

20-21 F.5 2nd TERM EXAM-MATH-CP 1

20-21 F.5
2nd TERM EXAM
MATH CP
PAPER 1

2020 – 2021
Form 5 2nd Term Examination

MATHEMATICS Compulsory Part

PAPER 1

Question-Answer Book

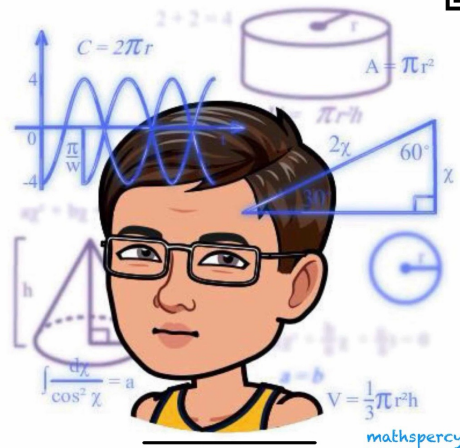
18th June, 2021

8:15 a.m. – 10:30 a.m. (2 hours 15 minutes)

This paper must be answered in English.

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.
2. This paper consists of THREE sections, A(1), A(2) and B.
3. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
4. Unless otherwise specified, all working must be clearly shown.
5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
6. The diagrams in this paper are not necessarily drawn to scale.



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Section	Marks
A (1 – 5)	
A (6 – 14)	
A Total	/ 70
B Total	/ 35
TOTAL	/ 105

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Section A(1) (35 marks)

1. Make a the subject of the formula $5(a - 4b) = 3a + 2$. (3 marks)

2. Simplify $\frac{(ab^{-3})^4}{a^{-6}b^{-5}}$ and express your answer in positive indices. (3 marks)

3. Factorize
(a) $6m^2 + 7mn - 5n^2$,
(b) $6m^2 + 7mn - 5n^2 - 10m + 5n$. (3 marks)

4. The marked price of a mobile phone is \$9300. The mobile phone is sold at a discount of 35% on its marked price.
- (a) Find the selling price of the mobile phone.
- (b) Suppose that the marked price of the mobile phone is 50% above its cost. Someone claims that there will be a loss after selling the mobile phone. Do you agree? Explain your answer.

(4 marks)

5. The coordinates of the points P and Q are $(4, -6)$ and $(-2, 6)$ respectively. P is rotated anticlockwise about the origin O through 270° to P' . Q is translated leftwards by k units to Q' .
- (a) Write down the coordinates of P' .
- (b) If PQ is parallel to $P'Q'$, find the value of k .

(5 marks)

6. (a) Solve the compound inequality $4 - x < \frac{5 - 2x}{3}$ and $18 + x > 4$.
- (b) Hence, write down the least integer satisfying the compound inequality in (a).

(4 marks)

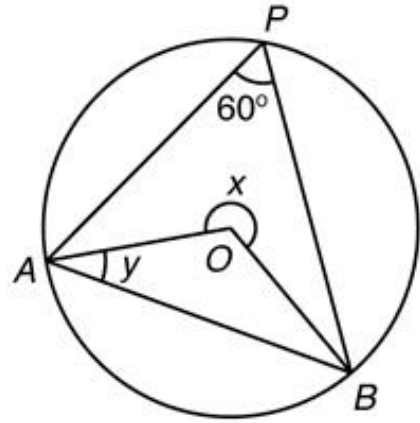
7. The table below shows the distribution of the numbers of credit cards owned by some employees in a company.

Number of credit cards owned	2	3	4	5
Number of employees	8	12	15	5

- (a) Find the mode, the median and the standard deviation of the above distribution.
- (b) One of the employees now leaves the company. The number of credit cards owned by this employee is 3. Find the change in the median of the distribution due to the leaving of the employee.

(5 marks)

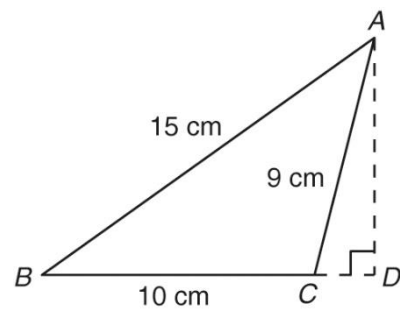
8. In the figure, O is the centre of circle ABP . $\angle APB = 60^\circ$. Find x and y . (4 marks)



9. The figure shows a triangle ABC with height AD . If $AB = 15$ cm, $AC = 9$ cm and $BC = 10$ cm, find

- (a) the area of $\triangle ABC$,
 (b) the length of AD .

(4 marks)



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Section A(2) (35 marks)

10. Simplify $\frac{\sin^2(180^\circ - \theta) + \sin^2(90^\circ - \theta)}{\tan(90^\circ + \theta) \times \cos(180^\circ + \theta)}$. (3 marks)

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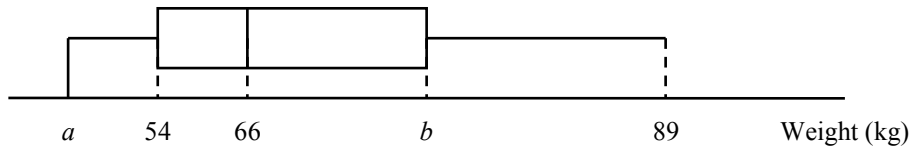
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11. The box-and-whisker diagram below shows the distribution of the initial weights (in kg) of 29 members joining a fitness course. It is given that the mean, the inter-quartile range and the range of the distribution are 69 kg, 25 kg and 40 kg respectively.



- (a) Find a and b . (2 marks)
- (b) If four members with initial weights 52 kg, 60 kg, 68 kg and 71 kg quitted the fitness course, find the mean and the median of the weights of the remaining members. (3 marks)
- (c) One year later, it is found that the weight of the heaviest member after the training is 11 kg less than that before joining the fitness course. The trainer claims that at least 25% of the members can reduce their weights. Do you agree? Explain your answer. (2 marks)

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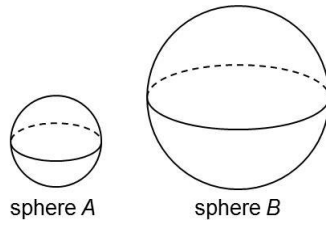
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13. In the figure, the ratio of the radius of metal sphere *A* to that of metal sphere *B* is 1 : 2. It is given that the volume of sphere *A* is $32\pi \text{ cm}^3$.



- (a) Find the volume of sphere *B* in terms of π . (3 marks)
- (b) The two metal spheres are melted and recast into a larger metal sphere *C*. Find the radius of sphere *C*. (3 marks)

A series of horizontal dotted lines provided for writing answers to the questions.

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- 14.** The cost (C) of producing a stapler is partly constant and partly varies inversely as the number of staplers (n) produced. When 250 staplers are produced, the cost of each stapler is \$18. When 1000 staplers are produced, the cost of each stapler is \$13.5.
- (a) Express C in terms of n . (3 marks)
- (b) How many staplers should be produced if the cost of each stapler is \$16? (1 mark)
- (b) If 750 staplers are produced and each stapler is sold at \$25, what is the percentage profit? (2 marks)

Section B (35 marks)

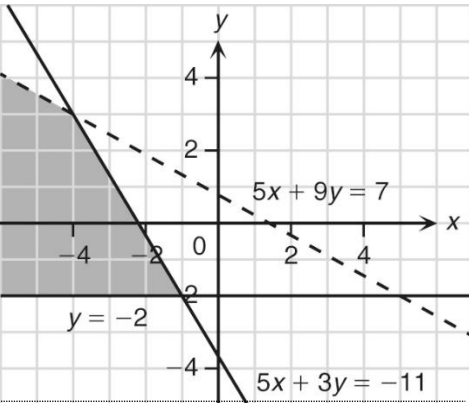
16. Solve the following equations.

(a) $(2^x)^x = 16.$

(b) $2 \log(x - 2) = \log 25$

(6 marks)

17. The shaded region represents the solutions of a system of inequalities. Write down the system of inequalities. (3 marks)

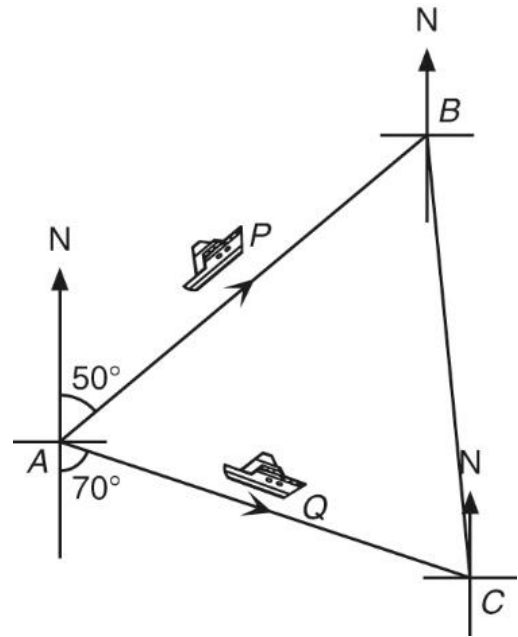


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19. In the figure, A , B and C are three islands. Ship P and ship Q depart from island A at the same time. Ship P travels in a direction of $N50^\circ E$ with a speed of 60 km/h , while ship Q travels in a direction of $S70^\circ E$ with a speed of 50 km/h . They arrive at island B and island C respectively after 3 hours.

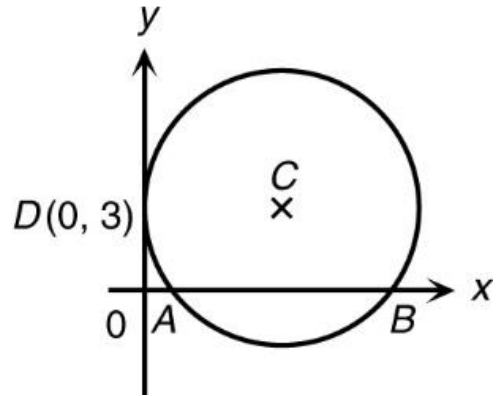
- (a) (i) Find the distance between A and B .
(ii) Find the distance between A and C .
(2 marks)
- (b) Find the distance between B and C .
(2 marks)
- (c) Find the compass bearing of C from B .
(3 marks)



21. In the figure, a circle with centre C touches the y -axis at $D(0, 3)$ and cuts the x -axis at A and B . It is given that the distance between A and B is 8.

(a) Find the centre and the radius of the circle.
(4 marks)

(b) Hence, find the equation of the circle.
(2 marks)



END OF PAPER