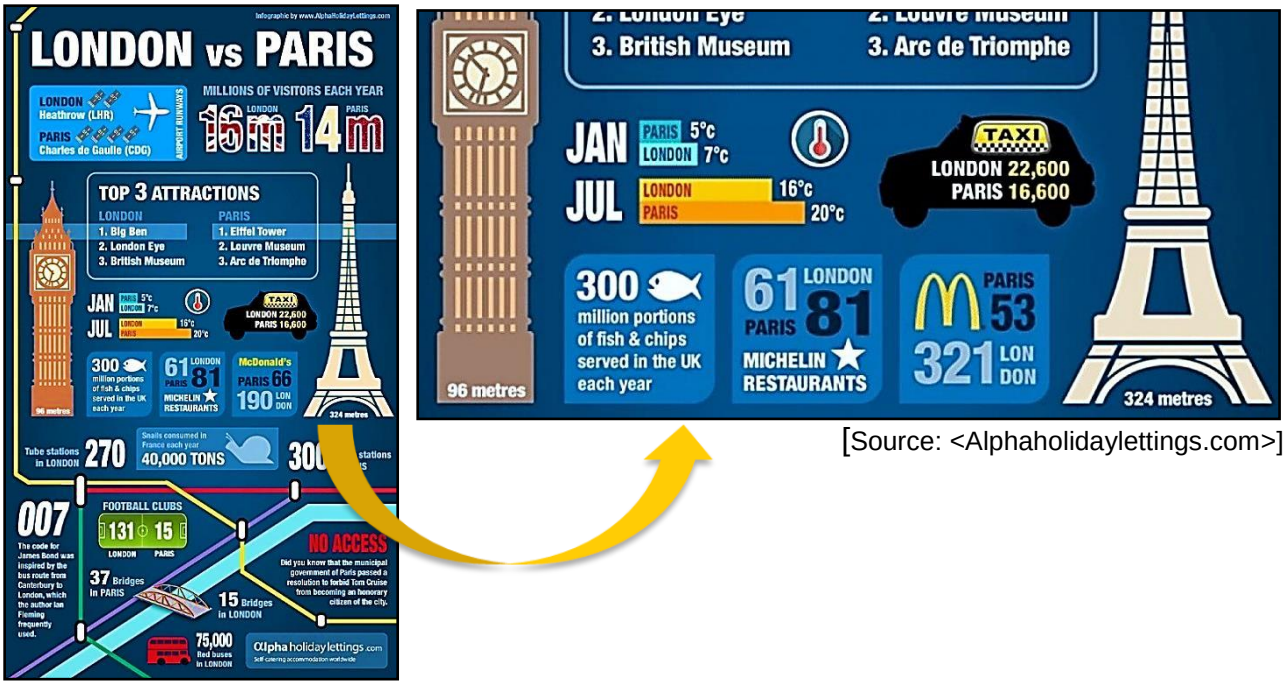


[Source: Visit Britain]

5.3.1 Determine the balance (in £) of the total GDP of the UK that is not related to tourism. (4)

5.3.2 Tourism will create a total of 3,7 million jobs by 2025, having increased by 630 000 jobs since 2015. Determine how many people worked in the tourism sector in 2015. (3)

5.4 London has 2 million more tourists annually than Paris. Study the infographic below and answer the questions that follow:



[Source: <Alphaholidaylettings.com>]

5.4.1 According to the infographic, determine the temperature of London in July. (2)

5.4.2 When comparing January's temperature with July's, state what season you think it is in July in London. (2)

5.5 Below are the maximum and minimum temperatures in °C for a week in July in London. Use it to answer the questions that follow:

Date	Sun 11/7	Mon 12/7	Tue 13/7	Wed 14/7	Thu 15/7	Fri 16/7	Sat 17/7
Max	15	16	17	17	17	17	16
Min	8	9	9	9	9	9	9

5.5.1 State the maximum and minimum temperatures for the maximum temperature. (3)

5.5.2 Determine the modal temperature for the minimum temperature. (2)

5.5.3 Determine the mean (average) for the maximum temperature, rounding off to the nearest degree. (4)

5.5.4 John plans to go to London on a day between Sunday 11/7 to Saturday 17/7. Determine the probability that he experiences a maximum temperature of 17 °C. Give your answer as a percentage. (3)

5.6 5.6.1 To travel on the tube costs £2,40 for a one way ticket. If a tourist decides to go see 5 of the sights around London which would require 6 trips on the tube (including the return trips), determine what this would cost the tourist. (2)

5.6.2 The underground offers an 'Oyster Card' which is a card which allows unlimited trips for 1 day. The card costs an initial administration fee of £3,00 and for the day pass it costs £10,00. Determine the cost if the tourist purchases the Oyster Card for one day. (2)

5.6.3 Determine the difference in price for the two options. (2)

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Total: 150 marks

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