basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2011

MARKS: 150

TIME: 3 hours

This question paper consists of 15 pages and 1 annexure.

INSTRUCTIONS AND INFORMATION

1.   This question paper consists of SIX questions. Answer ALL the questions.

2.   Answer QUESTION 6.1.3 and QUESTION 6.1.4 on the attached ANNEXURE. Write your centre number and examination number in the spaces provided on the ANNEXURE and hand in the ANNEXURE with your ANSWER BOOK.

3.   Number the answers correctly according to the numbering sytem used in this question paper.

4.   Start EACH question on a NEW page.

5.   You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.

6.   Show ALL the calculations clearly.

7.   Round ALL the final answers off to TWO decimal places, unless stated otherwise.

8.   Indicate units of measurement, where applicable.

9.   Write neatly and legibly.

QUESTION 1

1.1   1.1.1   Simplify: $241,50 \, (124,37 - 121,79) + \sqrt{232,5625}$ (2)

        1.1.2   Without rounding off, convert 25,5 centimetres to metres.   (2)

        1.1.3   How many eggs are there in a tray containing $2\frac{1}{2}$ dozen eggs?   (2)

        1.1.4   Determine the time 2 hours and 7 minutes after 22**:**57.   (2)

        1.1.5   Determine the length of ONE side of a square if the perimeter is 36 m.   (2)

        1.1.6   If 9 February 2011 is a Wednesday, determine the probability that 26 February 2011 will be a Saturday.   (2)

1.2
> A South African couple recently visited Botswana and Zambia. The table below shows the exchange rate between the currencies of the two countries and the South African rand (ZAR):
>
> | SOUTH AFRICAN RAND TO FOREIGN CURRENCY |
> | --- |
> | R1,00 (ZAR)   =   0,95   Botswana pula (BWP) |
> | R1,00 (ZAR)   =   681,07   Zambian kwacha (ZMK) |

        1.2.1   The couple budgeted to pay R20,00 per person for lunch. How much is this amount in Botswana pula?   (2)

        1.2.2   The accommodation in Zambia cost 360 286 ZMK per couple per day. They paid a deposit of 1 021 605 ZMK to secure their accommodation. Dinner costs 85 134 ZMK per person and they both had dinner at the hotel restaurant four times.

                 Use the formula below to calculate the total amount they will pay at the end of their ten-day stay at the hotel in Zambia.

                 Total amount due = (number of days $\times$ A) + (8 $\times$ B) − C, where: **A** = accommodation cost, **B** = cost per dinner and **C** = deposit paid   (3)

        1.2.3   On a particular day they travelled 180 km in 2 hours 15 minutes. Calculate their average speed in kilometres per hour.

                 Use the formula: **average speed** $= \dfrac{\textbf{distance}}{\textbf{time}}$ (3)
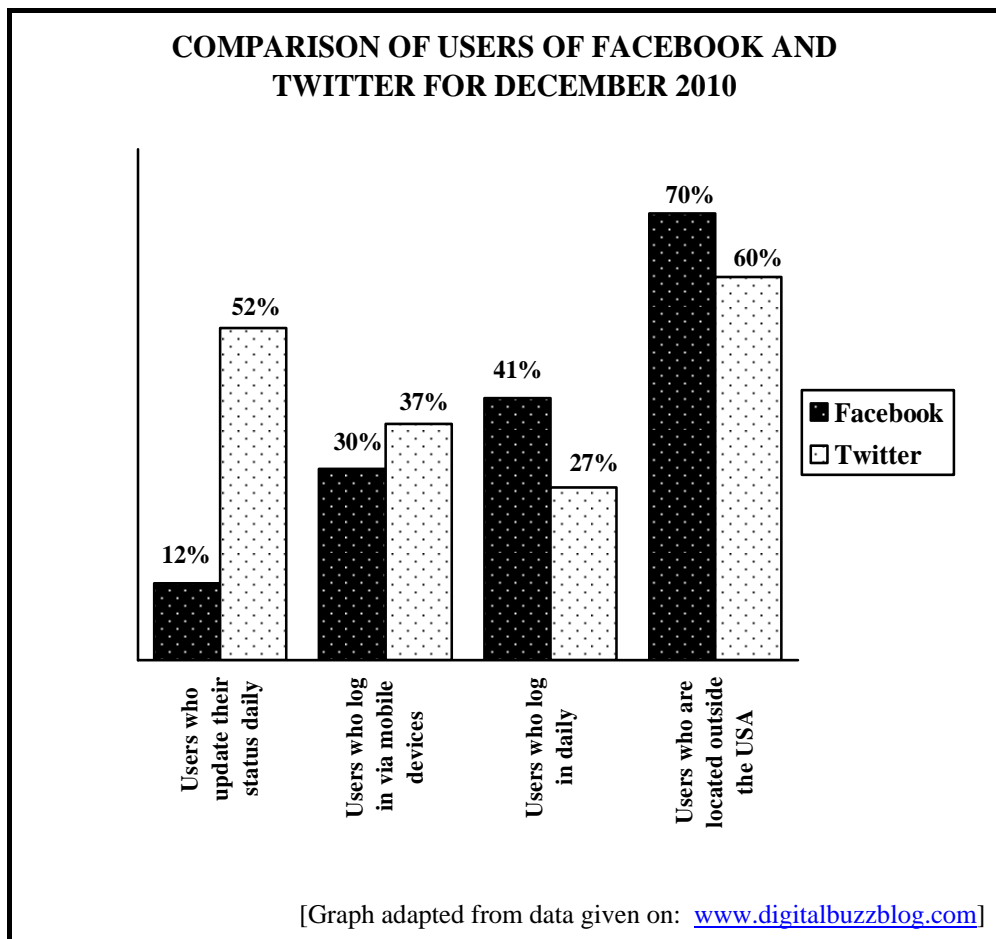
1.3 | Facebook and Twitter are two international social networking sites. Individuals can use Facebook and Twitter to communicate with one another via the Internet.

The following statistics about Facebook and Twitter come from a December 2010 article on the website www.digitalbuzzblog.com:

- Facebook has 500 million users, of which 230 million are male.
- Twitter has 106 million users, of which 50,88 million are male.

    1.3.1   (a)   Calculate the difference between the number of users of the two social networks. (2)

               (b)   Determine the number of female users of Twitter. (2)

   (c)   Calculate the percentage of Facebook users that are male. (3)

    1.3.2

COMPARISON OF USERS OF FACEBOOK AND TWITTER FOR DECEMBER 2010

70%

60%

52%

41%

37%

30%

27%

12%

■ Facebook
□ Twitter

Users who update their status daily

Users who log in via mobile devices

Users who log in daily

Users who are located outside the USA

[Graph adapted from data given on: www.digitalbuzzblog.com]

               (a)   Give ONE example of a mobile device. (1)

               (b)   Write down the percentage of Facebook users who logged in using mobile devices. (1)

               (c)   Calculate the percentage of Facebook users who did NOT update their status daily. (2)

               (d)   Determine the number of Twitter users that logged in daily. (3)

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QUESTION 2

2.1   The graph below shows the maximum and minimum temperatures of five world cities for 8 March 2011.

THE MAXIMUM AND MINIMUM TEMPERATURES OF FIVE WORLD CITIES FOR 8 MARCH 2011
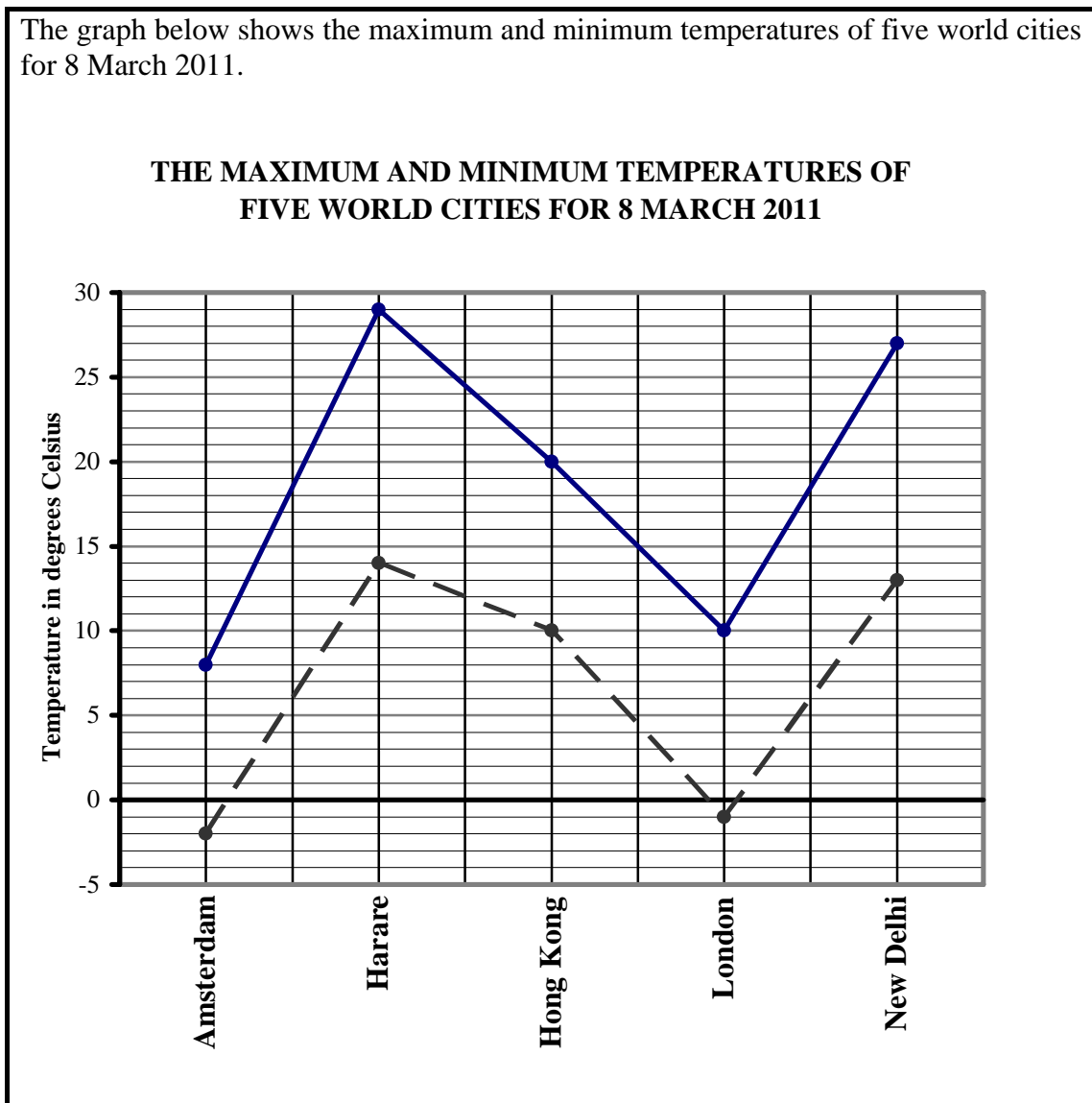
2.1.1   Write down New Delhi's maximum temperature.   (1)

2.1.2   Which city had a minimum temperature that was higher than London's maximum temperature?   (2)

2.1.3   Which city had the lowest minimum temperature?   (1)

2.1.4   Which city had the highest minimum temperature as well as the highest maximum temperature?   (2)

2.1.5   Determine the temperature range for Amsterdam.   (2)

2.1.6   Convert New Delhi's minimum temperature to degrees Fahrenheit ($^{\circ}$F), using the formula:

         Temperature in $^{\circ}$F $= 1,8 \times$ temperature in $^{\circ}$C $+ 32^{\circ}$ (2)

2.2 | South Africa has nine provinces, which vary in size. The pie charts below show the percentage land area per province and the total population distribution per province.
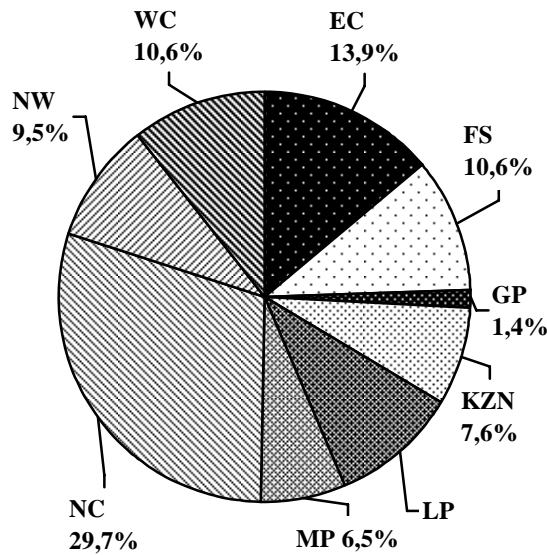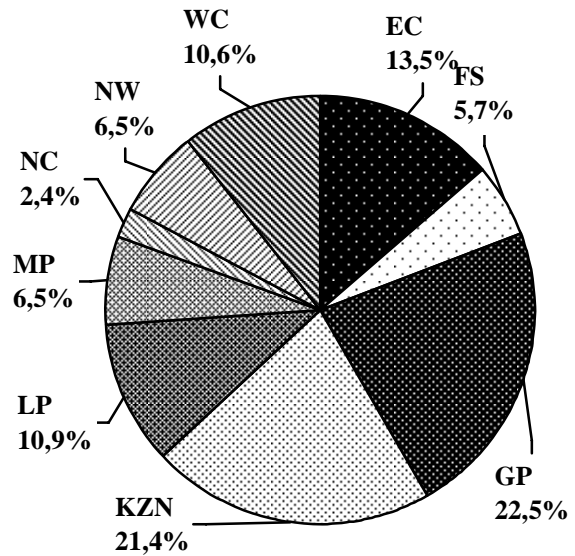
CHART A: LAND AREA

CHART B: POPULATION DISTRIBUTION


KEY for the pie charts above:

SYMBOL	PROVINCE	SYMBOL	PROVINCE
EC	Eastern Cape	FS	Free State
GP	Gauteng	KZN	KwaZulu-Natal
LP	Limpopo	MP	Mpumalanga
NC	Northern Cape	NW	North West
WC	Western Cape		

[www.statssa.gov.za (January 2010)]

2.2.1 Which province has the largest land area but the smallest population? (1)

2.2.2 Which provinces occupy the same percentage land area? (2)

2.2.3 Which province(s) have the same percentage on both charts? (2)

2.2.4 Calculate the percentage land area for Limpopo. (2)

2.2.5 Calculate South Africa's total population if the population of North West was 3 249 415. (3)

2.3   The graph below shows the cost of parking at a parking garage that is open 12 hours daily.

COST OF PARKING IN THE PARKING GARAGE
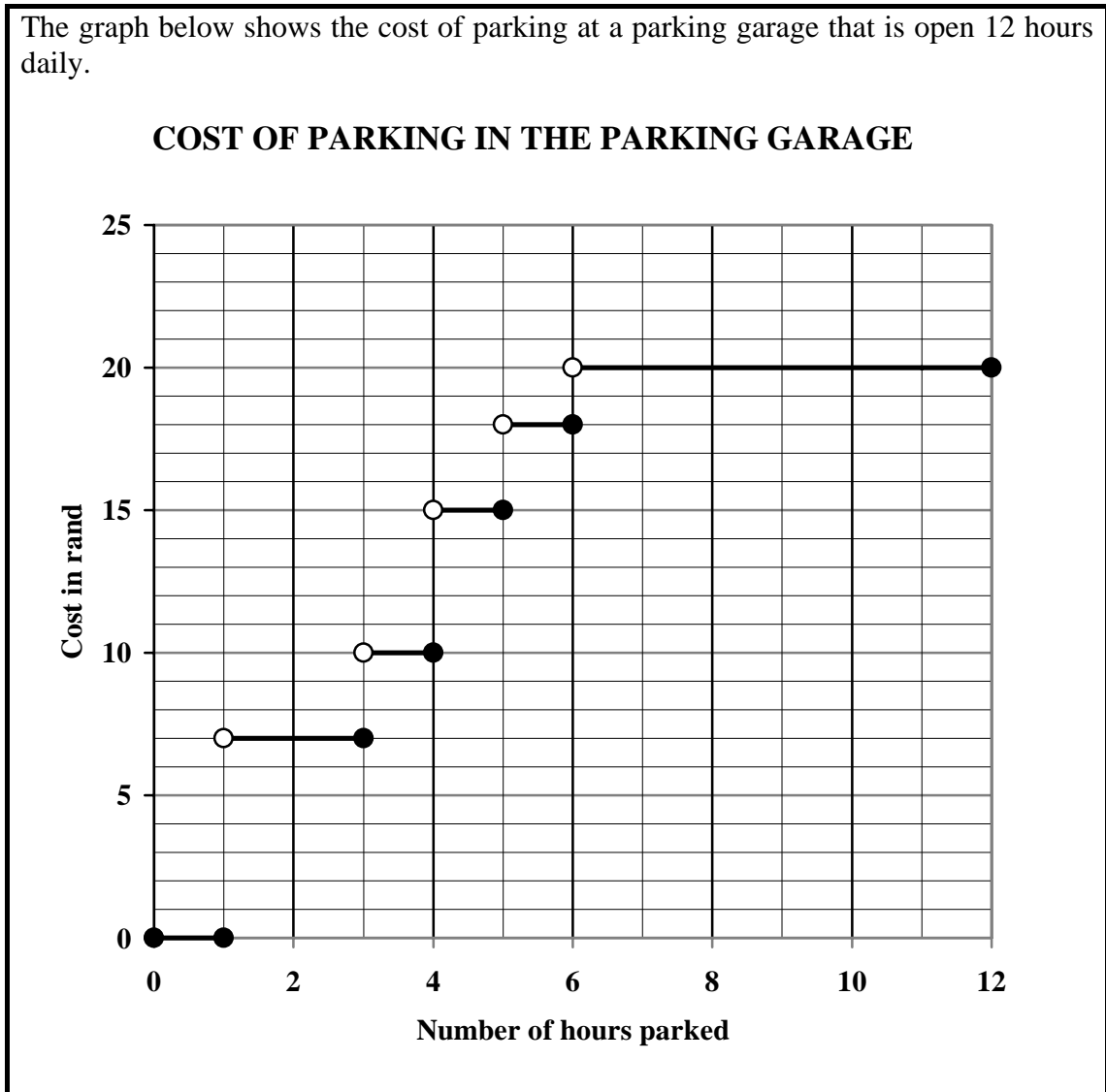
2.3.1   What is the maximum time that you can park at the parking garage for free? (2)

2.3.2   If you paid R10,00 for parking, how long was your car at the parking garage? (2)

2.3.3   How much would you pay if you parked your car at the parking garage for 6 hours 42 minutes? (2)

2.3.4   How much would you pay if you parked for exactly 3 hours? (2)

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QUESTION 3

Zoey is a university student. Her parents give her a monthly allowance of R2 500 to cover her expenses which consist of the following:

- Monthly cellphone payments
- A total monthly instalment of R400,00 for two clothing stores, Teencraze and Fabfashion
- Daily cost of R25,00 for food
- R110,00 per weekend for entertainment
- Transport costs of R125,00 per week

3.1   TABLE 1 below shows Zoey's budget for April:

TABLE 1: April 2011 budget

Monthly cellphone payments	R240
Teencraze account	R210
Fabfashion account	**A**
Food for the month	**B**
Weekend entertainment for four weeks	**C**
Transport for four weeks	**D**
TOTAL	**R2 330**

3.1.1   Calculate the missing amounts **A**, **B**, **C** and **D**.   (8)

3.1.2   Calculate the difference between her allowance and her total expenses for the month.   (2)

3.1.3   Zoey needs R200 to go on a university excursion. Name ONE possible way in which she can reduce her monthly expenditure so that she will have enough money for the excursion.   (2)

3.2   Zoey will be a student at the university for four years. Analysts have predicted that transport costs will increase at a compound interest rate of 8% per annum.
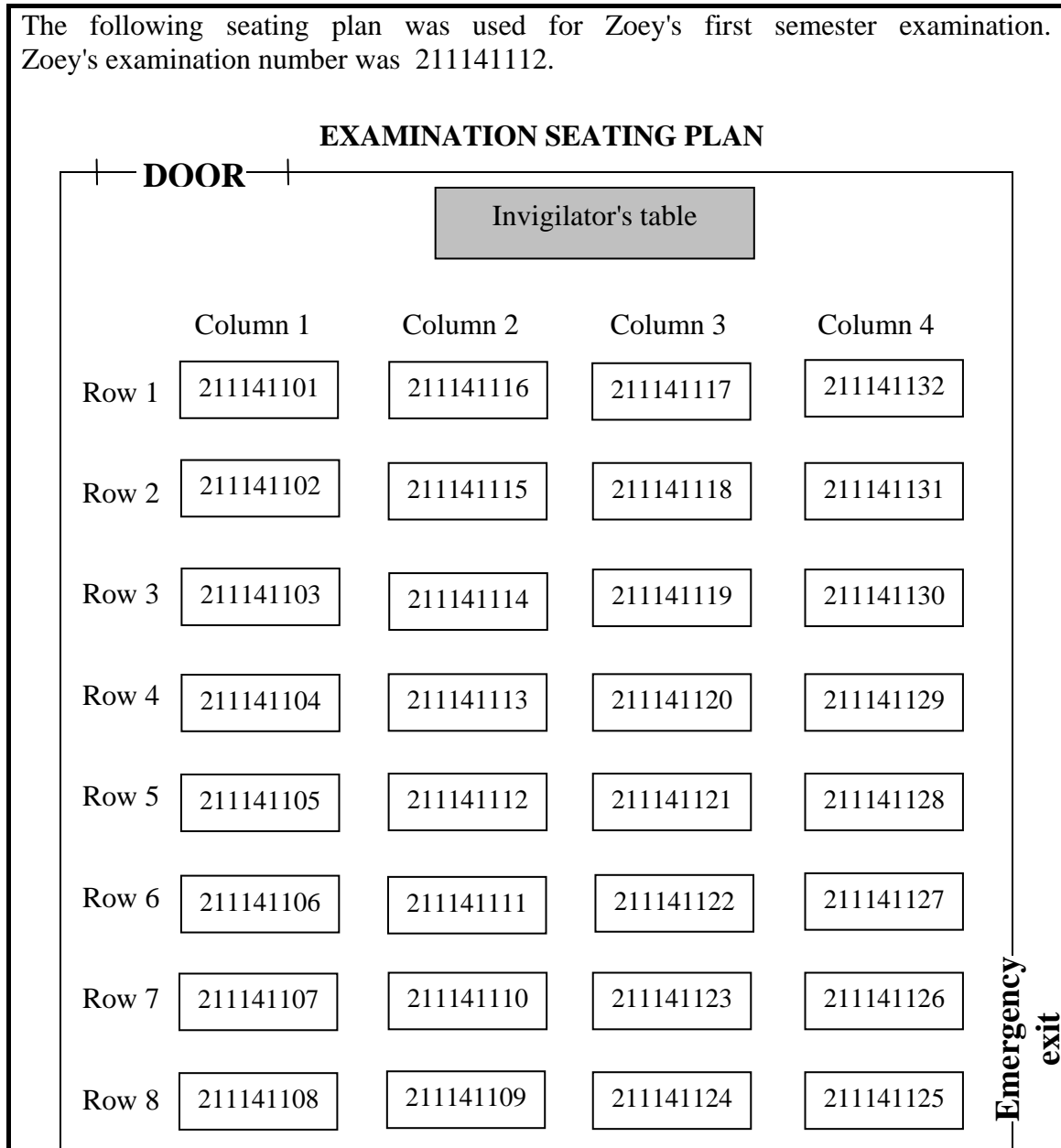
Calculate how much she will need to budget for her weekly transport in April 2014.

Use the formula: $A = P (1 + i)^n$, where A = final amount
                                                    P = initial amount
                                                    i = interest rate
                                                    n = number of years   (3)

3.3   The following seating plan was used for Zoey's first semester examination. Zoey's examination number was 211141112.

EXAMINATION SEATING PLAN

┤├ **DOOR** ┤├

Invigilator's table

	Column 1	Column 2	Column 3	Column 4
Row 1	211141101	211141116	211141117	211141132
Row 2	211141102	211141115	211141118	211141131
Row 3	211141103	211141114	211141119	211141130
Row 4	211141104	211141113	211141120	211141129
Row 5	211141105	211141112	211141121	211141128
Row 6	211141106	211141111	211141122	211141127
Row 7	211141107	211141110	211141123	211141126
Row 8	211141108	211141109	211141124	211141125

Emergency exit

3.3.1   Identify the row and column in which Zoey sat.   (2)

3.3.2   How many students sat in the same column, but behind Zoey?   (1)

3.3.3   Determine the general direction of the emergency exit from where Zoey sat.   (2)

3.3.4   Examination rules state that each candidate must occupy an area of at least 0,75 m². Calculate the minimum total area occupied by the students in this examination venue.   (3)

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QUESTION 4

4.1

> The Swartberg High Fundraising Committee intends opening a school uniform shop in January 2012. They foresee that the shop will mainly be supported by the new Grade 8 learners.
>
> They surveyed a sample of Grade 8 learners in June 2011 to determine their shoe sizes.
>
> **SHOE SIZES OF BOYS:**
>
> | 5 | 5 | 5 | 6 | 6 | 6 | 6 | $6\frac{1}{2}$ | $6\frac{1}{2}$ | $6\frac{1}{2}$ |
> |---|---|---|---|---|---|---|---|---|---|
> | 7 | 7 | 7 | $7\frac{1}{2}$ | 8 | $8\frac{1}{2}$ | 9 | 10 | 11 | |
>
> **SHOE SIZES OF GIRLS:**
>
> | $3\frac{1}{2}$ | 4 | 4 | $4\frac{1}{2}$ | 5 | 5 | 5 | 5 | 5 | $5\frac{1}{2}$ |
> |---|---|---|---|---|---|---|---|---|---|
> | $5\frac{1}{2}$ | 6 | 6 | 6 | 6 | 6 | 6 | $6\frac{1}{2}$ | 7 | 8 |

4.1.1	What is the modal shoe size of the boys?	(2)
4.1.2	Determine the median shoe size of the boys.	(2)
4.1.3	Determine the median shoe size of the girls.	(2)
4.1.4	Which shoe sizes are NOT worn by the boys?	(2)
4.1.5	Write, as a ratio, the number of boys not wearing half sizes to the number of girls not wearing half sizes.	(3)

4.2 | The shoe boxes in which the shoes will be packed have the following dimensions:
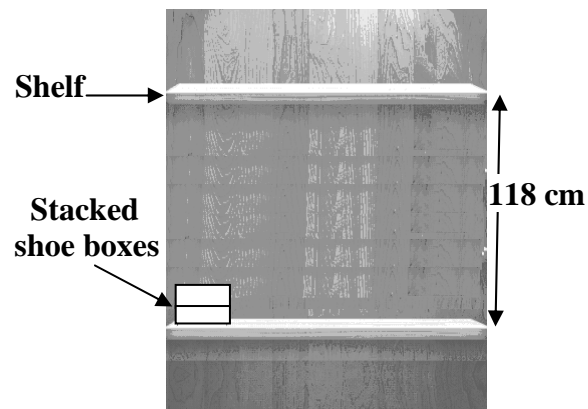
Length = 27,5 cm
Breadth = 15 cm
Height = 11,9 cm

4.2.1 Calculate the volume of the shoe box.

Use the formula: **Volume = length × breadth × height** (3)

4.2.2 The shoes are packed on shelves. The height between the shelves is 118 cm.

Determine the maximum number of shoe boxes that can be stacked on top of each other in a single pile between two shelves. (2)
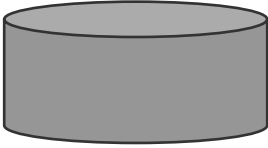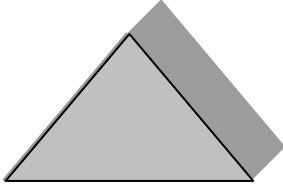
[16]

QUESTION 5

5.1   The Umgababa Men's Society is responsible for raising funds to take the mothers in the community on an outing on Mothers' Day. They decide to make chocolates and sell them to the community. They use a special chocolate recipe to make either round or triangular shaped chocolates. The price of each chocolate is determined by the volume of the chocolate. The chocolates are covered with foil wrapping.

The diagrams below show the dimensions of the two different shapes of chocolate.

ROUND CHOCOLATES (CYLINDER)	TRIANGULAR CHOCOLATES (TRIANGULAR PRISM)
Radius of the cylinder = 18,5 mm Height of the cylinder = 10 mm	**The triangle has three equal sides.** Each side of the triangle = 50 mm Height of the triangle = 43,3 mm Height of the prism = 10 mm

The following formulae may be used:

Volume of a cylinder = $\pi \times \mathbf{r}^2 \times \mathbf{h}$

Total surface area of a cylinder = 2 $\times \pi \times \mathbf{r} \times (\mathbf{r} + \mathbf{h})$,

where $\pi = 3{,}14$; $\mathbf{r} =$ radius of the cylinder and $\mathbf{h} =$ height of the cylinder.

Volume of a triangular prism = $\frac{1}{2} \times \mathbf{s} \times \mathbf{h} \times \mathbf{H}$

Total surface area of a triangular prism = (s $\times$ **h) + 3(s** $\times$ **H)**,

where $\mathbf{s} =$ side of triangle, $\mathbf{h} =$ height of triangle and $\mathbf{H} =$ height of prism

Calculate the following:

5.1.1	Volume of a round chocolate	(3)
5.1.2	Volume of a triangular chocolate	(3)
5.1.3	Total surface area of a round chocolate	(4)
5.1.4	Total surface area of a triangular chocolate	(3)

5.2

> The foil wrapping used to cover the chocolates comes in rectangular sheets only. The sheets of silver and red foil are the same size, while the gold foil is a different size.
>
> - A single sheet of silver or red foil can cover 6 round chocolates and 4 triangular chocolates.
> - A single sheet of gold foil can cover 12 triangular chocolates.
> - The gold foil will be used to wrap only triangular chocolates.
>
> There are 7 sheets of silver foil, 5 sheets of red foil and 10 sheets of gold foil available to wrap the chocolates.
>
> They use the formulae below to calculate the number of round and triangular chocolates that can be wrapped with the foil.
>
> **Total number of round chocolates** $= 6 \times (r + s)$
>
> **Total number of triangular chocolates** $= 4 \times (r + s) + (12 \times g)$
> where: r = number of sheets of red foil
> s = number of sheets of silver foil
> g = number of sheets of gold foil

Calculate the total number of:

5.2.1 Chocolates that will be wrapped in gold foil (2)

5.2.2 Round chocolates that will be wrapped (3)

5.2.3 Triangular chocolates that will be wrapped (3)

5.3

> Peter is in the front of the queue to buy a chocolate for his mother and randomly chooses a chocolate.
>
> There are 50 chocolates left that are wrapped as follows:
>
> - 17 silver
> - 20 gold
> - 13 red

Determine the probability that Peter will choose a chocolate wrapped in:

5.3.1 Red foil (2)

5.3.2 Green foil (2)

[25]

QUESTION 6

6.1

> The Golden Girls Hockey Club qualified to play in the Wilken Cup Final. In an attempt to encourage her team to score as many goals as possible, the owner of the club developed the following bonus options as an incentive:
>
> **OPTION A:**
> Each player will receive a basic bonus of R4 600 per game plus an extra R250 for each goal scored by the team.
> This can be written as:
> **OPTION A = R4 600 + R250 × number of goals scored**
>
> **OPTION B:**
> Each player will receive a basic payment of R4 000 per game plus an extra R400 for each goal scored by the team.
> This can be written as:
> **OPTION B = R4 000 + R400 × number of goals scored**
>
> TABLE 2 below shows the total bonus that each team member could receive based on the number of goals scored.
>
> **TABLE 2: Total bonus payments for each player**
>
> | Number of goals scored | 0 | 2 | 4 | Q | 7 | 8 |
> |---|---|---|---|---|---|---|
> | **OPTION A (in rand)** | 4 600 | **P** | 5 600 | 6 100 | 6 350 | 6 600 |
> | **OPTION B (in rand)** | 4 000 | 4 800 | 5 600 | 6 400 | 6 800 | 7 200 |

    6.1.1   Calculate the missing values **P** and **Q**.   (4)

    6.1.2   Answer the following questions:

          (a)   Using OPTION B, how much money will each player receive if the team does not score any goals in the final match?   (1)

          (b)   Using OPTION A, how many goals did the team score in the final match if the owner paid each player R6 350?   (2)

          (c)   Suppose the team scored 5 goals. Which payment option would give the players the most money?   (2)

    6.1.3   The graph of Option B is already drawn on ANNEXURE A. Draw another line graph on the same grid to represent Option A. Clearly label your graph.   (4)

    6.1.4   Clearly indicate the break-even point on ANNEXURE A by using the letter **Y**.   (2)

6.2 | Two weeks before the final hockey match a concert was held on the hockey field. The stadium manager inspected the field after the concert and found that some of the lines on the field were unclear and part of the grass on the field was damaged.

The dimensions of the hockey field are: length   = 98 m
                                                          breadth = 72 m
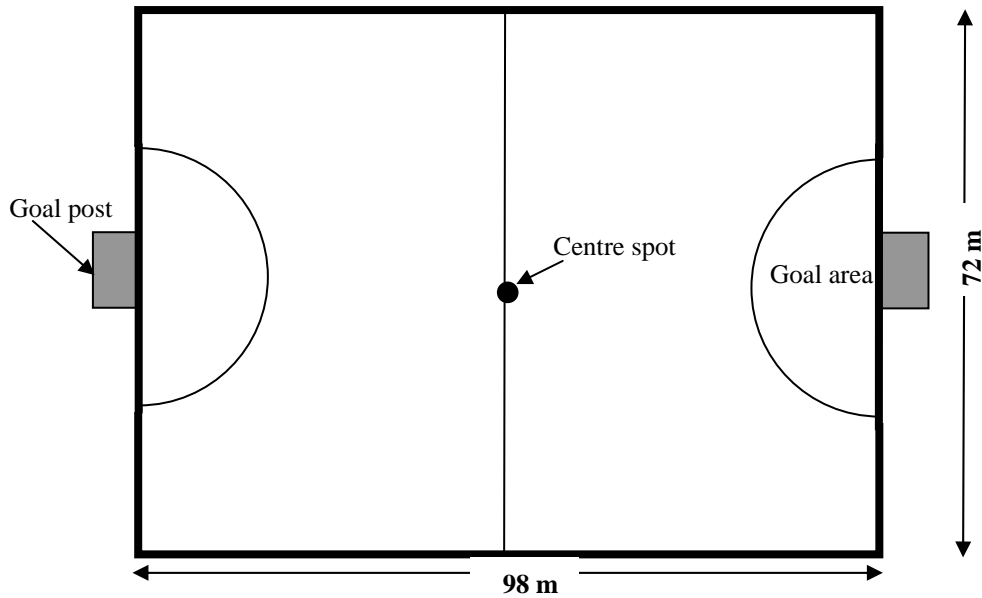
The following formulae may be used:

Perimeter of a rectangle = 2 (*l* + *b*), where *l* = length and *b* = breadth

Area of a circle = $\pi \times$ **(radius)**^{2}, using $\pi = 3,14$

6.2.1 All the outside boundary lines (bold lines) have to be re-marked and one of the goal areas (semicircle) has to be re-grassed.

    (a) Determine the total length of the boundary lines of the hockey field that need to be re-marked. (3)

    (b) Calculate the area of the ONE goal area that has to be re-grassed, if the radius is 16 m. (3)

6.2.2 If it takes 25 minutes to re-mark 8,5 m of boundary lines, calculate how long, in hours, it would take to re-mark 100 m of boundary lines. (3)

[24]

TOTAL: 150

ANNEXURE A

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 6.1.3 and QUESTION 6.1.4

Number of goals scored	0	2	4	Q	7	8
Option A (in rand)	4 600	**P**	5 600	6 100	6 350	6 600
Option B (in rand)	4 000	4 800	5 600	6 400	6 800	7 200

TOTAL BONUS PAYMENT FOR EACH PLAYER