

SC 4021  
WASSCE 2016  
GENERAL MATHEMATICS/  
MATHEMATICS (CORE) 1  
Objective Test  
1½ hours

**1**

Name: .....

Index Number: .....

**THE WEST AFRICAN EXAMINATIONS COUNCIL**  
**West African Senior School Certificate Examination for School Candidates**

SC 2016 GENERAL MATHEMATICS/MATHEMATICS (CORE) 1 1½ hours

OBJECTIVE TEST  
[ 50 marks ]

*Do not open this booklet until you are told to do so. While you are waiting, write your name and index number in the spaces provided at the top right-hand corner of this booklet and thereafter, read the following instructions carefully.*

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- Use HB pencil throughout.
- If you have got a blank answer sheet, complete its top section as follows.
  - In the space marked *Name*, write in capital letters your **surname** followed by your **other names**.
  - In the spaces marked *Examination, Year, Subject and Paper*, write 'WASSCE', 'SC 2016', 'GENERAL MATHEMATICS/MATHEMATICS (CORE)' and '1' respectively.
  - In the box marked *Index Number*, write your **index number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. **Shade** carefully the space with the same number as each digit.
  - In the box marked *Paper Code*, write the digits **402112** in the spaces on the left-hand side. **Shade** the corresponding numbered spaces in the same way as for your index number.
  - In the box marked *Sex*, shade the space marked **M** if you are **male**, or **F** if you are **female**.
- If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked *Index Number, Paper Code and Sex*, **reshade** each of the shaded spaces.
- An example is given below. This is for a **male** candidate, whose name is **Chukwuma Adekunle CIROMA**, whose **index number** is **4251102068** and who is offering **General Mathematics/Mathematics (Core) 1**.

**THE WEST AFRICAN EXAMINATIONS COUNCIL**

PRINT IN BLOCK LETTERS

Name: **CIROMA CHUKWUMA ADEKUNLE** Examination: **WASSCE** Year: **SC 2016**  
Surname Other Names  
Subject: **GENERAL MATHEMATICS / MATHEMATICS (CORE)** Paper: **1**

INDEX NUMBER	
4	0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9
2	0 0 0 1 0 0 0 3 0 4 0 5 0 6 0 7 0 8 0 9
5	0 0 0 1 0 2 0 3 0 4 0 0 0 6 0 7 0 8 0 9
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6	0 0 0 1 0 2 0 3 0 4 0 5 0 0 0 7 0 8 0 9
8	0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 0 0 9

For Supervisors only.  
If candidate is absent shade this space: ☐

PAPER CODE	
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SEX
Indicate your sex by shading the space marked M (for Male) or F (for Female) in this box: M F

**INSTRUCTIONS TO CANDIDATES**

- Use grade HB pencil throughout.
- Answer each question by choosing one letter and shading it like this: [A] [B] [C] ☒
- Erase completely any answers you wish to change.
- Leave extra spaces blank if the answer spaces provided are more than you need.
- Do not make any markings across the heavy black marks at the right-hand edge of your answer sheet.



Answer **all** the questions.

Mathematical tables may be used in any question.

The use of non-programmable, silent and cordless calculator is allowed.

**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.

The ages, in years, of **four** boys are 10, 12, 14 and 18. What is the average age of the boys?

- A. 12 years
- B.  $12\frac{1}{2}$  years
- C. 13 years
- D.  $13\frac{1}{2}$  years

The correct answer is  $13\frac{1}{2}$  years, which is lettered D, and therefore answer space D would be shaded.

[A]

[B]

[C]



Think carefully before you shade the answer spaces; erase completely any answer you wish to change.

Do all rough work on this question paper.

Now, answer the following questions.

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1. If  $23_x + 101_x = 130_x$ , find the value of  $x$ .

- A. 7
- B. 6
- C. 5
- D. 4

2. Simplify:  $(\frac{3}{4} - \frac{2}{3}) \times 1\frac{1}{5}$ .

- A.  $\frac{1}{60}$
- B.  $\frac{5}{72}$
- C.  $\frac{1}{10}$
- D.  $1\frac{7}{10}$

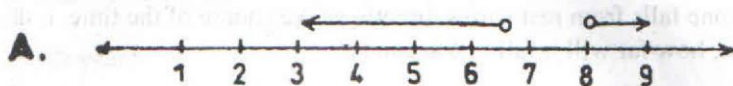
3. Simplify:  $(\frac{10\sqrt{3}}{\sqrt{5}} - \sqrt{15})^2$ .
- A. 75.00  
B. 15.00  
C. 8.66  
D. 3.87
4. The distance,  $d$ , through which a stone falls from rest varies directly as the square of the time,  $t$ , taken. If the stone falls 45 cm in 3 seconds, how far will it fall in 6 seconds?
- A. 90 cm  
B. 135 cm  
C. 180 cm  
D. 225 cm
5. Which of the following is a valid conclusion from the premise:  
"Nigerian footballers are good footballers"?
- A. Joseph plays football in Nigeria therefore he is a good footballer.  
B. Joseph is a good footballer therefore he is a Nigerian footballer.  
C. Joseph is a Nigerian footballer therefore he is a good footballer.  
D. Joseph plays good football therefore he is a Nigerian footballer.
6. On a map, 1 cm represents 5 km. Find the area on the map that represents 100 km<sup>2</sup>.
- A. 2 cm<sup>2</sup>  
B. 4 cm<sup>2</sup>  
C. 8 cm<sup>2</sup>  
D. 16 cm<sup>2</sup>
7. Simplify:  $\frac{3^{n-1} \times 27^{n+1}}{81^n}$ .
- A. 3<sup>2n</sup>  
B. 9  
C. 3<sup>n</sup>  
D. 3<sup>n+1</sup>

8. What sum of money will amount to D10,400.00 in 5 years at 6% simple interest?

A. D 8,000.00  
 B. D10,000.00  
 C. D12,000.00  
 D. D16,000.00

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9. Which of the following number lines illustrates the solution of the inequality  $4 \leq \frac{1}{3}(2x - 1) < 5$ ?



10. The roots of a quadratic equation are  $\frac{4}{3}$  and  $-\frac{3}{7}$ . Find the equation.

A.  $21x^2 - 19x - 12 = 0$   
 B.  $21x^2 + 37x - 12 = 0$   
 C.  $21x^2 - x + 12 = 0$   
 D.  $21x^2 + 7x - 4 = 0$

11. Find the values of  $y$  for which the expression  $\frac{y^2 - 9y + 18}{y^2 + 4y - 21}$  is undefined.

A. 6, -7  
 B. 3, -6  
 C. 3, -7  
 D. -3, -7

12. Given that  $2x + y = 7$  and  $3x - 2y = 3$ , by how much is  $7x$  greater than 10?

A. 1  
 B. 3  
 C. 7  
 D. 17



13. Simplify:  $\frac{2}{1-x} - \frac{1}{x}$ .

- A.  $\frac{x+1}{x(1-x)}$   
 B.  $\frac{3x-1}{x(1-x)}$   
 C.  $\frac{3x+1}{x(1-x)}$   
 D.  $\frac{x-1}{x(1-x)}$

14. Make  $s$  the subject of the relation:  $p = s + \frac{sm^2}{nr}$ .

- A.  $s = \frac{mrp}{nr + m^2}$   
 B.  $s = \frac{nr + m^2}{mrp}$   
 C.  $s = \frac{nrp}{mr + m^2}$   
 D.  $s = \frac{nrp}{nr + m^2}$

15. Factorize:  $(2x + 3y)^2 - (x - 4y)^2$ .

- A.  $(3x - y)(x + 7y)$   
 B.  $(3x + y)(2x - 7y)$   
 C.  $(3x + y)(x - 7y)$   
 D.  $(3x - y)(2x + 7y)$

16. The curved surface area of a cylinder, 5 cm high, is  $110 \text{ cm}^2$ . Find the radius of its base.

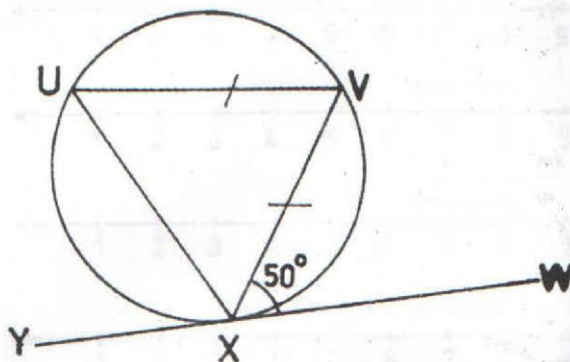
[ Take  $\pi = \frac{22}{7}$  ]

- A. 2.6 cm  
 B. 3.5 cm  
 C. 3.6 cm  
 D. 7.0 cm

17. The volume of a pyramid with height  $15\text{ cm}$  is  $90\text{ cm}^3$ . If its base is a rectangle with dimensions  $x\text{ cm}$  by  $6\text{ cm}$ , find the value of  $x$ .

- A. 3  
B. 5  
C. 6  
D. 8

18.

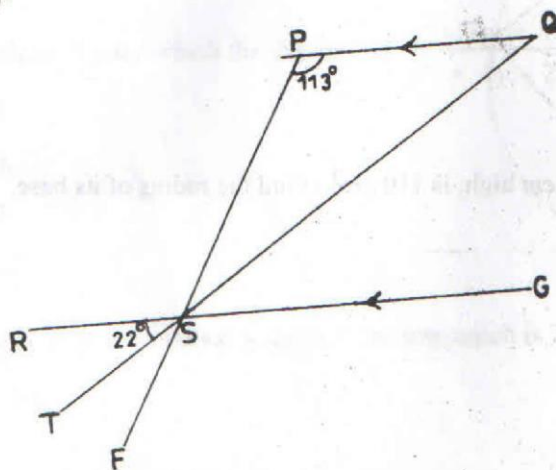


In the diagram,  $\overline{YW}$  is a tangent to the circle at  $X$ ,  $|UV| = |VX|$  and  $\angle VXW = 50^\circ$ .

Find the value of  $\angle UXY$ .

- A.  $70^\circ$   
B.  $80^\circ$   
C.  $105^\circ$   
D.  $110^\circ$

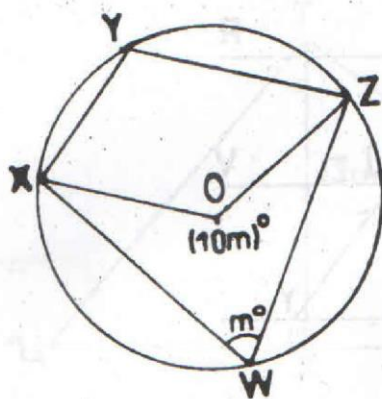
19.



In the diagram,  $\overline{PF}$ ,  $\overline{QT}$ ,  $\overline{RG}$  intersect at  $S$  and  $PQ \parallel RG$ . If  $\angle SPQ = 113^\circ$  and  $\angle RST = 22^\circ$ , find  $\angle PSQ$ .

- A.  $22^\circ$   
B.  $45^\circ$   
C.  $67^\circ$   
D.  $89^\circ$

20.



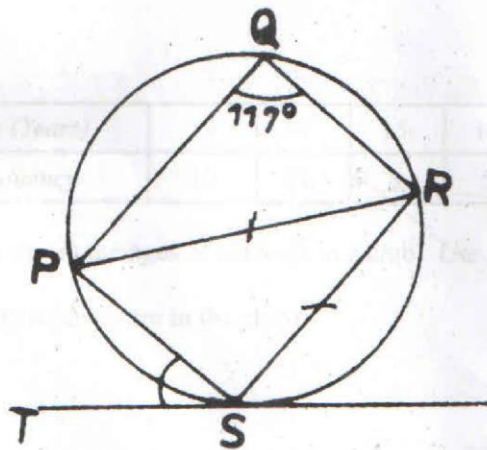
In the diagram,  $O$  is the centre of the circle,  $\angle XOZ = (10m)^\circ$  and  $\angle XWZ = m^\circ$ . Calculate the value of  $m$ .

- A. 30
- B. 36
- C. 40
- D. 72

21. Kweku walked  $8\text{ m}$  up a slope and was  $3\text{ m}$  above the ground. If he walks  $12\text{ m}$  further up the slope, how far above the ground will he be?

- A.  $4.5\text{ m}$
- B.  $6.0\text{ m}$
- C.  $7.5\text{ m}$
- D.  $9.0\text{ m}$

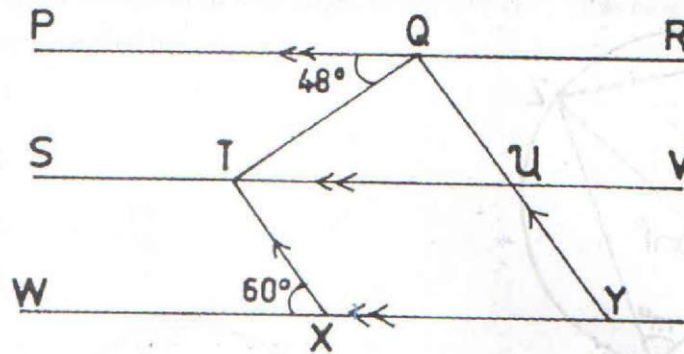
22.



In the diagram,  $TS$  is a tangent to the circle at  $S$ .  $|PR| = |RS|$  and  $\angle PQR = 117^\circ$ . Calculate  $\angle PST$ .

- A.  $54^\circ$
- B.  $44^\circ$
- C.  $34^\circ$
- D.  $27^\circ$

23.



In the diagram,  $PR \parallel SV \parallel WY$ ,  $TX \parallel QY$ ,  $\angle PQT = 48^\circ$  and  $\angle TXW = 60^\circ$ . Find  $\angle TQU$ .

- A.  $120^\circ$
- B.  $108^\circ$
- C.  $72^\circ$
- D.  $60^\circ$

A straight line passes through the points  $P(1, 2)$  and  $Q(5, 8)$ .

Use this information to answer questions 24 and 25.

24. Calculate the gradient of the line  $PQ$ .

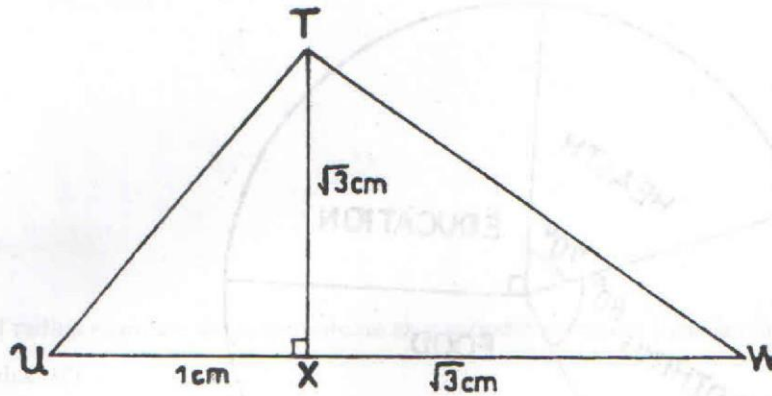
- A.  $\frac{3}{5}$
- B.  $\frac{2}{3}$
- C.  $\frac{3}{2}$
- D.  $\frac{5}{3}$

25. Calculate the length  $PQ$ .

- A.  $4\sqrt{11}$
- B.  $4\sqrt{10}$
- C.  $2\sqrt{17}$
- D.  $2\sqrt{13}$



26.



In the diagram,  $TX$  is perpendicular to  $UW$ ,  $|UX| = 1 \text{ cm}$  and  $|TX| = |WX| = \sqrt{3} \text{ cm}$ . Find  $\angle UTW$ .

- A.  $135^\circ$
- B.  $105^\circ$
- C.  $75^\circ$
- D.  $60^\circ$

27. If  $\cos \Theta = x$  and  $\sin 60^\circ = x + 0.5$ ,  $0^\circ < \Theta < 90^\circ$ , find, correct to the nearest degree, the value of  $\Theta$ .

- A.  $66^\circ$
- B.  $67^\circ$
- C.  $68^\circ$
- D.  $69^\circ$

Age (Years)	13	14	15	16	17
Frequency	10	24	8	5	3

The table shows the ages of students in a club. Use it to answer questions 28 and 29.

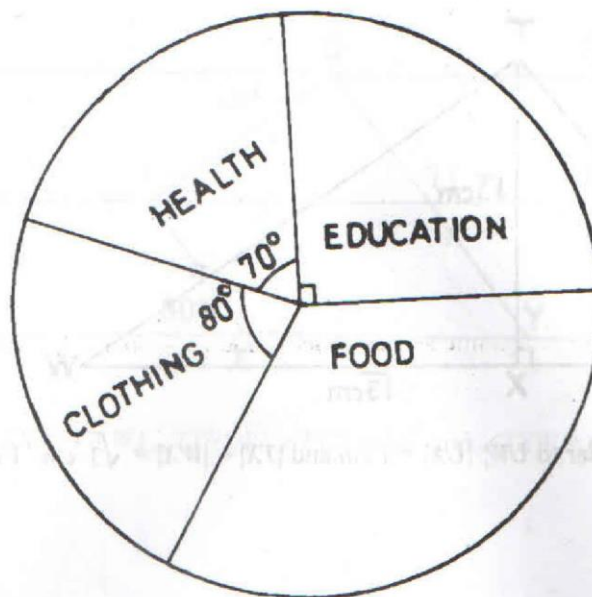
28. How many students are in the club?

- A. 50
- B. 55
- C. 60
- D. 65

29. Find the median age.

- A. 13
- B. 14
- C. 15
- D. 16

30.



The figure is a pie chart which represents the expenditure of a family in a year. If the total income of the family was Le 10,800,000.00, how much was spent on food?

- A. Le 2,250,000.00
- B. Le 2,700,000.00
- C. Le 3,600,000.00
- D. Le 4,500,000.00

31. A fair die is thrown **two** times. What is the probability that the sum of the scores is **at least** 10?

- A.  $\frac{5}{36}$
- B.  $\frac{1}{6}$
- C.  $\frac{5}{18}$
- D.  $\frac{2}{3}$

32. The marks of eight students in a test are : 10, 4, 5, 3, 14, 13, 16 and 7. Find the range.

- A. 16
- B. 14
- C. 13
- D. 11

33. If  $\log_2(3x - 1) = 5$ , find  $x$ .

A. 2.00  
B. 3.67  
C. 8.67  
D. 11.00

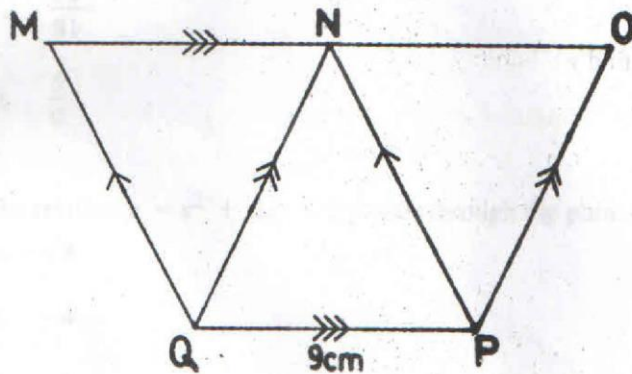
34. A sphere of radius  $r$  cm has the same volume as a cylinder of radius 3 cm and height 4 cm.  
Find the value of  $r$ .

A.  $\frac{2}{3}$   
B. 2  
C. 3  
D. 6

35. Express 1975 correct to 2 significant figures.

A. 20  
B. 1,900  
C. 1,980  
D. 2,000

36.



In the diagram,  $MOPQ$  is a trapezium with  $QP \parallel MO$ ,  $MQ \parallel NP$ ,  $NQ \parallel OP$ ,  $|QP| = 9$  cm and the height of  $\triangle QNP = 6$  cm, calculate the area of the trapezium.

A.  $96 \text{ cm}^2$   
B.  $90 \text{ cm}^2$   
C.  $81 \text{ cm}^2$   
D.  $27 \text{ cm}^2$

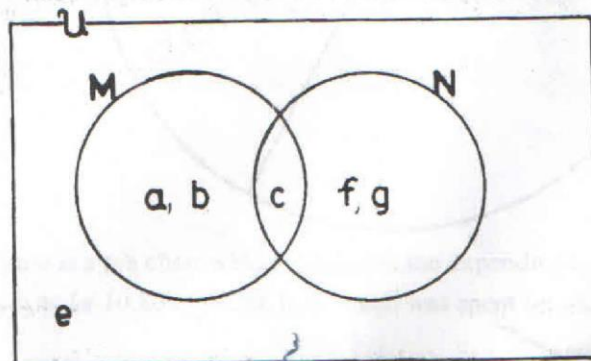


37. The perimeter of a sector of a circle of radius 21 cm is 64 cm. Find the angle of the sector.

[ Take  $\pi = \frac{22}{7}$  ]

- A.  $70^\circ$   
 B.  $60^\circ$   
 C.  $55^\circ$   
 D.  $42^\circ$

38.



Determine  $M' \cap N$  from the Venn diagram.

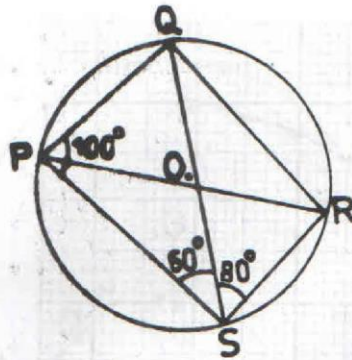
- A.  $\{f, g\}$   
 B.  $\{e\}$   
 C.  $\{c, f, g\}$   
 D.  $\{e, f, g\}$
39. If  $20 \pmod{9}$  is equivalent to  $y \pmod{6}$ , find  $y$ .

- A. 1  
 B. 2  
 C. 3  
 D. 4

40. Simplify:  $\frac{(p-r)^2 - r^2}{2p^2 - 4pr}$

- A.  $\frac{1}{2}$   
 B.  $p - 2r$   
 C.  $\frac{1}{p - 2r}$   
 D.  $\frac{2p}{p - 2r}$

41.



In the diagram,  $O$  is the centre of the circle,  $\angle QPS = 100^\circ$ ,  $\angle PSQ = 60^\circ$  and  $\angle QSR = 80^\circ$ . Calculate  $\angle SQR$ .

- A.  $20^\circ$
- B.  $40^\circ$
- C.  $60^\circ$
- D.  $80^\circ$

42. A bag contains 5 red and 4 blue identical balls. If two balls are selected at random from the bag, one after the other, with replacement, find the probability that the first is red and the second blue.

- A.  $\frac{2}{9}$
- B.  $\frac{5}{18}$
- C.  $\frac{20}{81}$
- D.  $\frac{5}{9}$

43. The relation  $y = x^2 + 2x + k$  passes through the point (2, 0). Find the value of  $k$ .

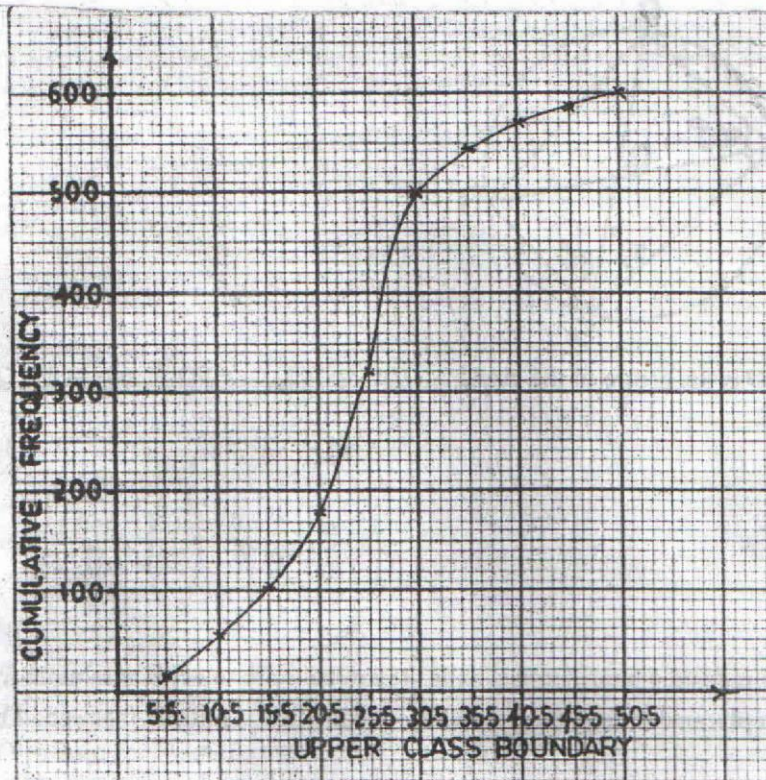
- A. -8
- B. -4
- C. 4
- D. 8

44. Find the next three terms of the sequence: 0, 1, 1, 2, 3, 5, 8, ...

- A. 13, 19, 23
- B. 9, 11, 13
- C. 11, 15, 19
- D. 13, 21, 34



45.

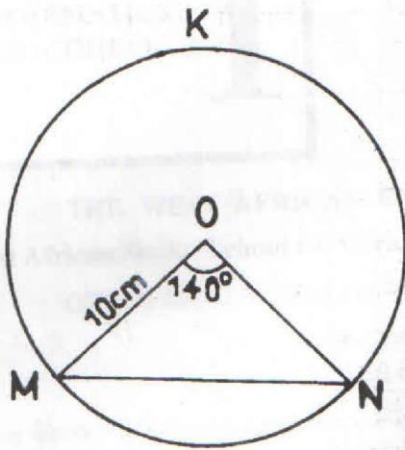


Find the lower quartile of the distribution illustrated by the cumulative frequency curve.

- A. 17.5  
 B. 19.0  
 C. 27.5  
 D. 28.0
46. The ratio of the exterior angle to the interior angle of a regular polygon is 1: 11. How many sides has the polygon?  
 A. 30  
 B. 24  
 C. 18  
 D. 12
47. Halima is  $n$  years old. Her brother's age is 5 years more than half of her age. How old is her brother?  
 A.  $\frac{n}{2} + \frac{5}{2}$   
 B.  $\frac{n}{2} - 5$   
 C.  $5 - \frac{n}{2}$   
 D.  $\frac{n}{2} + 5$



48.



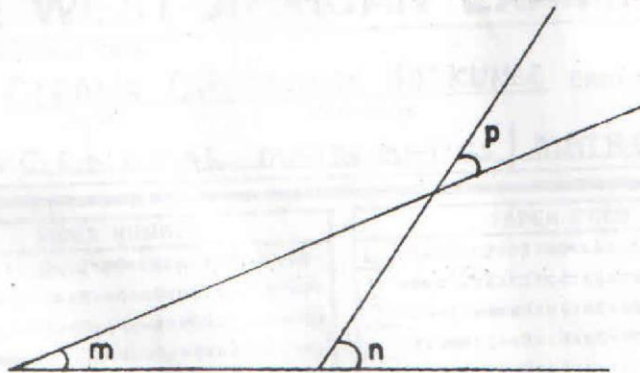
In the diagram  $\overline{MN}$  is a chord of a circle  $KMN$  centre  $O$  and radius  $10\text{ cm}$ . If  $\angle MON = 140^\circ$ , find, correct to the nearest  $\text{cm}$ , the length of the chord  $MN$ .

- A.  $19\text{ cm}$
- B.  $18\text{ cm}$
- C.  $17\text{ cm}$
- D.  $12\text{ cm}$

49. An object is  $6\text{ m}$  away from the base of a mast. If the angle of depression of the object from the top of the mast is  $50^\circ$ , find, correct to 2 decimal places, the height of the mast.

- A.  $8.60\text{ m}$
- B.  $7.83\text{ m}$
- C.  $7.51\text{ m}$
- D.  $7.15\text{ m}$

50.



From the diagram, which of the following is **true**?

- A.  $m + n + p = 180^\circ$
- B.  $m + n = 180^\circ$
- C.  $m = p + n$
- D.  $n = m + p$



4. A circle with center O has a radius of 10 cm. A chord MN is drawn. A line segment KQ is drawn from a point K on the circle to a point Q on the radius OM, such that KQ is perpendicular to OM. The angle KQM is labeled as 40 degrees.

- A. 10 cm
- B. 18 cm
- C. 17 cm
- D. 15 cm

48. A point is 10 m away from the base of a mast. If the angle of depression of the point from the top of the mast is 30°, then the height of the mast is \_\_\_\_\_ m.

- A. 8.60 m
- B. 7.32 m
- C. 7.51 m
- D. 7.12 m

49. A line is drawn from a point on a circle to the center of the circle. The angle between this line and the tangent to the circle at that point is 40°.

- A. 50°
- B. 40°
- C. 30°
- D. 20°



50. The value of  $m$  and  $n$  is \_\_\_\_\_.

- A.  $\frac{1}{2}$
- B.  $\frac{1}{3}$
- C.  $\frac{1}{4}$
- D.  $\frac{1}{5}$

From the figure, find the value of  $x$ .

- A.  $x = 100^\circ$
- B.  $x = 80^\circ$
- C.  $x = 70^\circ$
- D.  $x = 60^\circ$

