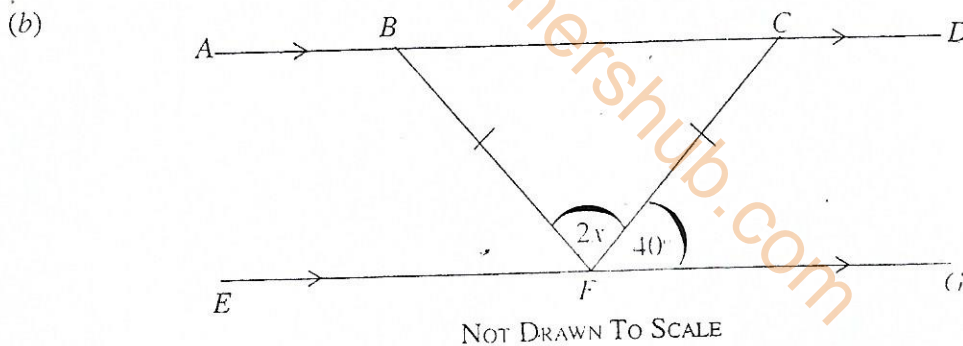


Answer **four** questions **only**.

All questions carry equal marks.

All working must be clearly shown. Marks will **not** be awarded for correct answers without corresponding working.

1. (a)  $P = \{\text{Factors of } 30\}$   
 $Q = \{\text{Multiples of } 5 \text{ less than } 40\}$   
 Find  $P \cap Q$ .
  - (b) A trader saved GH¢ 200.00 for 3 years at 12% simple interest per annum.  
 What will be the total amount in the trader's account at the end of the 3 years?
  - (c) Evaluate  $\frac{4.56 \times 3.6}{0.12}$  and leave your answer in standard form.
2. (a) (i) Ama scored 82, 74 and 90 in three tests. What mark should she score in the fourth test, so that her average mark for the four tests would be 85?  
 (ii) What was her median score in the four tests?



In the diagram  $\overline{AD}$  is parallel to  $\overline{EG}$ , angle  $CFG = 40^\circ$  and triangle  $BCF$  is isosceles.  
 Find the value of:

- (i) angle  $CBF$ ;
- (ii) angle  $DCF$ ;
- (iii)  $x$ .

3. (a) Solve for  $x$ , if  

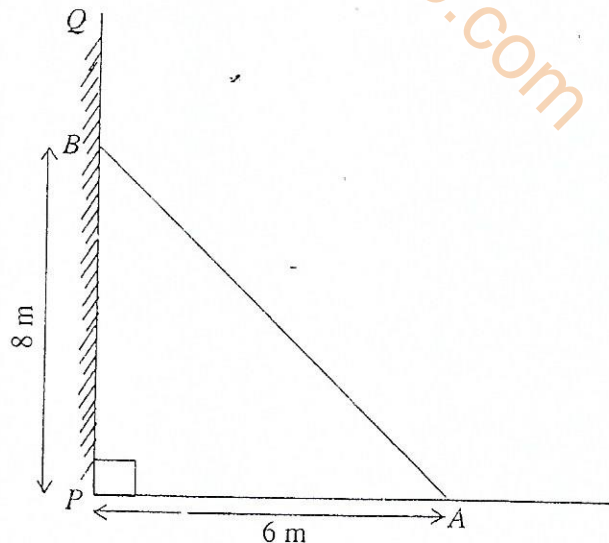
$$\frac{1}{3}x + 1\frac{2}{3} < -\frac{3}{4}x - \frac{1}{2}$$

- (b) The following shows the distribution of marks of students in an examination.

6	43	26	18	27
42	8	22	31	39
55	44	37	47	59
10	12	36	53	48

- (i) Make a stem-and-leaf plot of the marks above.
- (ii) Find the probability of selecting a student who scored between 40 and 50.
- (iii) Find the number of students who passed the examination, if the pass mark was 30.

4. (a) A box has length 8.0 cm, width 5.0 cm and height 10.0 cm. Find the:
- total surface area of the box;
  - the volume of the box.
- (b) (i) Using a scale of 2 cm to 1 unit on both axes, draw two perpendicular axes  $Ox$  and  $Oy$  on a graph sheet.
- (ii) On the same graph sheet mark the  $x$ -axis from  $-5$  to  $5$  and the  $y$ -axis from  $-6$  to  $6$ .
- (iii) Plot and join the points  $A(0,3)$ ,  $B(2,3)$  and  $C(4,5)$  to form triangle  $ABC$ .
- (iv) Draw the image  $A_1B_1C_1$  of triangle  $ABC$  under a translation by the vector  $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$ .
- (v) Draw the image  $A_2B_2C_2$  of triangle  $ABC$  under a reflection in the  $x$ -axis.
5. (a) Using a ruler and a pair of compass only:
- construct triangle  $PQR$  such that  $|PR| = 8$  cm,  $|PQ| = 6$  cm and  $|QR| = 5$  cm;
  - construct the perpendicular bisector of  $PR$  and label it  $l_1$ ;
  - construct the perpendicular bisector of  $QR$  and label it  $l_2$ ;
  - Label the point of intersection of  $l_1$  and  $l_2$  as  $N$ ;
  - With  $N$  as centre and radius equal to  $|PN|$ , draw a circle.
- (b) (i) Measure the radius of the circle.
- (ii) Calculate the circumference of the circle, correct to 3 significant figures.  
[Take  $\pi = 3.14$ ]
6. (a) Factorize completely  $6xy - 3y + 4x - 2$ .
- (b)



NOT DRAWN TO SCALE

The diagram shows a ladder  $AB$  which leans against a vertical wall  $PQ$  at  $B$ . If  $|PB|$  is 8 m, and the other end of the ladder is 6 m away from the foot of the wall (at  $P$ ), find the length of the ladder ( $AB$ ).

(c) Kojo had 1,800 bags of rice in stock for sale. In January he sold  $\frac{2}{3}$  of it. In February, he sold  $\frac{3}{4}$  of what was left.

- (i) What fraction of the stock of rice did he sell
  - ( $\alpha$ ) in February?
  - ( $\beta$ ) in January and February?
- (ii) How many bags of rice were left unsold, by the end of February?

***END OF ESSAY TEST***

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Answer all questions.

Each question is followed by four options lettered A to D. Find the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question. An example is given below.

If  $3n + 2 = 8$ , find the value of  $n$ .

- A. 10
- B. 6
- C. 3
- D. 2

The correct answer is 2, which is lettered D and therefore answer space D would be shaded.

☐ A ☐ B ☐ C ☒ D ☐ E

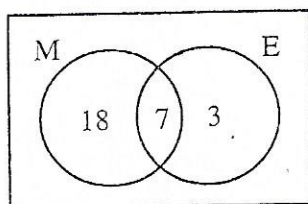
Think carefully before you shade the answer spaces. Erase completely any answers you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. If set N is a subset of set M, then
  - A. sets M and N have the same number of elements.
  - B. some members of set N can be found in set M.
  - C. no member of set N is in set M.
  - D. all members of set N are in set M.

The Venn diagram shows the number of pupils who offer Mathematics (M) and/or English (E) in a class.



Use this information to answer Questions 2 and 3.

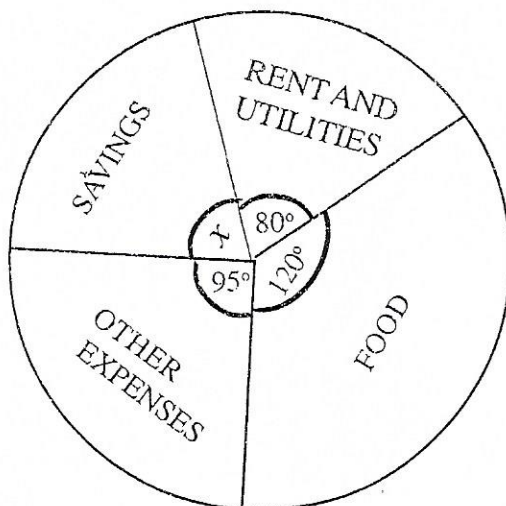
2. How many pupils offer Mathematics?
  - A. 10
  - B. 18
  - C. 25
  - D. 28
3. How many pupils offer only one subject?
  - A. 3
  - B. 7
  - C. 18
  - D. 21
4. Simplify:  $12 - 7 - (-5)$ .
  - A. -10
  - B. -2
  - C. 0
  - D. 10



5. Express 72 as a product of its prime factors.
- A.  $2 \times 3^3$
  - B.  $2^2 \times 3^3$
  - C.  $2^3 \times 3$
  - D.  $2^3 \times 3^2$
6. Find the **smallest** number which is divisible by 16 and 20?
- A. 40
  - B. 80
  - C. 120
  - D. 160
7. Convert  $243_{\text{five}}$  to a base ten numeral.
- A. 40
  - B. 43
  - C. 45
  - D. 73
8. A pineapple which was bought for GH¢ 1.00 was sold at GH¢ 1.30. Calculate the profit percent.
- A. 10%
  - B. 20%
  - C. 23%
  - D. 30%
9. Simplify  $35x^5y^3 \div 7xy^2$
- A.  $5x^4y$
  - B.  $5x^4y^5$
  - C.  $5x^6y$
  - D.  $5x^6y^5$
10. Two bells P and Q ring at intervals of 3 hours and 4 hours, respectively. After how many hours will the two bells **first** ring simultaneously (at the same time)?
- A. 6 hours
  - B. 8 hours
  - C. 12 hours
  - D. 24 hours
11. A boy scores  $\frac{17}{25}$  in a French test. Express his score as a percentage.
- A. 17%
  - B. 34%
  - C. 68%
  - D. 85%
12. Arrange the following fractions in ascending order of magnitude.  $\frac{2}{5}$ ,  $\frac{5}{12}$  and  $\frac{3}{4}$ .
- A.  $\frac{2}{5}$ ,  $\frac{3}{4}$ ,  $\frac{5}{12}$
  - B.  $\frac{2}{5}$ ,  $\frac{5}{12}$ ,  $\frac{3}{4}$
  - C.  $\frac{5}{12}$ ,  $\frac{2}{5}$ ,  $\frac{3}{4}$
  - D.  $\frac{3}{4}$ ,  $\frac{2}{5}$ ,  $\frac{5}{12}$

13. Kofi paid rent of GH¢1,800.00 each year. If the rent is 0.3 of his annual income, find his annual income.
- GH¢ 600.00
  - GH¢5,400.00
  - GH¢ 6,000.00
  - GH¢18,000.00
14. I gave a storekeeper a GH¢10.00 note for goods I bought. He asked me for another 15Gp for ease of change. If he then gave me 50Gp, how much did I pay for the goods?
- GH¢ 9.35
  - GH¢ 9.45
  - GH¢ 9.65
  - GH¢ 10.65
15. Kojo can buy 15 shirts at GH¢ 4.00 each. If the price is increased to GH¢ 5.00, how many shirts can he now buy?
- 12
  - 15
  - 19
  - 20
16. A hall which is 8 m long is represented on a diagram as 4 cm long. What is the scale of the diagram?
- 1 : 200
  - 1 : 250
  - 1 : 400
  - 1 : 800
17. Jane arrived at work at 7:55 am. and left at 4:15 p.m. For how long was she at work?
- 7 hr 20 min
  - 7 hr 45 min
  - 8 hr 20 min
  - 8 hr 40 min
18. Given that  $(3.14 \times 18) \times 17.5 = 3.14 \times (3p \times 17.5)$ , find the value of  $p$ .
- 3.0
  - 5.8
  - 6.0
  - 9.0

The pie chart shows how Kwaku spends his monthly salary.



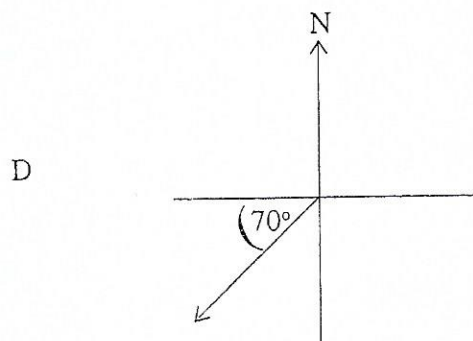
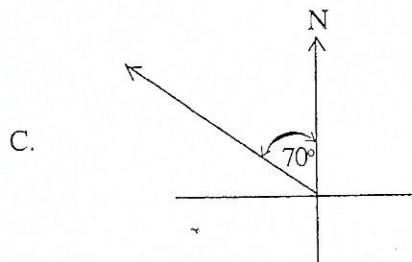
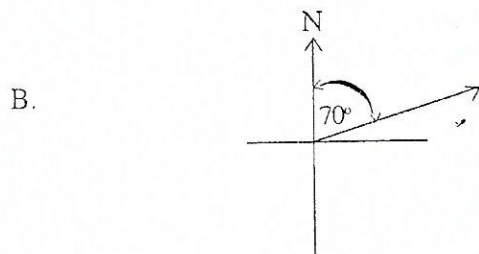
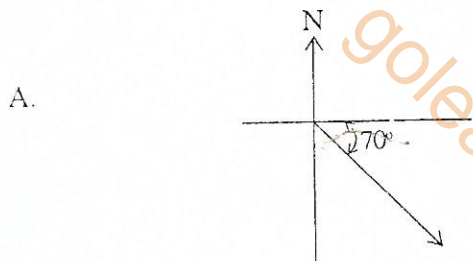
Use this information to answer Questions 19 to 21.

19. Find the value of  $x$ .
- A.  $65^\circ$
  - B.  $75^\circ$
  - C.  $85^\circ$
  - D.  $100^\circ$
20. Kwaku earns GH¢ 630.00 a month. How much of this does he spend on food?
- A. GH¢ 140.00
  - B. GH¢ 157.50
  - C. GH¢ 210.00
  - D. GH¢ 350.00
21. What percentage of his salary does he spend on rent and utilities?
- A. 12.1%
  - B. 12.5%
  - C. 22.2%
  - D. 33.3%
22. In an enlargement with scale factor 2, which of the following statements is **not** true?
- A. Each length is multiplied by 2.
  - B. Each angle remains the same.
  - C. The shape of the figure does not change.
  - D. The size of the figure does not change.
23. Kofi, Kojo and Ama shared GH¢ 480,000.00 in the ratio 3 : 5 : 4. How much did Ama receive?
- A. GH¢ 160,000.00
  - B. GH¢ 200,000.00
  - C. GH¢ 218,181.81
  - D. GH¢ 342,859.14
24. If  $w = 12$ ,  $x = 5$ ,  $y = 6$  and  $z = 4$ , find the value of  $wx - yz$ .
- A. 18
  - B. 27
  - C. 36
  - D. 84
25. A man was 24 years old when his son was born. Now he is three times as old as his son. Find the age of the son.
- A. 6 years
  - B. 12 years
  - C. 18 years
  - D. 36 years
26. There are 20 identical balls in a box. Twelve are blue and the rest are green. If one ball is taken at random from the box, find the probability that the ball is green.
- A.  $\frac{1}{20}$
  - B.  $\frac{2}{5}$
  - C.  $\frac{3}{5}$
  - D.  $\frac{3}{4}$

27. Using the following mapping, find the missing numbers  $p$  and  $q$ .

$x$	1	2	3	4	5	6
$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
$y$	3	5	$p$	9	11	$q$

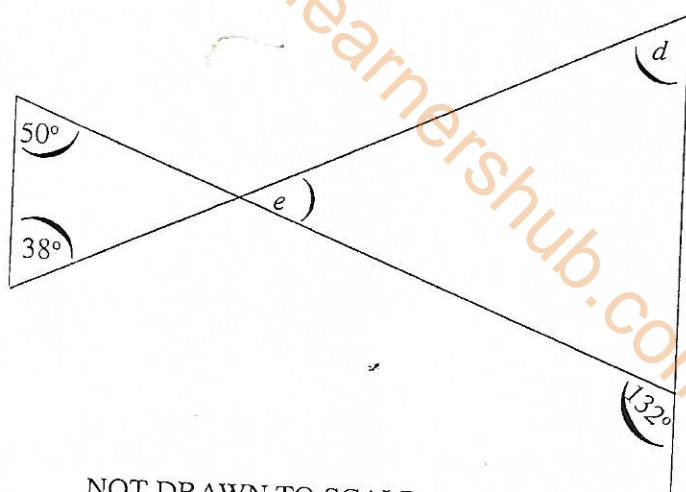
- A.  $p = 6, q = 12$   
 B.  $p = 6, q = 13$   
 C.  $p = 7, q = 12$   
 D.  $p = 7, q = 13$
28. The perimeter of a rectangle is 24 cm. If the length is 7 cm, find its width.
- A. 3 cm  
 B. 5 cm  
 C. 10 cm  
 D. 12 cm
29. A boy walks on a bearing  $070^\circ$ . Which of the following diagrams show his direction?





30. How many faces has a cube?  
 A. 4  
 B. 6  
 C. 8  
 D. 12
31. The diameter of a circular tray is 28 cm. Find the area of the tray [Take  $\pi = \frac{22}{7}$ ].  
 A.  $44 \text{ cm}^2$   
 B.  $88 \text{ cm}^2$   
 C.  $154 \text{ cm}^2$   
 D.  $616 \text{ cm}^2$
32. Calculate the volume of a cylinder with radius 7 cm and height 10 cm [Take  $\pi = \frac{22}{7}$ ].  
 A.  $220 \text{ cm}^3$   
 B.  $440 \text{ cm}^3$   
 C.  $1,540 \text{ cm}^3$   
 D.  $3,080 \text{ cm}^3$

Use the diagram to answer questions 33 and 34.



33. Find the value of  $e$ .  
 A.  $38^\circ$   
 B.  $40^\circ$   
 C.  $88^\circ$   
 D.  $92^\circ$
34. Find the angle marked  $d$ .  
 A.  $38^\circ$   
 B.  $40^\circ$   
 C.  $48^\circ$   
 D.  $88^\circ$
35. A 3.6 m long string, is to be cut into pieces, each of length 40 cm. How many pieces can be cut from the string?  
 A. 4  
 B. 6  
 C. 8  
 D. 9

36. Solve the inequality  $2x + 10 \geq \frac{7x}{2} - 5$ .
- A.  $x \leq 10$
  - B.  $x \geq 10$
  - C.  $x \leq 40$
  - D.  $x \geq 40$
37. The point  $P(5, 4)$  is reflected in the  $y$ -axis. Find its image.
- A.  $(-5, 4)$
  - B.  $(5, -4)$
  - C.  $(-4, 5)$
  - D.  $(4, -5)$
38. If  $\binom{4}{11} = \binom{x-3}{11}$ , find the value of  $x$ .
- A.  $-1$
  - B.  $1$
  - C.  $7$
  - D.  $12$
39. Find the gradient of the line which passes through the points  $M(-1, 2)$  and  $N(6, -3)$ .
- A.  $-\frac{5}{7}$
  - B.  $-\frac{7}{5}$
  - C.  $\frac{5}{7}$
  - D.  $\frac{7}{5}$
40. Find the next two terms in the sequence  $11, 7, 3, -1, \dots, \dots$
- A.  $5, 9$
  - B.  $3, 7$
  - C.  $-4, -9$
  - D.  $-5, -9$

**END OF PAPER**