higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(First Paper)

NQF LEVEL 4

NOVEMBER 2011

(10401034)

7 November (Y-Paper)
13:00 – 16:00

This question paper consists of 12 pages and 1 ANNEXURE.

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, etcetera that will be used in determining the answers.
5. Approved calculators may be used, unless otherwise stated.
6. Drawing instruments including rulers, pairs of compasses and protractors may be used.
7. Diagrams are not necessarily drawn to scale.
8. Write neatly and legibly.

QUESTION 1

1.1 Calculate the following:

1.1.1 $\dfrac{6-12}{18\div 3}$ (1)

1.1.2 $\dfrac{1}{2}\times 2+2$ (1)

1.1.3 $\dfrac{3}{4}+2\dfrac{1}{2}$ (1)

1.1.4 $98\div\dfrac{1}{2}$ (1)

1.1.5 $34{,}2-2{,}2\div 0{,}3$ (1)

1.1.6 $4\times(3+2)\div 10$ (1)

1.1.7 $\dfrac{1}{3}\times 27-\sqrt{64}$ (1)

1.2 Write the following ratio in its simplest form: 147 : 49 : 14 (3)

1.3 Write down the time displayed on the following digital clock after 40 minutes.

(1)

1.4 Determine the cost of 5 bus tickets using the formula:

Cost = number of bus tickets × R120,50 (2)

1.5 Petrol costs R9, 30 per litre. How much would it cost to fill up a 45 litre tank? (2)

1.6 Gabriella got a 12% discount when she bought a new jacket. The original price of the jacket was R 465. How much did she pay for the jacket? (2)

1.7 A train leaves the station at 7:00 am and arrives at its destination at 14:35 the next day. How long was the journey? Give your answer in hours and minutes. (2)

1.8 The number of students in a College has decreased from 770 pupils last year to 545 pupils this year. What is the percentage decrease in the enrolment at the college? Show all working. (3)

1.9 A family travels to London on holiday when the exchange rate is R13,68 = £1.

1.9.1 A sandwich costs £6. What is the cost of a sandwich in Rand and cents? (2)

1.9.2 They change R8 000 into pounds. How many pounds do they receive? (2)

1.10 How much did Megan originally earn, if her new salary after a 7, 5% increase is R7 432? Show all working. (3)

1.11 Calculate the volume (V) of a cylinder with a diameter (d) of 80 cm and a height (h) of 70 cm.

Use the formula $V = \pi \times r^2 \times h$, where $\pi = 3{,}14$ and $r = \frac{d}{2}$.

Show all working. (3)

1.12 In a survey that was conducted through a representative sample at your college; it was found that there were 38 students with scientific calculators and 122 students without scientific calculators.

1.12.1 What is the sample size? (2)

1.12.2 If any student is chosen at random, what is the probability that this student is without a scientific calculator? (2)

[36]

QUESTION 2

The SRC of Majozi FET College is planning a fundraiser dinner and dance. They intend selling 180 tickets at R100 each.

2.1 The events committee manages to secure the services of the Status Hall. The Status Hall charges R 2 000 and then charges a further R60 per person for hosting the dinner and dance:

Cost of Dinner and Dance					
Number of tickets sold (n)	0	50	100	150	180
Expense (E) in Rand	2 000	**A**	8 000	**B**	12 800

The formula for the expense (E) is: $E = 60 \times n + R2\,000$

Use the formula to calculate the values of:

2.1.1 A (2)

2.1.2 B (2)

2.2 The tickets are sold at R100 each:

Number of tickets sold (n)	0	50	100	150	180
Income (I) in Rand	0	5 000	10 000	**C**	18 000

The formula for Income (I) is: $I = 100 \times n$

2.2.1 Use the formula to find the value of C in the table. (2)

2.2.2 The grid on ANNEXURE A represents the expenses against the number of tickets sold. Use the table given above to draw a straight line graph on the same grid that represents the income against the number of tickets sold. (5)

2.3 Use the graph in QUESTION 2.2.2 to answer the following questions:

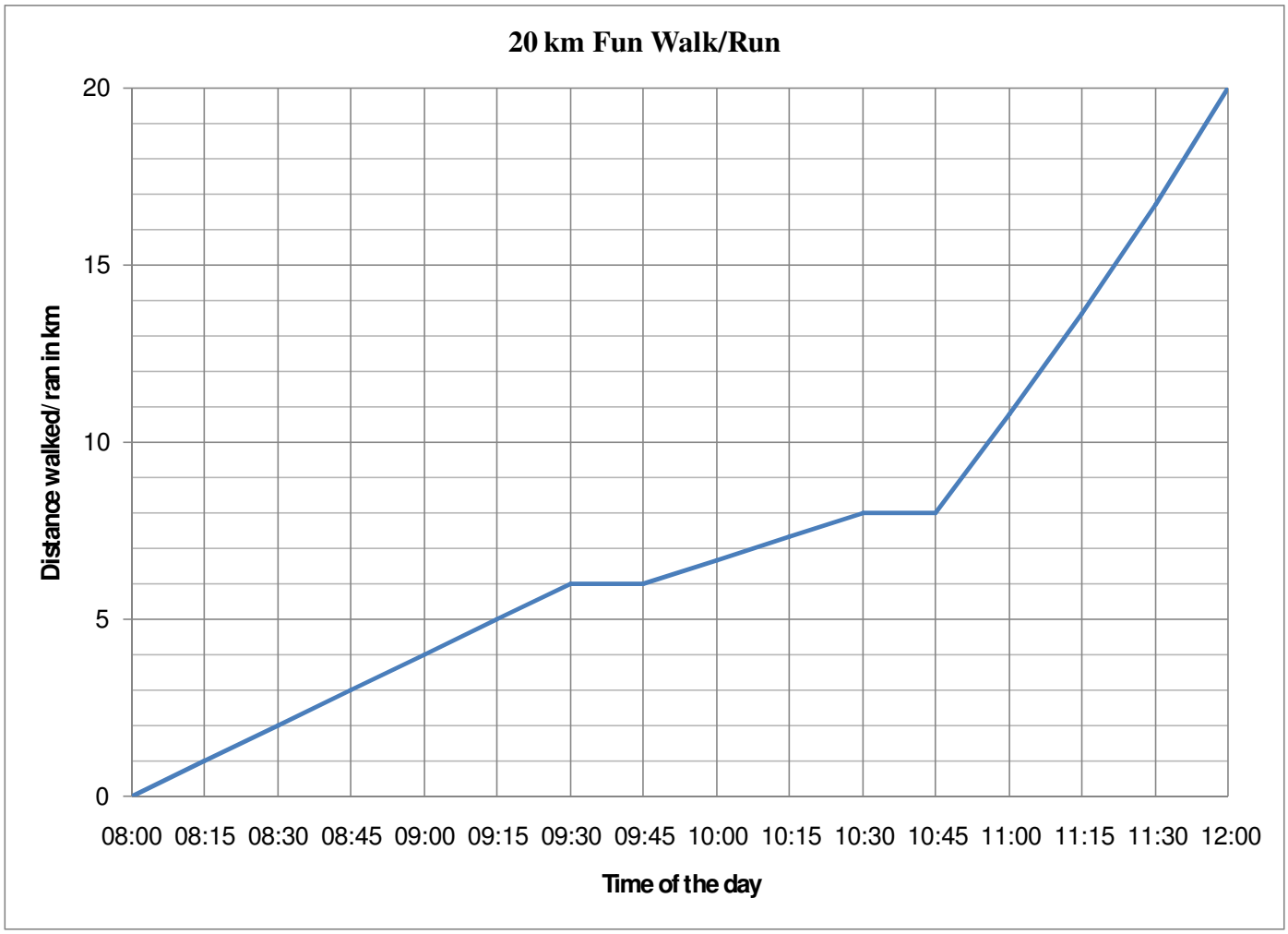
2.3.1 Determine the number of tickets which the SRC must sell in order to break even (neither a loss nor a profit). (2)

2.3.2 What profit would the SRC make if they sold all 180 tickets? (2)

[15]

QUESTION 3

Ann participated in a 20 km fun walk/run. Ann took two rest breaks during the walk/run. The graph below shows the distance covered by Ann against the time taken by her to complete the event:



3.1 How many kilometres did Ann walk in the first hour? (2)

3.2 At what times did Ann take her rest breaks? (2)

3.3 How long did each rest break last? (2)

3.4 At what estimated time did she reach the 12 km mark? (2)

3.5 Estimate how far Ann had walked by 10:00. (2)

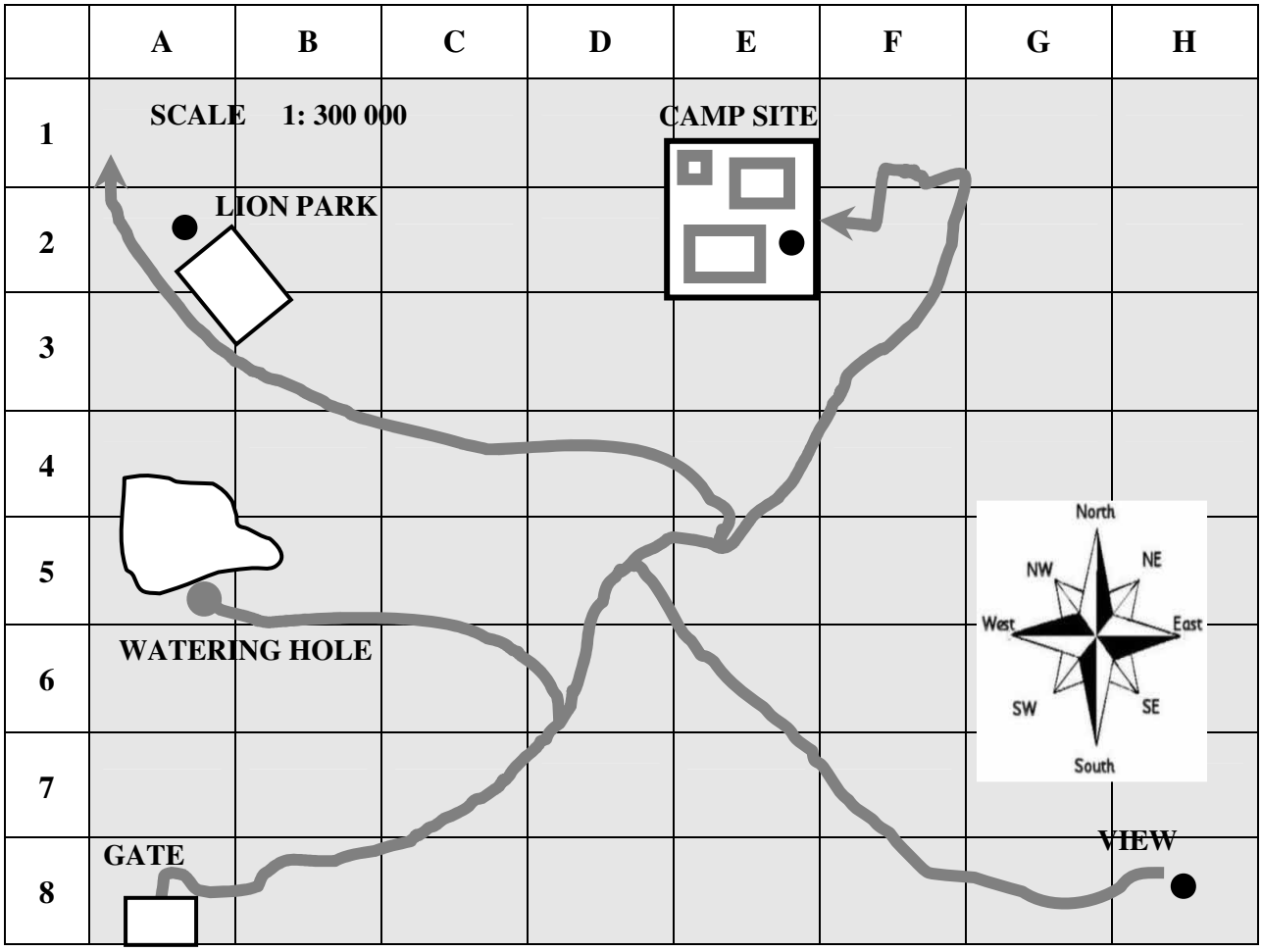
3.6 How long did Ann take to complete the race? (2)

3.7 If the time in South Africa is two hours ahead of the time in London, what was the time in London when the race started? (2)

[14]

QUESTION 4

Given below is a map of a private nature reserve. The Zuma family wants to get to the campsite. They are at the gate. Answer the questions based on the map:



4.1 If the entrance of the camp site is found in cell E 2, then write down the cell location of the gate. (2)

4.2 The distance on the map, from the gate to the camp site is 160 mm. Determine the actual distance in kilometres from the gate to the camp site. (Scale 1:300 000) (3)

4.3 If they travel at a speed of 60 km/h, how long will it take the family to reach the camp site from the gate? (Give your answer in minutes)

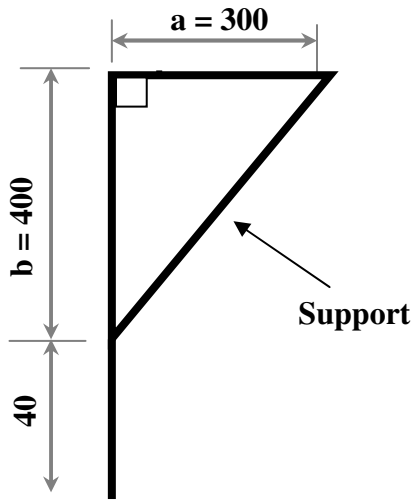
Formula : $\text{time} = \frac{\text{distance}}{\text{speed}}$ (3)

4.4 What is the compass direction of the watering hole from the camp site? (2)

[10]

QUESTION 5

Sipho is told to order enough angle iron to make a bracket shown in the sketch below.
All dimensions are in millimetres (mm).



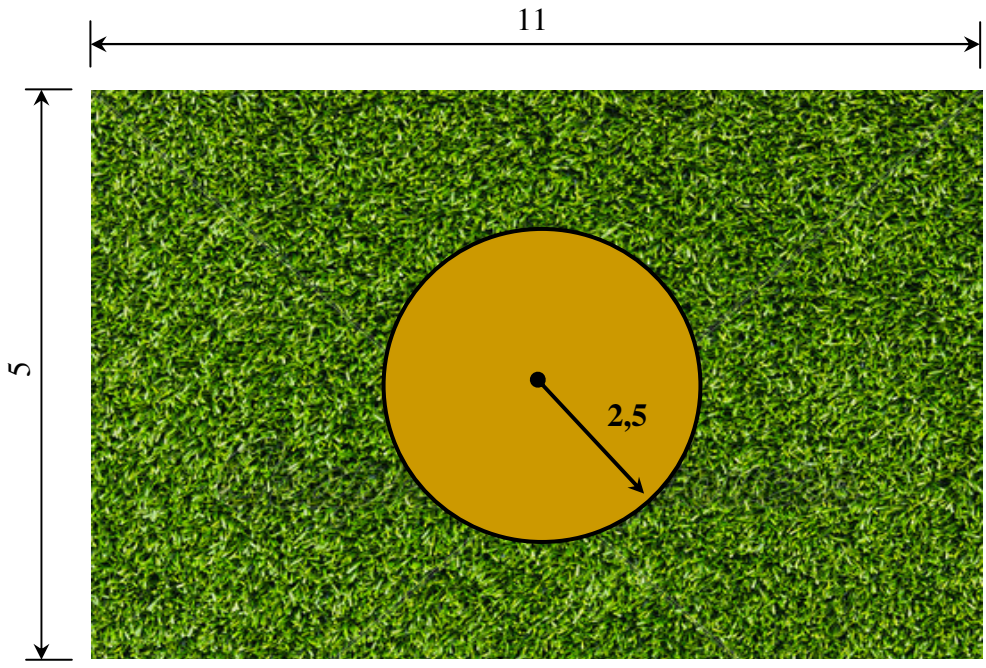
5.1 Study the diagram given above and answer the questions that follow:

5.1.1 Show that the length of the support is 500 mm.

Use: Support $= \sqrt{a^2 + b^2}$ (3)

5.1.2 Determine the amount of angle iron (in metres) that is required to make one bracket. (3)

5.2 Mr Myeni, a gardener at a college, created a circular flower bed in a rectangular field with lawn (grass), as shown in the diagram. All dimensions are in metres (m).



The radius of the flower bed is 2,5 m.
The length of the rectangular lawn is 11 m and the width is 5 m.

5.2.1 Mr Myeni wants to fence off the flowerbed. Determine the length of the fence he requires.
Formula: $Circumference = 2 \times \pi \times r$ where $\pi = 3{,}14$. (2)

5.2.2 Calculate the perimeter of the rectangular lawn. (2)

5.2.3 Write down the perimeter of the lawn in feet if 1 m = 3,25 feet. (2)

5.2.4 Calculate the area of the flower bed.
Formula: Area = $\pi \times r^2$ (2)

5.2.5 Hence, determine the area of the rectangular lawn, excluding the area of the flower bed. (3)

[17]

QUESTION 6

A survey was carried out to compare the levels of absenteeism between the Engineering division and the Business division at a college. The number of learners absent for the first fourteen days after the holidays was recorded. Given below is the table that shows the absenteeism for the two divisions.

ENGINEERING DIVISION													
51	29	44	47	42	24	91	62	89	29	78	99	57	98
BUSINESS DIVISION													
67	20	34	27	50	54	59	78	100	79	80	87	97	73

Use the information above to answer the following questions:

6.1 Determine the average/mean number of days of absenteeism of the Engineering division. (3)

6.2 Determine the following for the Business division:

6.2.1 The median (3)

6.2.2 Lower quartile (2)

6.2.3 Upper quartile (2)

6.3 Draw a box-and-whisker plot that represents the absenteeism for the Business faculty on ANNEXURE A. (6)

[16]

QUESTION 7

The amount you have saved for buying a car is not enough, and you need to take a loan from your company to make up the balance of R15 000.

7.1 Your company agrees to lend you the money but gives you two repayment options:

OPTION A	Repayment calculated annually at 18% simple interest, over 3 years.
OPTION B	Repayment calculated at 15% interest compounded annually, over 3 years.

7.1.1 Determine the total repayment if you choose OPTION A.
Formula: $A = P(1+in)$ (3)

7.1.2 Determine the total repayment if you choose OPTION B.
Formula: $A = P(1+i)^n$ (3)

7.1.3 Which loan option will you take and how much will you save? (2)

7.2 Study the advertisement below and answer the questions that follow:

7.2.1 What was the cash price of the television before the sale? (2)

7.2.2 Determine the total repayment after 36 instalments. (2)

7.2.3 Determine how much you would have saved if you decided to pay cash for the television as opposed to purchasing it on hire purchase. (2)

[14]

QUESTION 8

Ann, a level 4 student at an FET college received pocket money from her parents. She worked part time as a babysitter. Since money was hard to come by, Ann kept a very strict monthly budget. Use her September budget to answer the questions that follow:

September Monthly Budget: Ann			
Income	**Budget**	**Actual**	**Variance**
Pocket Money		R 300	
Babysitting		R 1 500	
Total income		R1 800	
Less expenses	**Budget**	**Actual**	**Variance**
Cell phone	R 100	R 180	-R 80
Movie Tickets	R 200	R 170	+R 30
Clothes	R 500	R 400	**D**
Gifts for parties	R 200	R 250	**E**
Tuck-shop money	R 200	R 100	**F**
DVDs/Music	R 400	R450	**G**
Total expenses	R 1600	**A**	**H**
Surplus/Deficit	**B**	**C**	**I**

8.1 Calculate the value of A (the actual total expense). (2)

8.2 Calculate the value of B (the budgeted surplus/deficit) **and** indicate whether the amount is a surplus or a deficit. (3)

8.3 Calculate the value of C (the actual surplus/deficit) **and** indicate whether the amount is a surplus or a deficit. (3)

8.4 Calculate the value of D, E, F, and G (the variance of the expenses). (4)

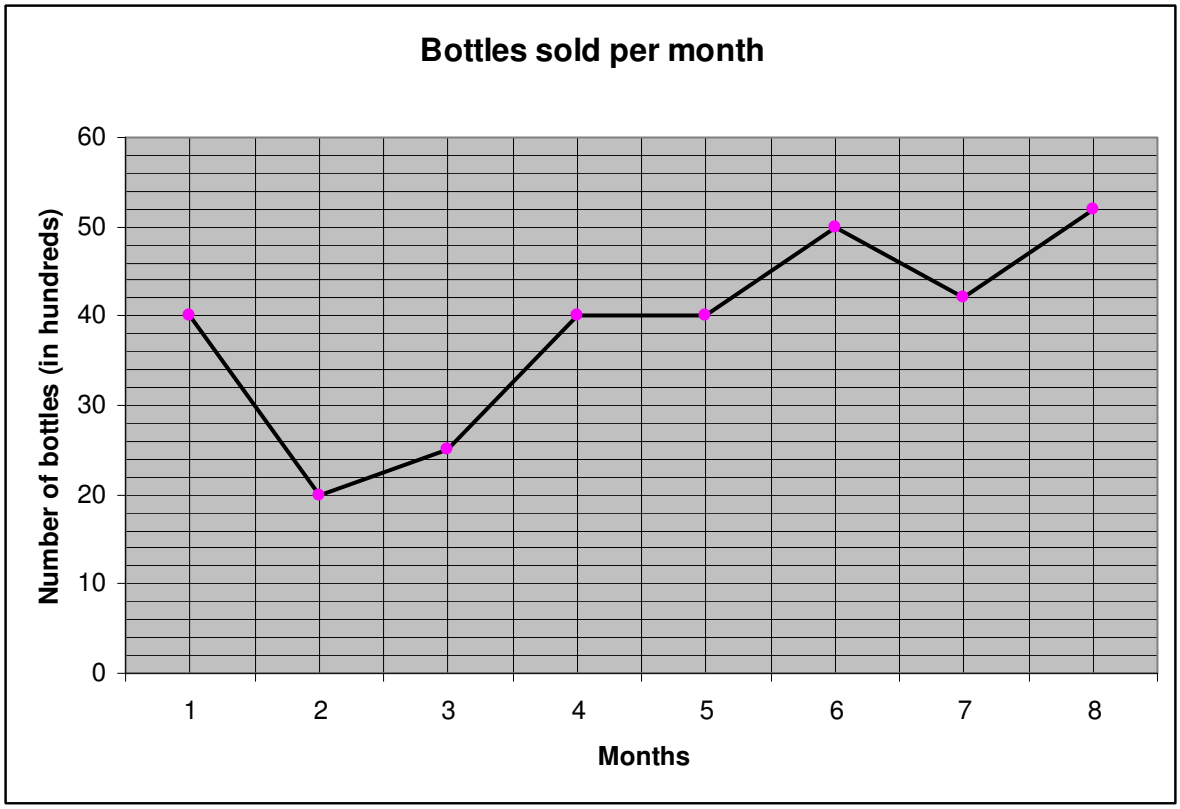
8.5 Calculate the value of H (the variance for the total expenses). (2)

8.6 Calculate the value of I (the variance for the surplus or deficit). (2)

[16]

QUESTION 9

A sales department used a line graph to represent the sales figures for part of the year 2011:



Answer the following questions based on the graph:

9.1 What is the sales period that the graph represents? (2)

9.2 How many bottles were sold altogether? (3)

9.3 In which two consecutive months have the same number of bottles been sold? (2)

9.4 Determine the range of the number of bottles sold during the period. (3)

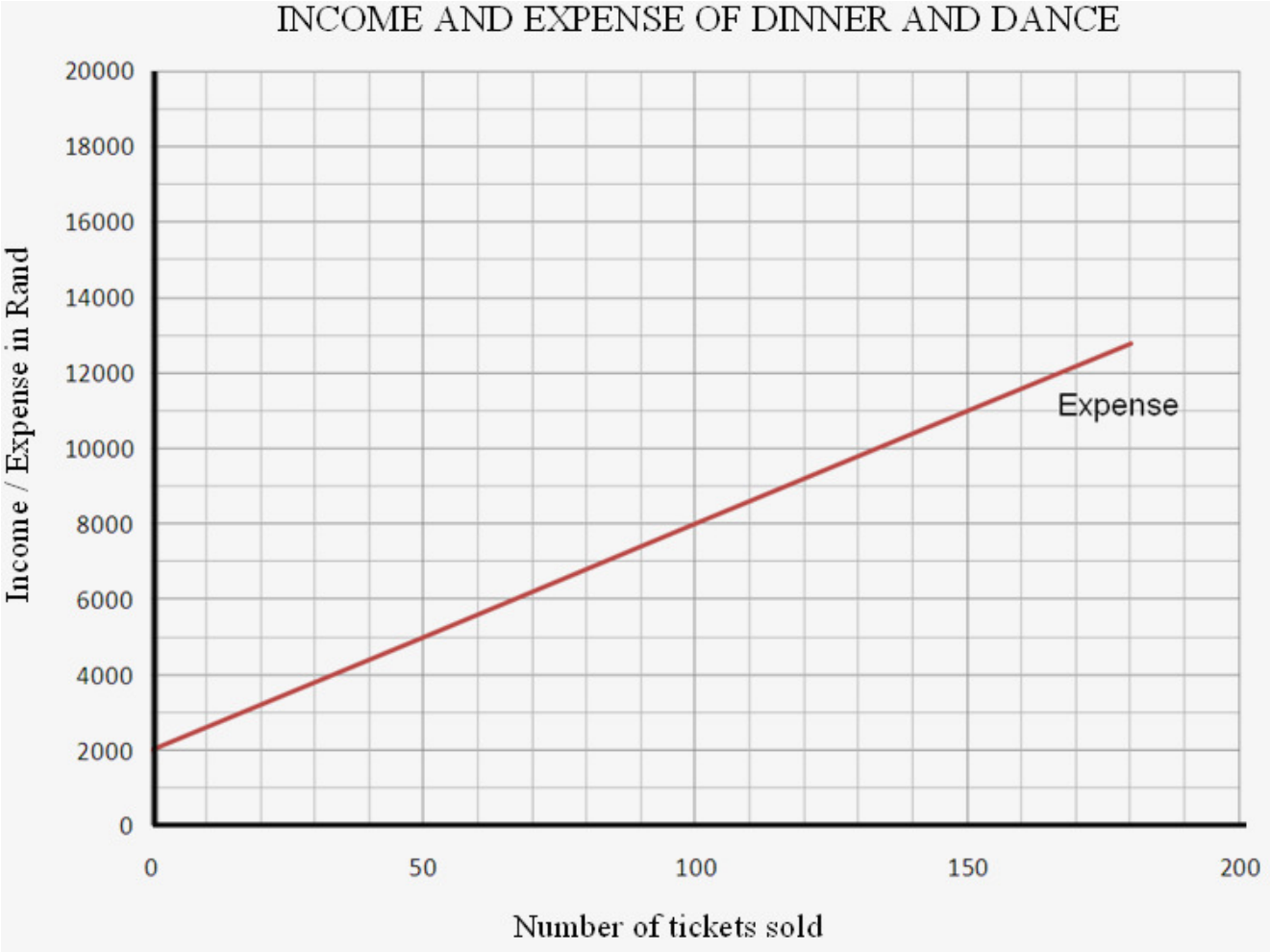
9.5 Choose the correct answer between brackets:
The general trend from month 2 – 6 shows a/an (decrease, increase, constant) in sales. (2)

[12]

TOTAL: 150

ANNEXURE A **EXAMINATION NUMBER:**

QUESTION 2.2.2



QUESTION 6.3

Box-and-whisper plot: Business Division's absenteeism