

# FOCUS A365

Name..... Tadeus Coffey ..... ADM. No.....

Candidate's sign..... [Signature] ..... Date.....

121/1  
**MATHEMATICS**  
 2 ½ Hours  
**FORM TWO**  
**MID TERM ONE EXAMINATIONS**

**Prepared for; St. Clare Girls' High School - Gatitu**

**Instructions to candidates.**

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the space provided above.
3. The paper contain two sections: **Section I and section II**
4. Answer **All** the questions in **section I** and **strictly any four** questions from **section II**.
5. All answers and working must be written in the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used, except unless stated otherwise.

**FOR EXAMINER'S USE ONLY.**

**Section I**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

**Section II**

17	18	19	20	21	22	Total

Grand Total

*This paper consists of 14 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing*  
**SECTION 1 (60 MARKS)**

**Answer all questions in this section (60 Marks)**

1. Find the sum of

$4\ 632 + 273 + 7\ 105 + 90\ 438$  and round off the answer to the nearest 1000.

(4 marks)

$$\begin{array}{r}
 4632 \\
 273 \\
 \hline
 4905 \\
 7105 \\
 \hline
 12010
 \end{array}
 \quad
 \begin{array}{r}
 12010 \\
 90438 \\
 \hline
 102,448
 \end{array}
 \Rightarrow 102,000$$

2. Five brothers wanted to share a parcel of land inherited for their late father. The first born received  $\frac{1}{4}$  of the parcel. The second, third and fourth born each received  $\frac{1}{6}$  of the remainder. If the portion received by the last born was 3 hectares, what was the initial size of the parcel land?

(4 marks)

$$A = \frac{1}{4}$$

$$\text{Rem} = \frac{4}{4} - \frac{1}{4} = \frac{3}{4}$$

$$B = \frac{1}{6} \times \frac{3}{4} = \frac{1}{8}$$

$$C = \frac{1}{8}$$

$$d = \frac{1}{8}$$

$$\text{Total} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{4} = \frac{5}{8}$$

$$\text{Remaind} = \frac{8}{8} - \frac{5}{8} = \frac{3}{8}$$

Therefore  $\frac{3}{8}$  rep. 3 hectares

$$\frac{8}{8} \text{ rep. ? } \frac{8}{8} \times \frac{8}{3} \times 3$$

$$= 8 \text{ hectares.}$$

3. Work out

$$\frac{3}{4} + \frac{1}{2} \text{ of } \left( \frac{2}{3} - \frac{3}{7} \right) \div \frac{3}{5} \times \frac{4}{5}$$

(4 marks)

$$\frac{3}{4} + \frac{1}{2} \text{ of } \frac{5}{21} \div \frac{3}{5} \times \frac{4}{5}$$

$$\frac{3}{4} + \left( \frac{1}{2} \times \frac{5}{21} \times \frac{5}{3} \times \frac{4}{5} \right)$$

$$\frac{3}{4} + \frac{10}{63} = \frac{189 + 40}{252} = \frac{189 + 40}{252}$$

$$= \frac{229}{252}$$

4. a) Express 4 480 as a product of prime numbers in index form.

(2 marks)

$$\begin{aligned}
 &2 \times 2240 \\
 &2 \times 2 \times 1120 \\
 &2 \times 2 \times 2 \times 560 \\
 &2 \times 2 \times 2 \times 2 \times 280 \\
 &2 \times 2 \times 2 \times 2 \times 2 \times 140 \\
 &2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 70 \\
 &2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 7 \\
 &= 2^7 \times 5 \times 7
 \end{aligned}$$

(2 marks)

b) Use prime factorization to simplify  
 $3024 \div 1008$

$$\begin{aligned}
 &3024 \\
 &2 \times 1512 \\
 &2 \times 2 \times 756 \\
 &2 \times 2 \times 2 \times 378 \\
 &2 \times 2 \times 2 \times 2 \times 189 \\
 &2 \times 2 \times 2 \times 2 \times 3 \times 63 \\
 &2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 21 \\
 &2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \\
 &2^4 \times 3^3 \times 7
 \end{aligned}$$

$$\begin{aligned}
 &1008 \\
 &2 \times 504 \\
 &2 \times 2 \times 252 \\
 &2 \times 2 \times 2 \times 126 \\
 &2 \times 2 \times 2 \times 2 \times 63 \\
 &2 \times 2 \times 2 \times 2 \times 3 \times 21 \\
 &2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7 \\
 &2^4 \times 3^2 \times 7 \\
 &= \frac{2^4 \times 3^3 \times 7}{2^4 \times 3^2 \times 7} \\
 &= \underline{\underline{3}}
 \end{aligned}$$

(4 marks)

5. Find the value of x in the equation.

$$\frac{2x-3}{3} = 7-2x$$

$$\begin{aligned}
 2x-3 &= 21-6x \\
 2x+6x &= 21+3 \\
 8x &= 24 \\
 x &= \frac{24}{8} \\
 x &= 3
 \end{aligned}$$

6. Juma invested a certain amount of money in a textiles business that paid simple interest at the rate of 20% per annum. At the end of nine months he withdrew sh 6,000 which was the interest the money had earned. Calculate the amount of money Juma had invested. (4 marks)

$$\frac{PRT}{100} = I$$

$$\frac{P \times 20 \times 9}{100 \times 12} = 6000$$

$$P = \frac{6000 \times 100 \times 12}{20 \times 9}$$

$$P = 2000 \times 20$$

$$= 40,000$$

7. A water tank was  $\frac{1}{8}$  full of water. When 10,500 litres of water was added into the tank it became  $\frac{3}{4}$  full. Determine the quantity of water in litres the tank can hold when it is completely full. (4 marks)

$$\frac{3}{4} - \frac{1}{8} = \frac{6-1}{8} = \frac{5}{8}$$

$$\frac{5}{8} \text{ rep } = 10,500 \text{ L}$$

$$\frac{8}{8} = ? \quad \frac{8}{8} \times \frac{8}{5} \times 10,500 = \underline{16,800 \text{ Litres}}$$

8. A rectangular floor of a story building measuring 560m by 300m is represented on a scale 1:20,000. What is the area of the scale drawing in  $\text{cm}^2$ ? (4 marks)

$$560 \times 300 = 168,000 \text{ M}^2$$

$$1 \text{ CM rep } 20,000 \text{ CM}$$

$$1 \text{ CM}^2 \text{ rep } 20,000 \times 20,000$$

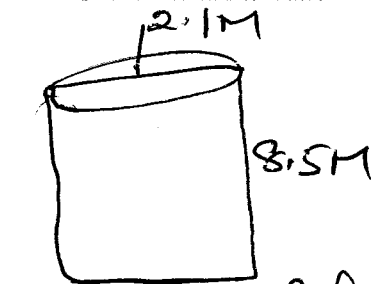
$$? = 168,000 \times 100 \times 100$$

$$\frac{168,000 \times 100 \times 100}{20,000 \times 20,000} = \frac{8.4 \text{ CM}}{2}$$

$$= \underline{4.2 \text{ CM}^2}$$

163

9. Kimaru's circular tank of diameter 2.1 metres and height 8.5 metres is full of water. How much water in litres is in the tank? Take  $\pi = 3.142$  (4 marks)



$$Vol = \pi r^2 h$$

$$= 3.142 \times 2.1 \times 8.5$$

$$= 3.142 \times \frac{2.1}{2} \times \frac{2.1}{2} \times 8.5 = 29.44 \text{ M}^3$$

$$1 \text{ M}^3 = 1000 \text{ l}$$

$$29.44 = \frac{29.44 \times 1000}{1}$$

$$= 29440 \text{ Litres}$$

10. A dealer paid Kshs 240,000 to an agent as commission for the sale of a car. The commission was 3% of the car price. How much money did the dealer remain with from the sale of the car if he also had to pay the government V.A.T at 16% of the total car? (4 marks)

Price of car? 240,000 is 3%  
? = 100%

$$\frac{100}{3} \times 240,000$$

$$= 8,000,000$$

$$= (100 - 16) \%$$

$$\frac{84}{100} \times 8,000,000$$

$$= 6,720,000 \text{ Ksh} - 240,000$$

$$= 6,480,000 \text{ Ksh}$$

11. Evaluate

$$12^3(9^4 - 3^5)$$

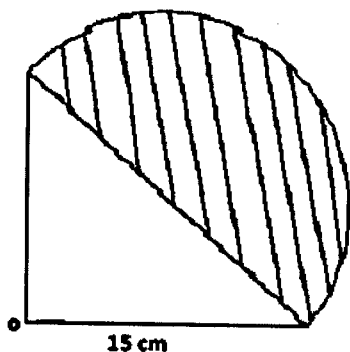
$$6^3 \times 3^6$$

$$\frac{2 \times 2 \times 2 \times (9^4 - 3^5)}{6 \times 6 \times 6 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$\frac{8(6561 - 243)}{729} = \frac{8(6318)}{729}$$

$$= 69.33$$

12. The figure below represents a quarter of a circle centre O. the radius of the circle is 15 cm. (3 marks)



What is the area of the shaded part? (Take  $\pi = \frac{22}{7}$ )

$$\begin{aligned}
 \text{Area of shaded part} &= \text{Area of sector} - \text{Area of triangle} \\
 &= \left( \frac{1}{4} \times \frac{22}{7} \times 15 \times 15 \right) - \frac{1}{2} \times 15 \times 15 \\
 &= 176.79 - 112.5 \\
 &= 64.29 \text{ cm}^2
 \end{aligned}$$

13. a) The mean age of five girls is 16 years. The age of the first 3 girls were 12, 14 and 13 respectively. The age of the fifth girl is 17 years older than the fourth girl.

What is the (a) modal age.

(3 marks)

$$16 \times 5 = 80 \text{ years}$$

$$12 + 14 + 13 = 39$$

$$80 - 39 = 41$$

$$\begin{array}{l|l}
 \text{Let fifth girl be } x & \text{5th girl} = 17 \\
 x + (x - 17) = 41 & \text{4th girl} = 12 \\
 2x = 24 & \\
 x = 12 &
 \end{array}$$

$$\text{Modal age} = 12$$

(2 marks)

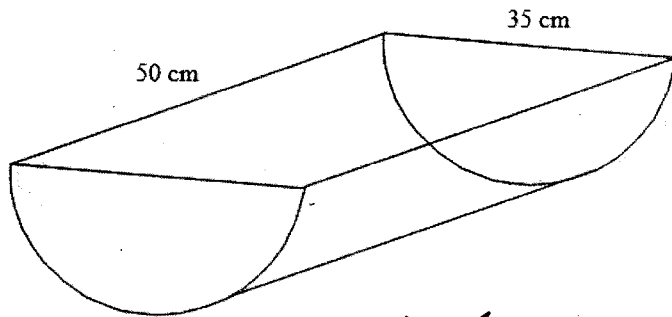
b) The median age

$$12, 12, 13, 14, 17$$

$$\text{Median} = \underline{\underline{13}}$$

14. Calculate the surface area of the solid below in  $\text{cm}^2$ . (Take  $\pi = \frac{22}{7}$ )

(4 marks)



$$\begin{aligned}
 & (50 \times 35) + \left( \frac{1}{2} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2} \times 2 \right) + \left( \frac{1}{2} \times \frac{22}{7} \times 35 \times 50 \times 2 \right) \\
 & \quad \checkmark \quad \quad \quad \checkmark \quad \quad \quad \checkmark \\
 & 1750 + 962.5 + 2750 \\
 & = 5,462.5 \checkmark
 \end{aligned}$$

15. In a sugar factory 400,000 kilograms of sugar were packed in 250g packets. If these 250g packets were packed again in bundles where each bundle had 20 such packets. How many bundles were obtained?

(4 marks)

$$\begin{aligned}
 & \frac{400000}{250} = 1600 \text{ packets} \\
 & \frac{1600}{20} = 80 \text{ bundles} \\
 & \quad \quad \quad = 80000 \text{ bundles} \\
 & \quad \quad \quad \underline{\underline{\hspace{2cm}}}
 \end{aligned}$$

**SECTION II (40 marks)**

Answer any four questions in this section.

16. a) Evaluate  $\frac{3}{4} + \frac{1}{16}$  of  $\left(\frac{3}{7} - \frac{1}{21}\right) \div \frac{6}{21} \times \frac{2}{5}$

(4 marks)

$$\frac{3}{4} + \left(\frac{1}{16} \text{ of } \frac{8}{21} \div \frac{6}{21} \times \frac{2}{5}\right)$$

$$\frac{3}{4} + \frac{1}{16} \times \frac{8}{21} \times \frac{21}{6} \times \frac{2}{5}$$

$$\frac{3}{4} + \frac{8}{30} = \frac{3}{4} + \frac{1}{30} = \frac{47}{60}$$

b) What is the value of  $14(4^4 - 3^5) + 49 \div \frac{1}{12}$

(3 marks)

$$14(256 - 243) + (49 \times \frac{12}{1})$$

$$14(13) + 588$$

$$182 + 588 = 770$$

c) Find n in the expression.

(3 marks)

$$\frac{2n}{5} + \frac{2n-3}{3} = 3$$

$$\frac{3}{15} \left(\frac{2n}{5}\right) + \frac{5}{15} \left(\frac{2n-3}{3}\right) = 3 \times 15$$

$$6n + 10n - 15 = 45$$

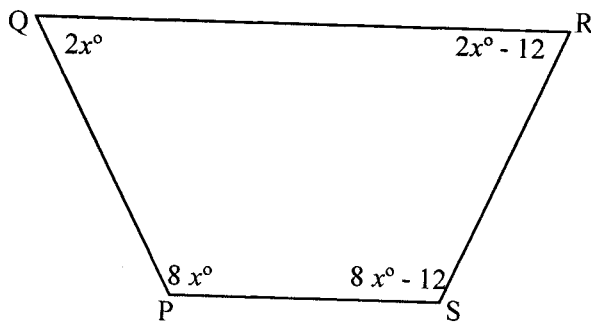
$$16n = 45 + 15$$

$$\frac{16n}{16} = \frac{60}{16} = \underline{\underline{3.75}}$$



17. a) Find the value of angle PQR in the figure below

(4 marks)



$$2x + 2x - 12 + 8x + 8x - 12 = 360$$

$$20x - 24 = 360$$

$$20x = 360 + 24$$

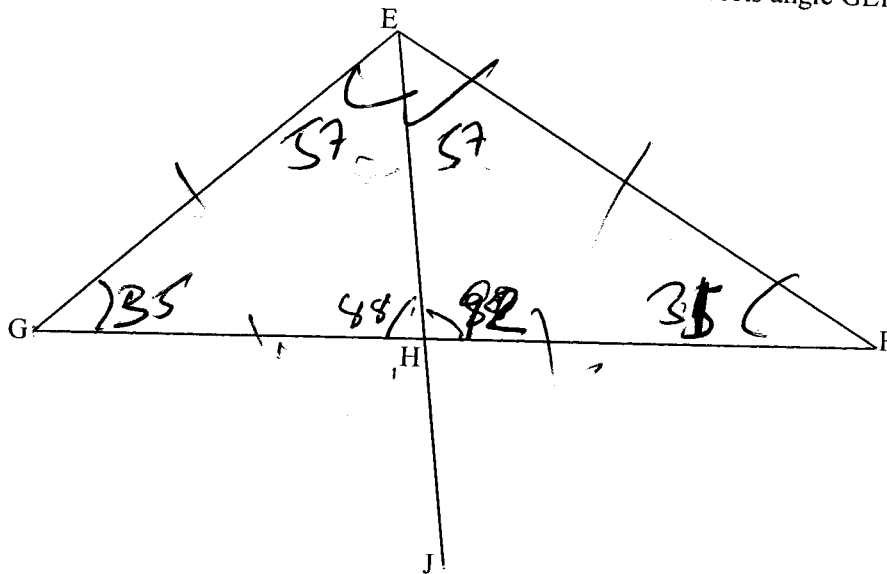
$$20x = 384 = \frac{384}{20}$$

$$x = \frac{384}{20}$$

$$x = 19.2^\circ \times 2 = 38.4^\circ$$

b) Calculate the size of angle GHJ in the figure below. EJ bisects angle GEF.

(3 marks)

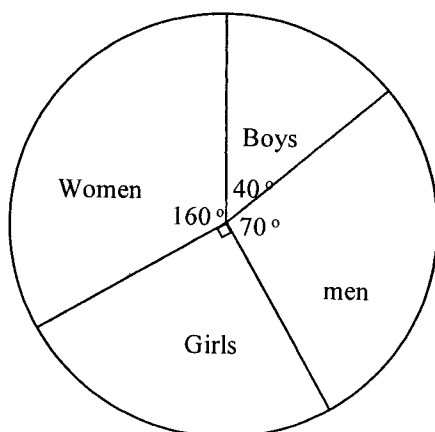


$$\underline{\underline{GHJ = 92^\circ}}$$

c) The population of a village is represented by the chart below.

If there were 1,200 men in the village, what is the total population in the village?

(3 marks)



$$\frac{70}{360} = 1200$$

$$\frac{360}{360} = \frac{360}{70} \times \frac{360}{70} \times 1200$$

$$= 6171 \text{ people}$$

18. a) (i) Write nine million, seventy five thousand, three hundred and seven in numerals.

(2 marks)

$$\begin{array}{r} 9\,000\,000 \\ - 15\,000 \\ \hline 9\,075\,307 \end{array}$$

(ii) Round off the number in a (i) above to the nearest ten thousand.

(2 marks)

$$\underline{9,080,000}$$

b) Work out the difference in value between the LCM of 16 and 36 and the G.C.D of 72 and 108. (4 marks)

$$\begin{array}{r|l} 2 & 16 & 36 \\ \hline & 8 & 18 \\ \hline & 4 & 9 \\ \hline & 2 & 9 \end{array}$$

$$\underline{144}$$

$$\begin{array}{r|l} 2 & 72 & 108 \\ \hline & 36 & 54 \\ \hline & 18 & 27 \\ \hline 3 & 6 & 9 \\ \hline & 2 & 3 \end{array}$$

$$4 \times 9 = 36$$

$$\text{Therefore} = 144 - 36$$

$$= \underline{108}$$

c) State the place value of the digit 7 in the number 4,975,862.

(2 marks)

Ten thousands

19 a) (i) Convert  $\frac{18}{22}$  to a decimal.

(2 marks)

$$\begin{array}{r} 0.81 \\ 22 \overline{) 180} \\ \underline{176} \\ 40 \\ \underline{38} \\ 20 \\ \underline{18} \end{array} = 0.81$$

(ii) Convert 1.37 to a fraction.

(2 marks)

$$\frac{137}{100} = 1\frac{37}{100}$$

b) Without using a calculator or mathematical tables, evaluate

(3 marks)

$$\sqrt{\frac{0.36 \times 0.0009 \times 20}{0.018}}$$

$$\frac{0.36 \times 0.0009 \times 20 \times 10^6}{0.018 \times 10^4}$$

$$= \sqrt{\frac{36 \times 9 \times 20}{18 \times 10^2 \times 50}}$$

$$= \sqrt{\frac{18}{50}} = \sqrt{\frac{36}{100}} = \frac{6}{10} = \underline{\underline{0.6}}$$

c) The cost of an exercise book in a supermarket is sh 14.80, while that of a pen is sh 9.50. If a student bought two pens and eleven exercise books. How much money did the student spend altogether? (3 marks)

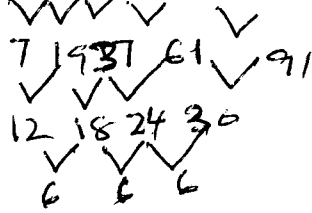
$$14.80 \times 11 = 162.8$$

$$9.50 \times 2 = 19$$

$$\underline{\underline{\text{Q. } 181.8}}$$

20. a) What are the next two terms in the series

1, 8, 27, 64, 125, ... 216



(4 marks)

b) Five employees are paid shs 30,000 after working for twenty days. Calculate the amount of money that nine employees would be paid if they work for eleven days if payment is at the same rate? (4 marks)

Emps	amt	days
5	30000	20
9		11

$$\frac{9}{5} \times \frac{30000}{20} \times 11$$

29,700

c) In high school the ratio of boys to girls is 3:7. There are 750 pupils in the school. During a sporting event  $\frac{1}{4}$  of the boys took part. How many boys did not take part in the event? (2 marks)

$$B:G = 3:7$$

$$\frac{3}{10} \times 750 = 225 \text{ boys}$$

$$= \frac{1}{4} \times 225$$

$$= 56 \text{ took part}$$

$$225 - 56 = 169 \text{ did not take part}$$

21.

a) Find the cube root of 9261 using the factor method

(3 marks)

$$\begin{aligned}
 &3 \times 3087 \\
 &3 \times 3 \times 1029 \\
 &3 \times 3 \times 343 \times 3 \\
 &3 \times 3 \times 3 \times 7 \times 49 \\
 &\underbrace{3 \times 3 \times 3}_{27} \times \underbrace{7 \times 7 \times 7}_{343} \\
 &\underline{\underline{3 \times 7 = 21}}
 \end{aligned}$$

b) Use a mathematical table only to solve the expression;

(5 marks)

$$\sqrt[3]{\frac{49 \times 0.002311}{0.6544 \div 21}}$$

NO	Diff	Log	
49	$4.9 \times 10^1$	1.6902	$\frac{-1.0540}{-2.4936}$
0.002311	$2.311 \times 10^{-3}$	<u>2.3638</u>	$\frac{0.5604}{0.5604 \times \frac{1}{3}}$
0.6544	$6.544 \times 10^{-1}$	<u>1.0540</u>	$\frac{0.1868}{0.1868}$
21	$2.1 \times 10^1$	<u>1.3222</u>	$10^0 \times 1.5375$
		<u>2.4936</u>	$= \underline{\underline{1.5375}}$

c) Find the gradient of a line passing through (-3, 5) and the point of origin.

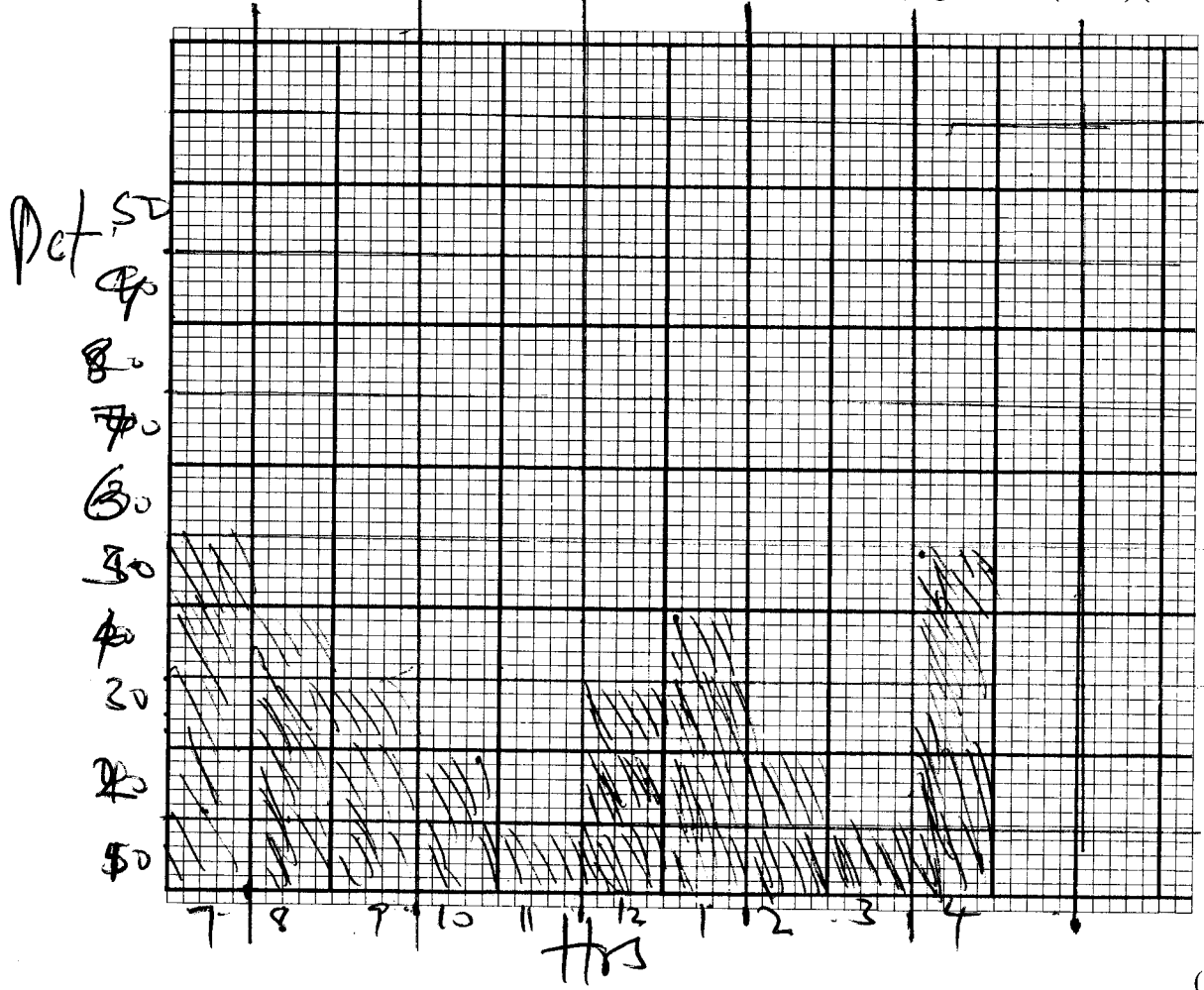
(2 marks)

$$\frac{0-5}{0-(-3)} = \frac{-5}{3} = -\frac{5}{3}$$

22. The table below shows the petrol consumption of a vehicle between 7am to 4pm daily.

Time	7 am	8 am	9 am	10 am	11 am	12 noon	1 pm	2 pm	3 pm	4 pm
Petrol (litres)	50	40	30	20	10	30	40	20	10	50

Use the graph paper below to draw the bar graphs of petrol (litres) (y-axis) against time (hours) (x-axis)



b) Calculate the quantity of litres consumed by the vehicle from 7.00 am to 11.00 am. (4 marks) (6 marks)

$$50 + 40 + 30 + 20 + 10 = \underline{\underline{150}}$$