

MATHEMATICS PAST QUESTIONS AND ANSWERS

This past questions is compiled by ghstudents.com and it's to serve as a study guide for candidates participating in the West African Examination Council (WAEC) examination. This past question is **NOT FOR SALE**.

Mathematics Past Questions (OBJECTIVE) 2020

SC 4021
WASSCE (SC) 2020
GENERAL MATHEMATICS/
MATHEMATICS (CORE) 1
Objective Test
 $1\frac{1}{2}$ hours

1

Name:.....

Index Num

compiled by ghstud

THE WEST AFRICAN EXAMINATIONS COUNCIL
West African Senior School Certificate Examination (WASSCE) for School

SC 2020

GENERAL MATHEMATICS/MATHEMATICS (CORE)

OBJECTIVE TEST
[50 marks]

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

1. Use HB pencil throughout.
2. If you have got a blank answer sheet, complete its top section as follows.
 - (a) In the space marked *Name*, write in capital letters your **surname** followed by your **first name**.
 - (b) In the spaces marked *Examination*, *Year*, *Subject* and *Paper*, write 'GENERAL MATHEMATICS/MATHEMATICS (CORE)' and '1' respectively.
 - (c) In the box marked *Index Number*, write your **index number** vertically in the spaces provided. There are numbered spaces in line with each digit. Shade carefully each space with each digit.
 - (d) In the box marked *Paper Code*, write the digits 402112 in the spaces on the right. There are corresponding numbered spaces in the same way as for your index number.
 - (e) In the box marked *Sex*, shade the space marked M if you are male, or F if you are female.
3. If you have got a pre-printed answer sheet, check that the details are correctly printed. If not, write the details in the spaces provided.
4. An example is given below. This is for a male candidate whose name is Chinweke Chibuzo Okeke whose index number is 4251102068 and who is offering General Mathematics.

THE WEST AFRICAN EXAMINATIONS

PRINT IN BLOCK LETTERS

CHIBUZO OKEKE

Examination: WASSCE (SC)

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 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]

☒ D

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.

1. Evaluate, correct to two decimal places,
 $75.0785 - 34.624 + 9.83$.
 - A. 30.60
 - B. 50.29
 - C. 50.28
 - D. 30.62
2. If $X = \{x : x < 7\}$ and $Y = \{y : y \text{ is a factor of } 24\}$ are subsets of $\mu = \{1, 2, 3, \dots, 10\}$, find $X \cap Y$.
 - A. $\{2, 3, 4, 6\}$
 - B. $\{1, 2, 3, 4, 6\}$
 - C. $\{2, 3, 4, 6, 8\}$
 - D. $\{1, 2, 3, 4, 6, 8\}$
3. Find the least value of x which satisfies the equation $4x \equiv 7 \pmod{9}$.
 - A. 7
 - B. 6
 - C. 5
 - D. 4
4. Express $1 + 2 \log_{10} 3$ in the form $\log_{10} n$.
 - A. $\log_{10} 90$
 - B. $\log_{10} 19$
 - C. $\log_{10} 9$

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7. An amount of N550,000.00 was realised when a principal, x was saved at 2% simple interest for 5 years. Find the value of x .

A. N470,000.00
B. N480,000.00
C. N490,000.00
D. N500,000.00

8. Given that $\frac{\sqrt{3} + \sqrt{5}}{\sqrt{5}} = x + y\sqrt{15}$, find the value of $(x + y)$.

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

9. If $x = 3$ and $y = -1$, evaluate $2(x^2 - y^3)$.

A. 24
B. 22
C. 20
D. 16

10. Solve $3x - 2y = 10$ and $x + 3y = 7$ simultaneously.

A. $x = -4$ and $y = 1$
B. $x = -1$ and $y = -4$
C. $x = 1$ and $y = 4$
D. $x = 4$ and $y = 1$

11. The implication $x \Rightarrow y$ is equivalent to

A. $\sim y \Rightarrow \sim x$
B. $y \Rightarrow \sim x$

13. Solve: $\frac{1}{3}(5 - 3x) < \frac{2}{5}(3 - 7x)$.

A. $x > \frac{7}{22}$
B. $x < \frac{7}{22}$
C. $x > \frac{-7}{27}$
D. $x < \frac{-7}{27}$

14. Make m the subject of the relation

$$k = \sqrt{\frac{m-y}{m+1}}$$

A. $m = \frac{y+k^2}{k^2+1}$
B. $m = \frac{y+k^2}{1-k^2}$
C. $m = \frac{y-k^2}{k^2+1}$
D. $m = \frac{y-k^2}{1-k^2}$

15. Find the quadratic equation whose roots are

$$\frac{1}{2} \text{ and } -\frac{1}{3}.$$

A. $3x^2 + x + 1 = 0$
B. $6x^2 + x - 1 = 0$
C. $3x^2 + x - 1 = 0$
D. $6x^2 - x - 1 = 0$

16. Given that x is directly proportional to y and inversely proportional to Z , $x = 15$ when $y = 10$ and $Z = 4$, find the equation connecting x , y and Z .

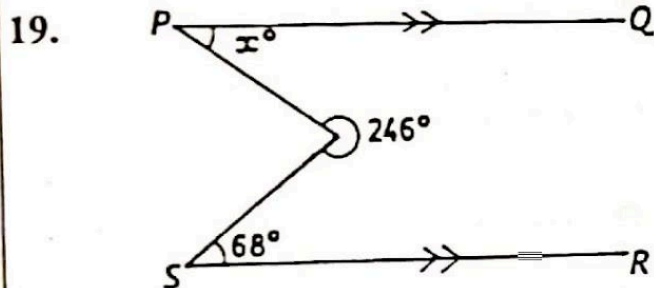
Index Number:.....

17. Two buses start from the same station at 9:00 *a.m.* and travel in opposite directions along the same straight road. The first bus travels at a speed of 72 *km/h* and the second at 48 *km/h*. At what time will they be 240 *km* apart?

A. 1:00 *pm*
 B. 12:00 noon
 C. 11:00 *am*
 D. 10:00 *am*

18. A solid cuboid has length 7 *cm*, width 5 *cm* and height 4 *cm*. Calculate its total surface area.

A. 280 *cm*²
 B. 166 *cm*²
 C. 140 *cm*²
 D. 83 *cm*²



NOT DRAWN TO SCALE

In the diagram, $\overline{PQ} \parallel \overline{SR}$. Find the value of x .

A. 34
 B. 46
 C. 57
 D. 68

21. The expression $\frac{5x+3}{6x(x+1)}$ will be zero when x equals

A. $\{0, 1\}$.
 B. $\{0, -1\}$.
 C. $\{-3, -1\}$.
 D. $\{-3, 0\}$.

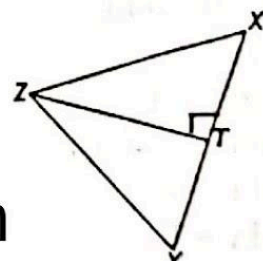
22. A man is five times as old as his son. x years time, the product of their ages will be 340. If the son's age is y , express the product of their ages in terms of y .

A. $5y^2 - 16y - 380 = 0$
 B. $5y^2 + 24y - 308 = 0$
 C. $5y^2 - 16y - 330 = 0$
 D. $5y^2 + 24y - 324 = 0$

23. Simplify: $\frac{a}{b} - \frac{b}{a} - \frac{c}{b}$.

A. $\frac{a - b + c}{ab}$
 B. $\frac{ab - bc - ac}{ab}$
 C. $\frac{a^2 - b^2 + ac}{ab}$
 D. $\frac{a^2 - b^2 - ac}{ab}$

24.



25. A fence 2.4 m tall, is 10 m away from a tree of height 16 m. Calculate the angle of elevation of the top of the tree from the top of the fence.

A. 76.11°
 B. 53.67°
 C. 52.40°
 D. 51.32°

26. Fati buys milk at ₦ x per tin and sells each at a profit of ₦ y . If she sells 10 tins of milk, how much does she receive from the sales?

A. ₦ $(xy + 10)$
 B. ₦ $(x + 10y)$
 C. ₦ $(10x + y)$
 D. ₦ $10(x + y)$

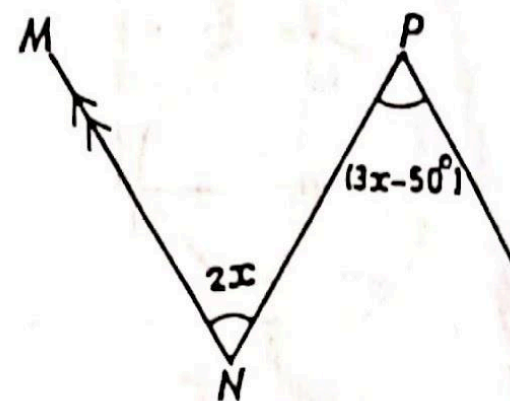
27. If $\tan y$ is positive and $\sin y$ is negative, in which quadrant would y lie?

A. First and Third only
 B. First and Second only
 C. Third only
 D. Second only

28. The dimensions of a rectangular base of a right pyramid are 9 cm by 5 cm. If the volume of the pyramid is 105 cm^3 , how high is the pyramid?

A. 10 cm
 B. 6 cm
 C. 8 cm
 D. 7 cm

30.



NOT DRAWN TO SCALE

In the diagram, $\overline{MN} \parallel \overline{PQ}$, $\angle MNP$ and $\angle NPQ = (3x - 50^\circ)$. Find the value of $\angle NPQ$.

A. 200°
 B. 150°
 C. 120°
 D. 100°

31. The length of an arc of a circle of radius

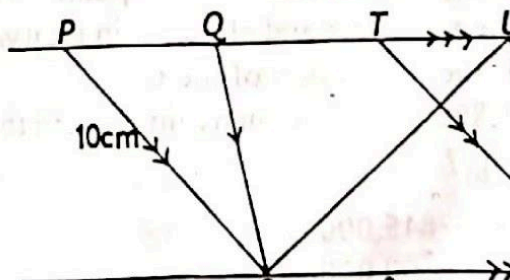
3.5 cm is $1\frac{19}{36}$ cm. Calculate,

correct to the nearest degree, the subtended by the arc at the centre

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

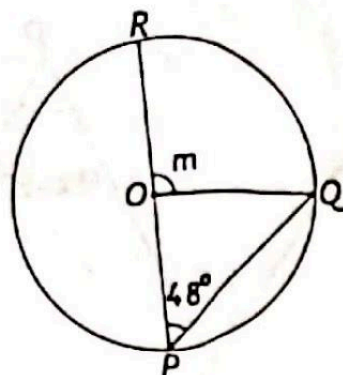
A. 55°
 B. 36°
 C. 25°
 D. 22°

32.



Index Number:.....

33.

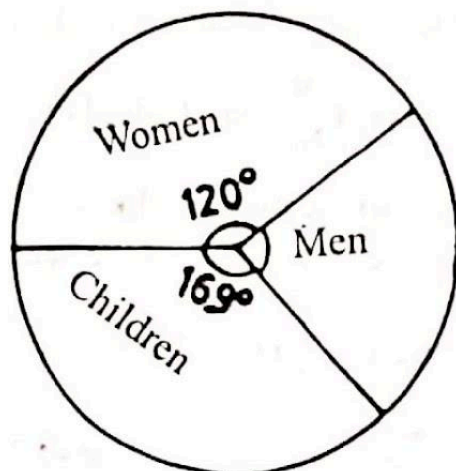


NOT DRAWN TO SCALE

In the diagram, PQR is a circle with centre O . If $\angle OPQ = 48^\circ$, find the value of m .

- A. 96°
- B. 90°
- C. 68°
- D. 42°

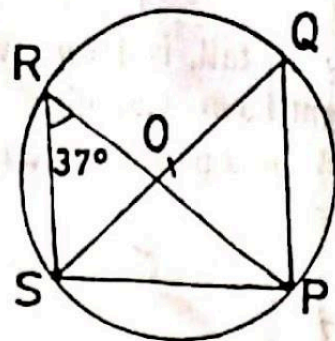
34.



NOT DRAWN TO SCALE

The pie chart shows the population of men, women and children in a city. If the population of the city is 1,800,000, how many men are in the city?

36.



NOT DRAWN TO SCALE

In the diagram, O is the centre. SOQ is the diameter and $\angle RSQ = 37^\circ$. Find $\angle PSQ$.

- A. 127°
- B. 65°
- C. 53°
- D. 37°

37. Find the sum of the interior angles of a pentagon.

- A. 340°
- B. 350°
- C. 540°
- D. 550°

38. The diameter of a sphere is 10 cm. Calculate, correct to the nearest cm^3 , the volume of the sphere. [Take $\pi = 3.14$]

- A. 903 cm^3
- B. 904 cm^3
- C. 905 cm^3
- D. 906 cm^3

A box contains 12 identical balls, of which 5 are red, 4 blue and 3 are green. Use this information to answer the following questions.

40. If two balls are selected at random one after the other with replacement, what is the probability that both are red?

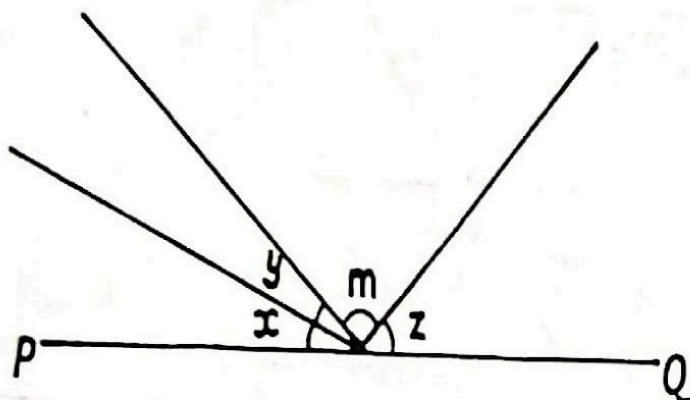
A. $\frac{25}{144}$

B. $\frac{5}{33}$

C. $\frac{5}{6}$

D. $\frac{103}{132}$

41.



NOT DRAWN TO SCALE

In the diagram, PQ is a straight line.

If $m = \frac{1}{2}(x + y + z)$, find the value of m .

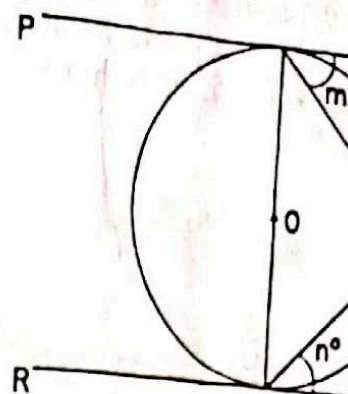
- A. 45°
 B. 60°
 C. 90°
 D. 100°

42.

x	6.20	6.85	7.50
y	3.90	5.20	6.50

The points on a linear graph are as shown

43.

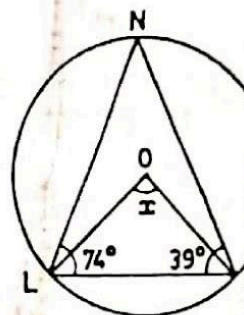


NOT DRAWN TO SCALE

In the diagram, O is the center of the circle, $\overline{PQ}$ and $\overline{RS}$ are secant lines to the circle. Find the value of m .

- A. 120°
 B. 90°
 C. 75°
 D. 60°

44.



NOT DRAWN TO SCALE

In the diagram, O is the center of the circle. If $\angle NLM = 74^\circ$ and $\angle LOM = x$, find the value of x .

- A. 134°
 B. 126°
 C. 113°
 D. 106°

45. Which of the following is a sufficient condition for

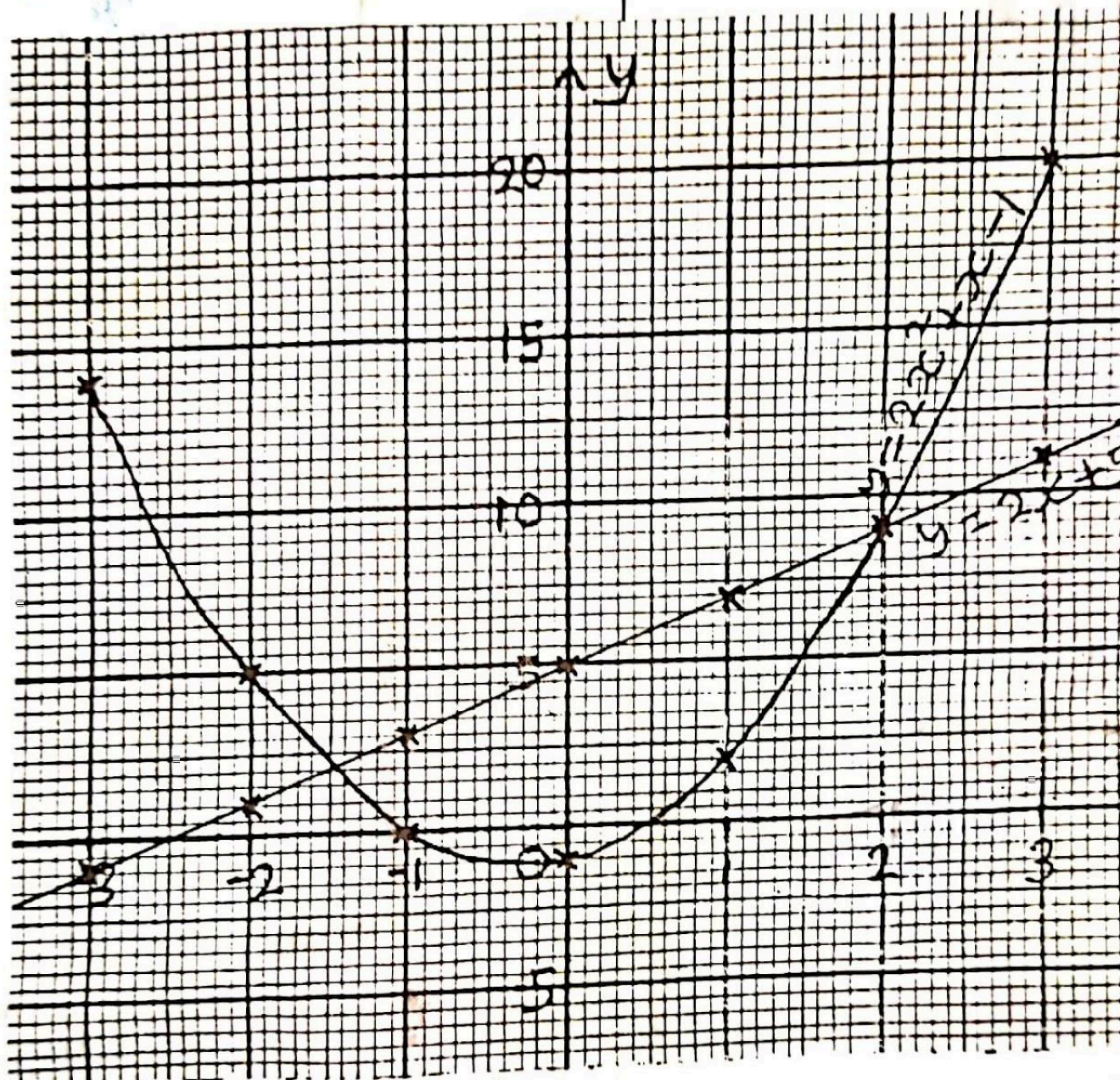
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46. A woman received a discount of 20% on a piece of cloth she purchased from a shop. If she paid \$525.00, what was the original price?

A. \$675.25
B. \$660.25
C. \$656.25
D. \$616.25

47. The interquartile range of is 7. If the 25th percentile is the upper quartile.

A. 35
B. 30
C. 23
D. 9



The graphs of the equations $y = 2x + 5$ and $y = 2x^2 + x - 1$ are shown. Use the information to answer questions 48 and 49.

48. Find the points of intersection of the two graphs.

Mathematics Past Questions and Answers 2020

1 – 10: CBCDACDCCD

11-20: AADBDBCBB

21-30: BDDABDCDAD

31-40: CBACCCCCDA

41-50: BBBADCCABA

Mathematics Past Questions (THEORY) 2020

NOT DRAWN TO SCALE

In the diagram, O is the centre of the circle $ABCDE$, $|BC| = |CD|$ and $\angle BCD = 100^\circ$. Find $\angle CDE$.

(b) Given that $\tan x = \sqrt{3}$, $0^\circ \leq x \leq 90^\circ$, evaluate $\frac{(\cos x)^2 - \sin x}{(\sin x)^2 + \cos x}$.

(b) correct to 1

5. A die was rolled

Number
Outcome

If the probability

(a) value

- (b) correct to the nearest whole number, the volume of the cone. [Take $\pi = \frac{22}{7}$]

5. A die was rolled a number of times. The outcomes are as shown in the table.

Number	1	2	3	4	5	6
Outcomes	32	m	25	40	28	45

If the probability of obtaining 2 is 0.15, find the:

- (a) value of m ;



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The diagram shows a wooden structure in the form of a cone, mounted on a hemispherical base. The vertical height of the cone is 48 m and the base radius is 14 m . Calculate, correct to three significant figures, the surface area of the structure. [Take $\pi \approx \frac{22}{7}$]

(b) Five years ago, Musah was twice as old as Sessay. If the sum of their ages is 100, find Sessay's present age.

8. (a) Ms. Mauren spent $\frac{1}{4}$ of her monthly income at a shopping mall, $\frac{1}{3}$ at an open market and $\frac{2}{5}$ of the remaining amount at a Mechanic workshop. If she had ₦225,000.00 left, find:

- (i) her monthly income;
(ii) the amount spent at the open market.

(b) The third term of an Arithmetic Progression ($A.P.$) is $4m - 2n$. If the ninth term of the progression is $2m - 8n$, find the common difference in terms of m and n .

9. Two cyclists X and Y leave town Q at the same time. Cyclist X travels at the rate of 5 km/h on a bearing of 049° and cyclist Y travels at the rate of 9 km/h on a bearing of 319° .

(a) Illustrate the information on a diagram.

(b) After travelling for two hours, calculate, correct to the nearest whole number, the:

- (i) distance between cyclists X and Y;
(ii) bearing of cyclist X from Y.

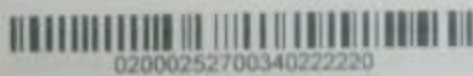
(c) Find the average speed at which cyclist X will get to Y in 4 hours.



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(ii) find, correct to two decimal places, the value of Q when $P = 3$, $m = 15$,
 $s = 0.2$, $k = 4$ and $r = 10$.

(b) Given that $\frac{x + 2y}{5} = x - 2y$, find $x : y$.

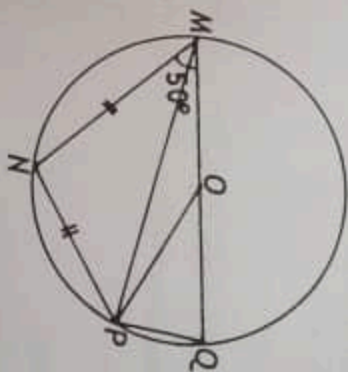


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(c) Using the curve, find, correct to **one** decimal place, the:

- (i) median mark;
- (ii) lowest mark for distinction if 5% of the students passed with distinction.

11. (a)



NOT DRAWN TO SCALE

In the diagram, $MNPQ$ is a circle with centre O . $|MN| = |NP|$ and $\angle OMN = 50^\circ$. Find:

- (i) $\angle MNP$;
- (ii) $\angle POQ$.

(b) Find the equation of the line which has the same gradient as $8y + 4x = 24$ and passes through the point $(-8, 12)$.

NOT DRAWN TO SCALE

In the diagram, $\overline{AB}$ is a tangent to the circle with centre O and COB is a straight line. If $\overline{CD} \parallel \overline{AB}$ and $\angle ABE = 40^\circ$, find $\angle ODE$.

- (b) $ABCD$ is a parallelogram in which $|\overline{CD}| = 7 \text{ cm}$, $|\overline{AD}| = 5 \text{ cm}$ and $\angle ADC = 125^\circ$.
- Illustrate the information in a diagram.
 - Find, correct to one decimal place, the area of the parallelogram.
- (c) If $x = \frac{1}{2}(1 - \sqrt{2})$, evaluate $(2x^2 - 2x)$.

13. (a) Using a ruler and a pair of compasses only, construct:

- (a) $\triangle ABC$ with $|AB| = 7.5 \text{ cm}$, $|AC| = 13.5 \text{ cm}$ and $\angle ABC = 120^\circ$;
 (b) locus, l_1 of points equidistant from A and B ;
 (c) locus, l_2 of points equidistant from B and C .
- Using N , the point of intersection of l_1 and l_2 as centre, draw a circle to pass through points A , B and C .
- Using the method of completing the square, solve, $4x^2 - 4\sqrt{3}x + 3 = 0$, leaving the answer in surd form.



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(b) Tickets for a movie premiere cost \$18.50 each while the bulk purchase price for 5 tickets is \$80.00. If 4 gentlemen decide to get a fifth person to join them so that they can share the bulk purchase price equally, how much would each person save?



(c) probability of obtaining an even number.

SECTION B

[60 marks]

Answer five questions only from this section.

All questions carry equal marks.

6. (a) Copy and complete the table of values for the relation $y = 3 \sin 2x$.

x	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°
y	0.0					1.5					-2.6

- (b) Using a scale of 2 cm to 15° on the x -axis and 2 cm to 1 unit on the y -axis, draw the graph of $y = 3 \sin 2x$ for $0^\circ \leq x \leq 150^\circ$.

- (c) Use the graph to find the truth set of:
- (i) $3 \sin 2x + 2 = 0$;
- (ii) $\frac{3}{2} \sin 2x = 0.25$.

