19.5: 2018 Paper II

SECTION A

ANSWER ALL 15 QUESTIONS IN THIS SECTION

1. A shop sells a television set. It offers a discount of 15% off the normal price. Kina bought the television set for 357,000fcfa. Calculate the normal price of the television set.

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2. Given that $(x-1)$ is one of the factors of $f(x)=2x^3+x^2-2x-1$

(a) Show that $(x-1)$ is a factor of f(x)

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(b) Find the other two factors of f(x)

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3. (a) Find the value of x, given that $2^{x+1}=\frac{1}{4^3}$

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(b) Simplify $\frac{5-x}{5}-\frac{2-x}{10}$

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4. The function of f is defined on $\mathbb{R}$ as $f(x)=2-8x^2$

(a) Evaluate f(2)

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(b) Factorize f(x) completely

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Solve the equation f(x) = 0

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5. Copy and complete the table accompanying this question

p	q	$\neg p$	$q \wedge \neg p$
T	T		
T	F		
F	T		
F	F		

6. Given that $\sin\alpha = \frac{5}{12}$, find

(a) $\cos\alpha$

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(b) $\tan\alpha$

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7. A ship sails from a port A on a bearing of 060° to port B. from B the ship sails to C on a bearing of 150°. Given that AB = 60 km, and BC = 70 km, calculate

(a) The distance AC

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(b) The bearing of A from C

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8. Figure 1 shows a sector of a circle, center O, and radius 10cm. Angle AOC is 38°. Calculate the length of the straight line AC. Give your answer to 1 decimal place.

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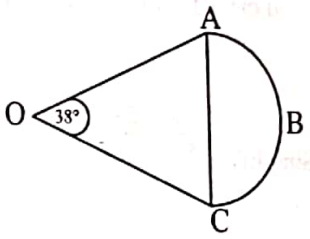

9. Figure 2 shows a road network for towns A, B, C and D
Determine the number of ways to move from

(a) A to C

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(b) B to D

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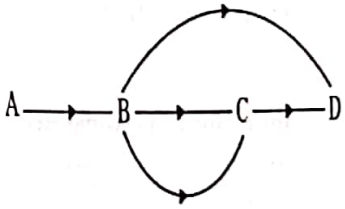

Find

(c) The number of arcs involved in the network

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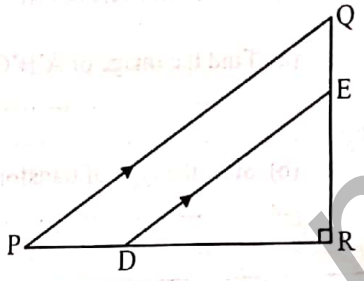
10. Figure 3 shows a triangle PQR with PR = 6 cm and PD = 2 cm. DE is parallel to PQ

Given that

(a) QR = 4.5 cm, find ER



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(b) The area of triangle PQR = 13.5 cm², calculate the area of trapezium PDEQ

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11. Figure 4 is a cyclic quadrilateral and PT is a tangent to the circle with angle SQR = 70° and angle PQO = 50°.

Calculate the angles marked and θ

(a) β

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(b) α

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(c) θ

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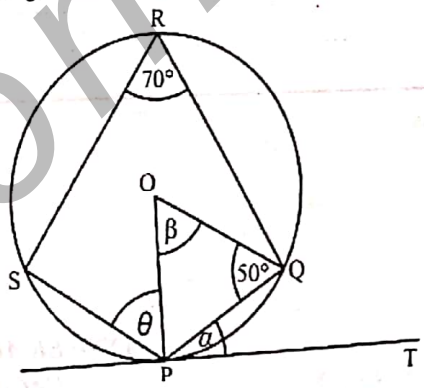

12. The position vectors of P and Q are $2i+j$ and $\frac{2}{3}i+4j$ respectively

Given that $PQ=\frac{2}{5}OR$, find

(a) The position vector of the point R

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(b) The magnitude and direction of OP

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13. Given that $(-1,a)$ is the midpoint of the line segment joining $(0,-2)$ and $(b,8)$, then find the values of a and b

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14. A triangle with vertices A(3, 1), B(6, 1) and C(3, 5) is transformed by the matrix $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$

(a) Find the image of A'B'C' of ABC under this transformation

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(b) State the type of transformation in a)

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15. A bag contains 3 white balls and 7 red balls. A ball is drawn at random from the bag and not replaced. A second ball is drawn. Find the probability of drawing

(a) Two white balls

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(b) A white ball and a red ball in that order.

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SECTION B

ANSWER ALL FOUR QUESTIONS IN THIS SECTION
EACH QUESTIONS CARRIES 15 MARKS

1. (i) A tailor analyzed the cost of sewing one coat a follows
   - The cost of buying the material for 15,000FCFA
   - Other expenditure amount to 10% of the cost of material.

   (a) Calculate how much was spent on other expenditure.

The tailor worked for 7 hours and charged 1,500FCFA per hour for the labour.
Calculate

(b) The cost of labour

(c) The total cost incurred to make the coat

To sell the coat the tailor intends to make a profit of 20% on the cost price

(d) Determine the cost at which the tailor must sell the coat.

(ii) Given the matrix $M = \begin{pmatrix} 2 & 3 \\ 3 & -1 \end{pmatrix}$

(a) Find the inverse of M

(b) Hence solve the equations

$2x + 3y = -11$

$3x - y = 22$

2. (i) In a class of 50 students,
40 like Mathematics
30 like Physics and ,
5 like neither Mathematics nor Physics
(a) Draw a Venn diagram to illustrate the relationship
Hence, find the number of students who like
(b) Both Mathematics and Physics
(c) Mathematics only.

(ii) The function f and g are defined on $\mathcal{R}$, the set of real numbers as
$f : x \mapsto 1-x$
$g : x \mapsto x^2+5$
(a) Evaluate $f(-3)$
(b) Express $gf(x)$ in terms of x
Given that $gf(x) = a+bx+x^2$
(c) Find the values of a and b

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3. (i) Given the function $f(x) = 2x^2+x-3$
(a) Copy and complete the following table.

x	-3	-2	-1	0	1	2	3
y	12				1		18

(b) Draw the graph of f(x) for values of x from -3 to 3. Use a scale of 1cm to 1 unit on both axes.
From your graph solve the equation
(c) $f(x) = 0$
(d) $2x^2+x = 4-x$, by drawing a suitable straight line on the same axes.

(ii) (a) Construct the triangle ABC with AB = 3cm, BC = 4cm and AC = 5cm
(b) Construct the bisectors of angle ABC and angle BCA
(c) Mark the point X, where the bisectors meet
(d) Construct the circumcircle of triangle ABC with X as the center
(e) Measure the radius of the circle.

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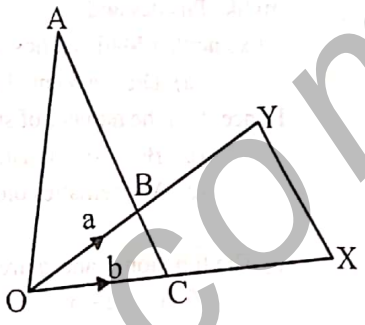
4. (i) The table shows the distribution of marks (on a total of 10) obtained by students in a language proficiency test.

Test marks	1	2	3	4	5	6	7	8	9	10
Number of students	2	3	5	6	8	2	3	0	1	1

Using the distribution, find
(a) The mode
(b) The median mark
(c) The mean mark
(d) The pass mark is 6 out of 10, determine the number of students who failed the test
(e) Find the probability that a student chosen at random passed the test

(ii) Figure 1 shows triangle OBC and OYX with point B along OY and C along OX.



Given that

$\mathbf{OY} = 2\mathbf{OB}, \mathbf{OX} = 3\mathbf{OC}, \mathbf{OB} = \mathbf{a}$ and $\mathbf{OC} = \mathbf{b}$

Express in terms of **a** and **b** the vectors:

(a) **OY**

(b) **OX**

(c) **YX**