higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(Second Paper)
NQF LEVEL 4

NOVEMBER 2012

(10401034)

5 November (Y-Paper)
13:00 – 16:00

REQUIREMENTS: **Drawing instruments including rulers, pairs of compasses and protractors may be used.**

Calculators may be used.

This question paper consists of 10 pages and 2 annexures.

TIME: 3 HOURS
MARKS: 150

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, et cetera that you used in determining the answers.
5. An approved calculator may be used, unless otherwise stated.
6. Diagrams are not necessarily drawn to scale.
7. Write neatly and legibly.

QUESTION 1

1.1 Betty wants to buy a new bed for her child. The cash price of the bed is R7 899, including VAT (Value Added Tax). She does not have enough money to pay for the bed so she decides to buy it on hire-purchase. Dunbril Furnishers offers her the following hire-purchase deal:

Deposit: R1 399
Monthly instalment: R439,50
Period of payment: 24 months

1.1.1 How much is the cash price, excluding VAT (without VAT) of this bed? (3)

1.1.2 What is the total amount that Betty will pay on the hire-purchase option? (3)

1.1.3 How much interest will she pay when using the hire-purchase option? (2)

1.2 In 2010/2011 Betty earned a gross salary of R18 750 per month.
Every month 7,5% of her salary was deducted and paid into her pension fund.
A monthly deduction of R187,50 was made on her salary and paid towards her UIF (Unemployment Insurance Fund).
Study the tax table given below and answer the questions that follow.

Rates applicable to individuals

Taxable Income (R)	Rates of tax (R)
0 – 150 000	18% of taxable income.
150 001 – 235 000	27 000 + 25% of taxable income above 150 000
234 001 – 325 000	48 250 + 30% of taxable income above 235 000
325 001 – 455 000	75 250 + 35% of taxable income above 325 000
455 001 – 580 000	120 750 + 38% of taxable income above 455 000
580 000 and above	168 250 + 40% of taxable income above 580 000

Tax Rebates applicable to individuals are:

- Primary rebate R10 755
- Additional rebate (for persons 65 years and older) R6 012
- Tertiary (person 75 or older) R2 000

Tax thresholds applicable to individuals are:

- Below age 65 R59 750
- Age 65 to below 75 R74 000
- Age 75 and over R104 261

SOUTH AFRICAN REVENUE SERVICE (SARS) 2010/2011

1.2.1 Determine Betty's gross annual (yearly) salary. (2)

1.2.2 Betty is a 36-year-old female. Calculate her monthly tax (PAYE).

Show ALL your calculations by considering the following:

- Calculation of annual tax
- Tax per month = $\frac{\text{Annual tax}}{12 \text{ months}}$

(7)

1.2.3 How much is deducted from Betty's gross salary each month for her pension contribution? (2)

1.2.4 What percentage of Betty's salary is deducted for UIF? (2)

1.3 Betty is a member of her employer's medical aid scheme. The TABLE below shows the monthly contributions schedule for employees. Use the information in this TABLE to answer the questions that follow:

Salary band	**Member**	**Adult**	**Child**
R0 – R3 000	R484	R444	R268
R3 001 – R5 000	R524	R480	R292
R5 001 – R7 200	R572	R528	R316
R7 201 +	R688	R636	R384

1.3.1 If Betty is a single parent with one child, how much is deducted from her gross salary each month for her medical aid? (2)

1.3.2 How much is Betty's net salary per month after the following deductions:

- Medical aid contribution: The employer subsidises Betty with $\frac{2}{3}$ of her total contributions
- Pension fund
- UIF
- PAYE (7)

1.4 Betty plans to buy a dining room suite which costs R12 999,99. She invested a once-off amount of R10 000 into a medium-term investment which earns 12,5% interest per annum as from January 2010.

1.4.1 Calculate how much Betty's investment will be worth by the end of December 2012.
You may use the formula: $A = P(1 + i)^n$, where
A = Final Amount
P = Starting amount
i = interest rate as a decimal
n = period (4)

1.4.2 The cash price of the dining room suite that Betty plans to buy increases by 4,5% annually as per inflation rate. Will Betty's investment be enough for her to buy this dining room suite cash by the end of December 2012? Justify your answer by showing ALL your calculations. (6)

[40]

QUESTION 2

Khombo has to attend a workshop in Polokwane for three days. She approached Glad Car Hire and Happy Rentals to decide which company to use.

- The distance between Polokwane and Pretoria is 267 km.
- During her three-day stay in Polokwane Hotel she will have to travel from the hotel to the workshop venue. This distance is equivalent to 40% of the distance between Polokwane and Pretoria.
- On the last day she will have to travel back to Pretoria.

The TABLE below shows the car rental figures of Glad Car Hire and Happy Rentals.

Company	Car type	Fixed rental, including the first 200 km	Rental per km above 200 km
Glad Car Hire	Corolla	R390,00	R2,10
Happy Rentals	Corolla	R280,00	R2,39

2.1 Calculate the total distance she will travel in kilometres (km). Round off to the nearest km. (5)

2.2 The formula that may be used to calculate the cost of hiring a car from Happy Rentals is:

Cost = R280,00 + R2,39 × (No. of kilometres more than 200 km)

Use the above formula to calculate the cost of hiring a car from Happy Rentals to travel 397 km. (4)

2.3 Write a formula that can be used to calculate the cost of hiring a car from Glad Car Hire.

Cost = ... (3)

2.4 Use your formula in QUESTION 2.3 to calculate the cost of hiring a car from Glad Car Hire to travel 489 km. (4)

2.5 The following TABLE may also be used to compare the costs of hiring a car from the two companies:

Distance	0 - 200 km	300 km	400 km	500 km	**A**	850 km
lad Car Hire	R390	R600	R8 10	R1 020	R1440	R1755
Happy Rentals	R280	R519	R758	R997	R1475	R1 833,50

Use a suitable formula to calculate the distance **A**. (4)

2.6 On the same set of axis, using the graph paper on ANNEXURE A, draw line graphs for hiring a car from each company (as given in the TABLE in QUESTION 2.5) to illustrate the cost of hiring a car in relation to the distance travelled. Clearly label you graphs. (8)

2.7 Use the graphs to determine the following:

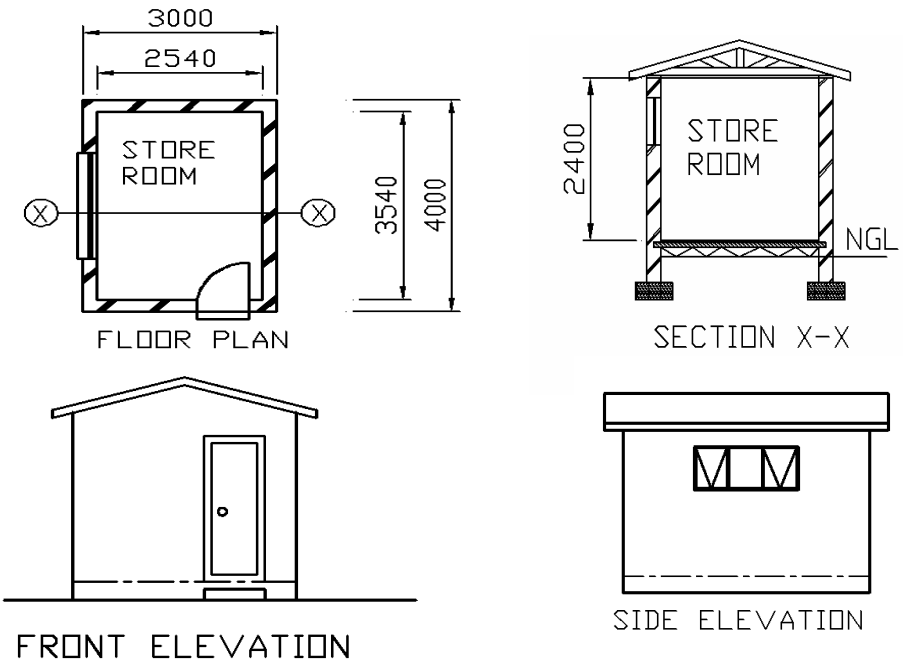
2.7.1 What is the approximate rental cost at the break-even point? (2)

2.7.2 From which company should Khombo hire a car if she now has to travel a total distance of 800 kilometres? Justify your answer by stating the cost for the distance to be travelled for each company. (5)

[35]

QUESTION 3

3.1 Given below is a plan layout for a store room. There are four layouts given, namely the floor plan, section X-X, the front elevations and the side elevation. Study the plan layout below and answer the questions that follow.



Given:

- Internal and external dimensions are given in millimetres (mm) as shown on FLOOR PLAN layout.
- Height in millimetres (mm) from floor to ceiling as shown in the SECTION LAYOUT.
- Standard steel doorframe of dimension: 900 mm × 2 100 mm as shown in the FRONT ELEVATION.
- Standard window of dimension: 1 620 mm × 700 mm as shown on the SIDE ELEVATION.
  Narrow widths areas including internal plastered reveals, soffits and sills = 0,5 m^2

3.1.1 Convert the internal height as shown on the SECTION LAYOUT to m, if 1 m = 1 000 mm. (2)

3.1.2 The owner wants to paint the internal wall areas of the structure. Show that the area to be painted is 26,66 m^2. Show ALL calculations.

HINT:

- Total area (area of internal walls + narrow widths)
- Areas of openings (door and window)

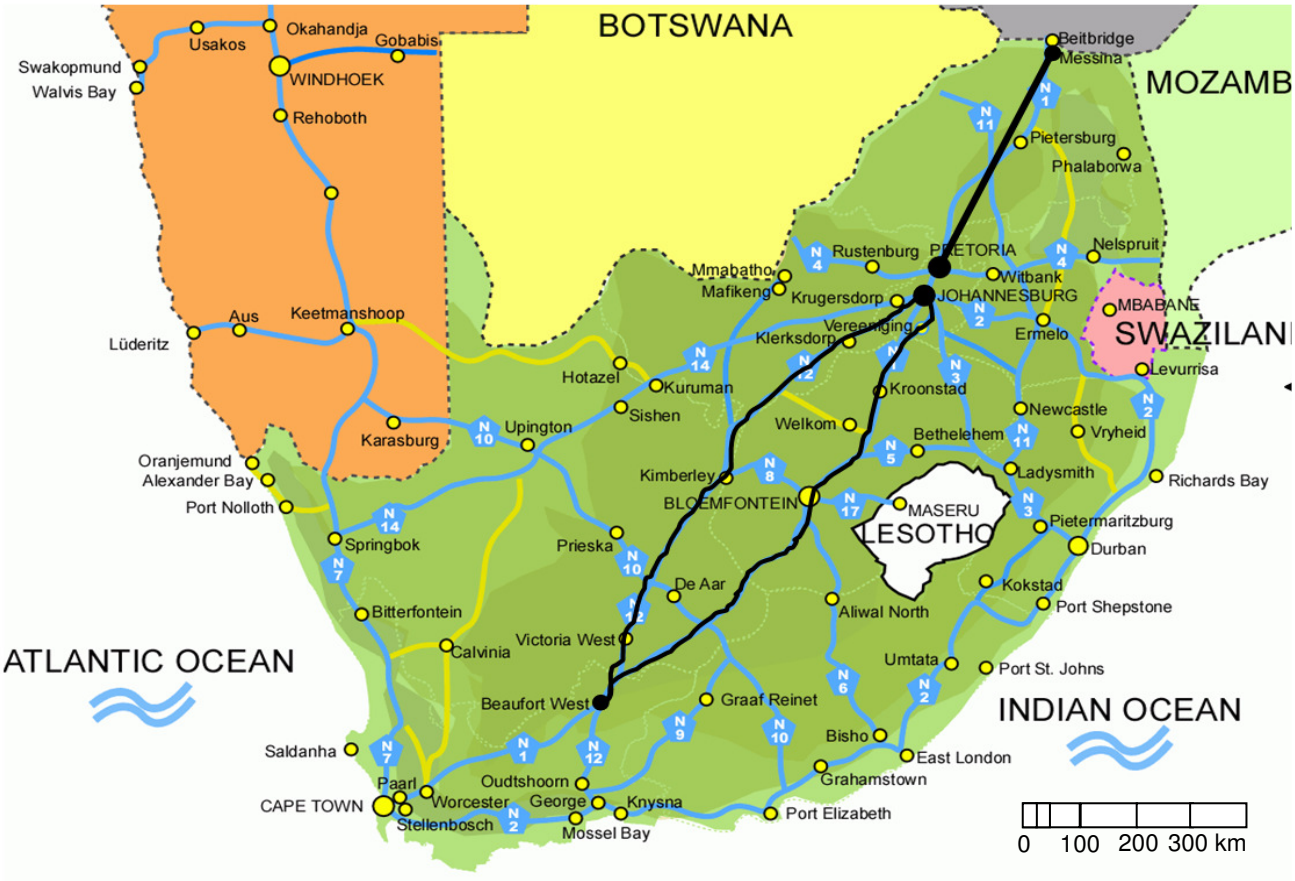
Formula: Painted Area = Total Area - Area of Openings (8)

3.1.3 One litre of paint covers 10 m^2 per coat. How many litres of paint do you need to paint the internal walls of the structure with TWO coats of the same colour paint? (4)

3.1.4 The paint selected is available only in 5 litre tins at R350 each. Determine the cost of the paint. (3)

3.1.5 Calculate the storage capacity of the room in m^3. Formula: Volume = $l \times b \times h$ (3)

3.2 Use the map below to answer the questions that follow.



3.2.1 Use the map to determine the straight line distance between Pretoria and Messina. (3)

3.2.2 Mr Steencarp and his friends travelled by car from Beaufort West to Johannesburg to enter a fishing competition. They wanted to travel the shortest route from Beaufort West to Johannesburg.

Which is the shortest route from Beaufort West to Johannesburg, the route via Kimberley or the one via Bloemfontein? Justify your answer by calculating the distances between the two cities. (6)

3.2.3 Mr Steencarp's cousin used an airbus to fly from Durban to Johannesburg to join them on the fishing competition. Write the direction the pilot must fly:

(a) From Durban to Johannesburg (2)

(b) From Johannesburg back to Durban (2)

3.3 The world has adopted the Greenwich Mean Time (GMT) which is a system of keeping time. ALL countries set their time according to their position with respect to GMT. South Africa is two hours ahead of the GMT so that if the GMT is 13:00, it will be 15:00 in SA. International time is represented as GMT + or – a certain number of hours. Given below are the time zones for three countries.

- New Zealand: GMT + 12
- SA: GMT +2
- USA: GMT – 5

3.3.1 On 11 September 2011 South Africa played against Wales in its opening Rugby World Cup match in New Zealand starting at 10:15 am South African time. What was the starting time of this game in New Zealand? (3)

3.3.2 Hlulani phoned his brother in USA to watch the same Rugby World Cup match between the South Africa and Wales. What was the starting time of the match in the USA? (3)

[39]

QUESTION 4

4.1 The TABLE below shows the fertility rates from 2008 to 2011 of four countries. The fertility rate is an estimation of the number of children that would be born to one woman during her lifetime.

To explain: 2,5 is the fertility rate for the South African population in 2010. This means that in 2010 it was estimated that each South African female would probably give birth to 2,5 ≈ 2 or 3 children in her lifetime.

The estimates in the sampled TABLE below cover ALL the residents of the named countries from 2008 to 2011. Study the TABLE in order to answer the questions that follow.

	Botswana	**Israel**	**SA**	**Swaziland**
2008	3,0	2,9	2,6	3,7
2009	2,9	2,9	2,6	3,6
2010	2,9	3,0	2,5	3,5
2011	2,8	3,0	2,5	3,5

[Source: *The World Bank*]

4.1.1 Which country had the highest fertility rate during the period 2008 to 2011? (2)

4.1.2 Describe the trend(s) of the fertility rate for South Africa from 2008 to 2011. (2)

4.1.3 Use your answer in QUESTION 4.1.2 above to describe the impact the fertility rate had on the growth of the South African population from 2008 to 2011. (2)

4.1.4 Describe the trend(s) of the fertility rate for Israel from 2008 to 2011. (2)

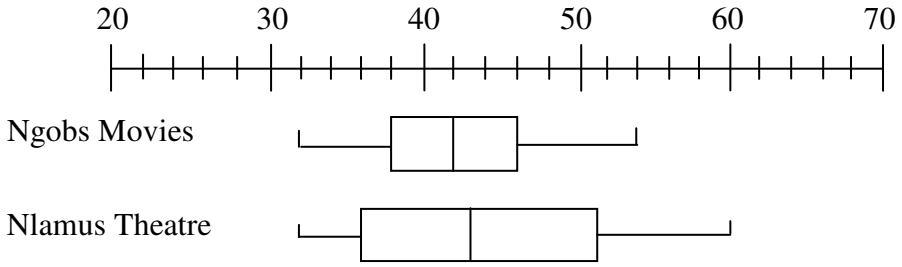
4.1.5 Compare the fertility rate of South Africa with that of Israel. (2)

4.1.6 Analise the fertility rate of the four countries using only the rate of 2011, by considering the following:

- Minimum rate
- Maximum rate
- Median
- Mean (6)

4.1.7 Draw a double bar graph to compare the fertility rate of the four countries for the years 2009 and 2010. Use ANNEXURE B to complete the double bar graph and provide a title and headings on the axis. (9)

4.2 Thandi, a student at an FET college, loves to watch movies during her leisure time. She made a study of two local movie theatres, Ngobs Movies and Nlamus Theatre. The box-and-whisker plot below represents ticket prices in rand of the two local movie theatres.



Use the above box-and-whisker plot to answer the following questions.

4.2.1 The median of Ngobs Movies is R42.
What is the median of Nlamus Theatre? (2)

4.2.2 The lowest price range of NlamusTheatre is R32 – R38.
What is the lowest price range of Ngobs Movies? (2)

4.2.3 Compare the ticket prices in the top range (third quartile to maximum) of the two theatres. (3)

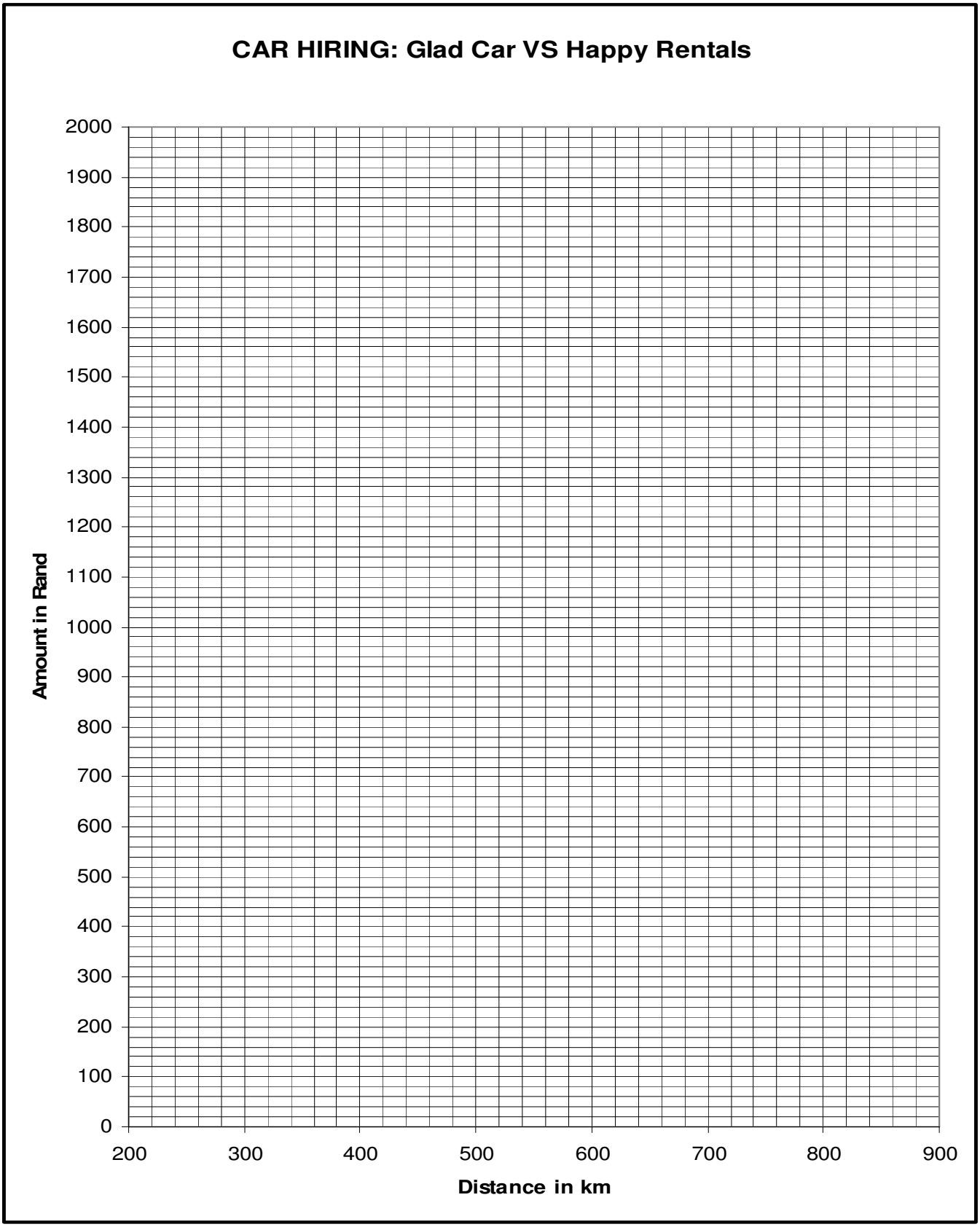
4.2.4 Which theatre has the greater range in ticket prices? Justify your answer. (4)

[36]

TOTAL: 150

ANNEXURE A **EXAMINATION NUMBER:**

2.6



ANNEXURE B **EXAMINATION NUMBER:**

4.1.7: