

19-20 F.5
2nd TERM EXAM
MATH CP
PAPER 1

2019 – 2020
Form 5 2nd Term Examination

MATHEMATICS Compulsory Part

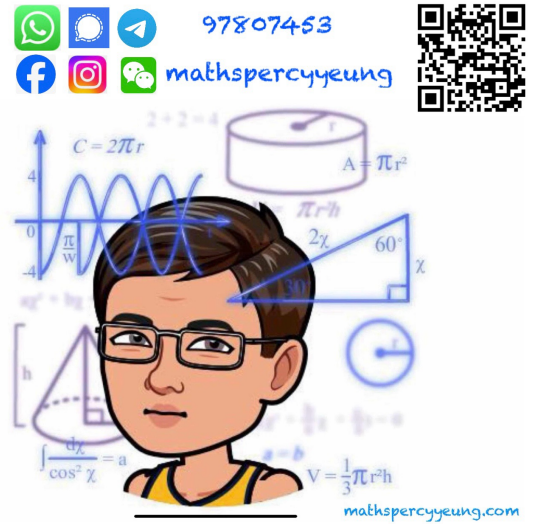
PAPER 1

Question-Answer Book

26th June, 2020
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.



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

Section A(1) (35 marks)

1. Make x the subject of the formula $\frac{3x+2y}{7} = 2x - p$. (3 marks)

2. Simplify $\frac{a^3b^8}{(a^{-2}b^4)^3}$ and express your answer in positive indices. (3 marks)

3. Factorize
- (a) $6p^2 + 7pq - 3q^2$,
- (b) $6p^2 + 7pq - 3q^2 - 6p - 9q$. (3 marks)

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4. On a public holiday, Mr. Chan and Mrs. Chan are watching a movie with their 3 children in a cinema. It is given that the ticket price of an adult is 50% higher than that of a child. If Mr. Chan pays \$300 for the tickets, what is the ticket price of a child? (4 marks)

5. The coordinates of the points M and N are $(3, 7)$ and $(-9, 3)$ respectively. M is reflected to M' with respect to the x -axis. N is rotated anticlockwise about the origin O through 90° to N' .
- (a) Write down the coordinates of M' and N' .
- (b) Is $M'N$ perpendicular to MN' ? Explain your answer. (4 marks)

6. (a) Solve the compound inequality $6(3x - 6) > 21x + 2$ or $3x + 15 > 0$.
 (b) Hence, write down the smallest positive integer satisfying the compound inequality. (4 marks)

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7. The histogram in Figure 1 shows the distribution of scores of a class of 40 students in a test.

Distribution of scores of 40 students

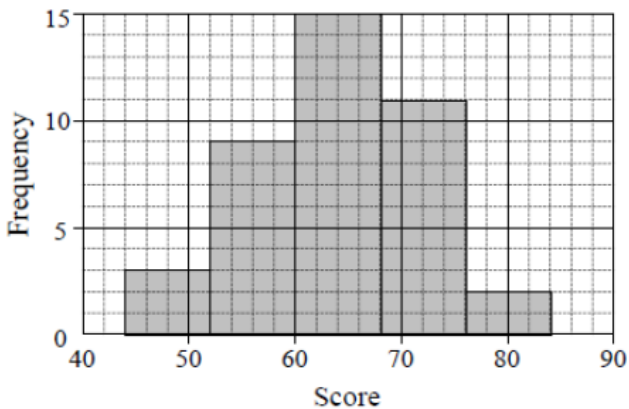


Figure 1

Table 1 Frequency distribution table for the scores of 40 students

Score (x)	Class Mark	Frequency
$44 \leq x < 52$		3
$52 \leq x < 60$		
	64	15
$68 \leq x < 76$		11
	80	

- (a) Complete Table 1.
 (b) Find the mean and standard deviation of the distribution.

(6 marks)

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8. In Figure 2, O is the centre of circle $ABCD$. $\angle ABD = 32^\circ$ and $\angle OCD = 54^\circ$.
Find $\angle COD$ and $\angle ADE$. (4 marks)

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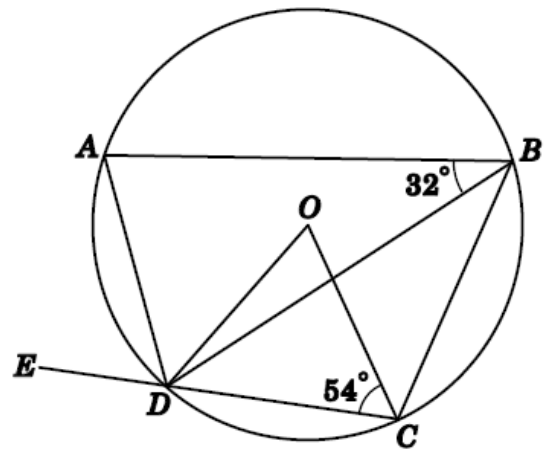


Figure 2

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9. In Figure 3, ABC is a circle with centre O and radius of 8. $\angle AOC = 100^\circ$. Find the area of the segment ABC . (4 marks)

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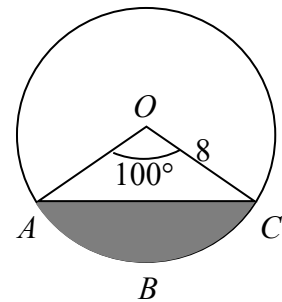


Figure 3

Section A(2) (35 marks)

10. Solve $-4\sin x = \sin(x + 270^\circ)$ where $0^\circ \leq x \leq 360^\circ$.
(give your answer correct to 1 decimal place) (3 marks)

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11. The data below represent the number of sit-ups done by 20 people in 1 minute.

10 13 21 23 25 25 26 27 27 32
 34 35 36 37 38 38 43 44 45 46

- (a) Find the median and the inter-quartile range of this distribution. (2 marks)
- (b) These 20 people then attend a physical training session. The box-and-whisker diagram in Figure 4 shows the distribution of the number of sit-ups done by these 20 people in 1 minute after the physical training session.

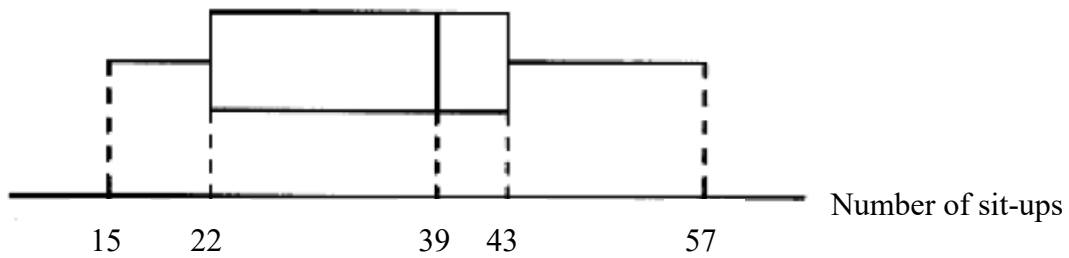


Figure 4

- (i) Is the distribution of the number of sit-ups done more dispersed after the physical training session? Explain your answer.
- (ii) According to two sets of data above, a newspaper reporter makes the following statement:
 ‘At least 25% of those 20 people show improvement in the number of sit-ups done after the physical training session.’
 Do you agree? Explain your answer.

(4 marks)

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12. It is given that $f(x)$ and $g(x)$ are polynomials of degree 3 satisfying the following two conditions:

(1) $f(x) = g(x) + x^3 + kx^2 + 8x + 8$, where k is a constant;

(2) $f(x)$ and $g(x)$ are both divisible by $x + 2$.

(a) Find the value of k . (2 marks)

(b) Suppose that when $g(x)$ is divided by $x^2 - 1$, the quotient and the remainder are $2x + 1$ and $ax - 15$ respectively.

(i) Find the value of a .

(ii) Someone claims that all the roots of the equation $f(x) = 0$ are rational numbers.

Do you agree? Explain your answer.

(4 marks)

15. In Figure 5, the straight line $L_1 : 4x - 3y + 12 = 0$ and the straight line L_2 are perpendicular to each other and intersect at A . It is given that L_1 cuts the y -axis at B and L_2 passes through the point $(4, 9)$.

(a) Find the equation of L_2 . (3 marks)

(b) Q is a moving point in the coordinate plane such that $AQ = BQ$. Denote the locus of Q by Γ .

(i) Describe the geometric relationship between Γ and AB .

(ii) Find the equation of Γ . (4 marks)

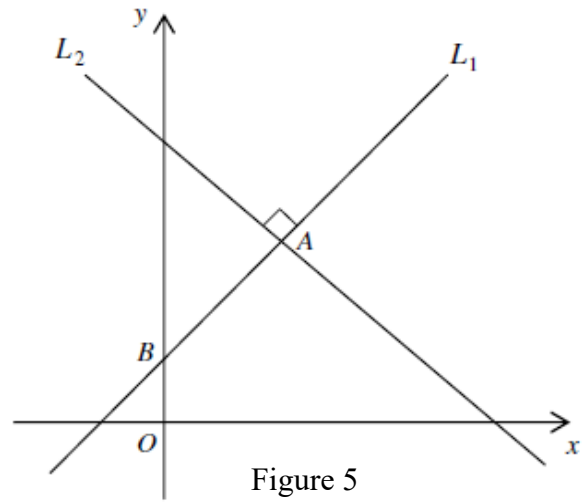


Figure 5

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Section B (35 marks)**16.** Solve the following equations.

(a) $5(4^x) + 3(2^{x+2}) - 9 = 0$

(b) $\log_4(8x-16) - \log_4(x-3) = 2$

(6 marks)

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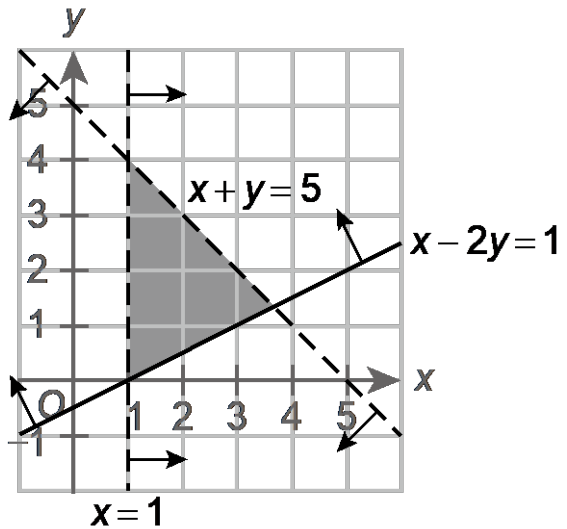
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17. The shaded region represents the solutions of a system of inequalities. Write down the system of inequalities. (3 marks)

18. The back-to-back stem-and-leaf diagram in Figure 6 shows the marks of a Mathematics examination of 15 boys and 15 girls of class 5S. It is given that the mean and standard deviation of the mark are 71 and 10 respectively.

Girls		Boys
Leaf (1)	Stem (10)	Leaf (1)
7 5 3	5	8
9 6 5 4 2 2 2	6	3 3 6 9
8 3	7	1 2 4 7 9
5 3 1	8	3 3 4 6 7

Figure 6

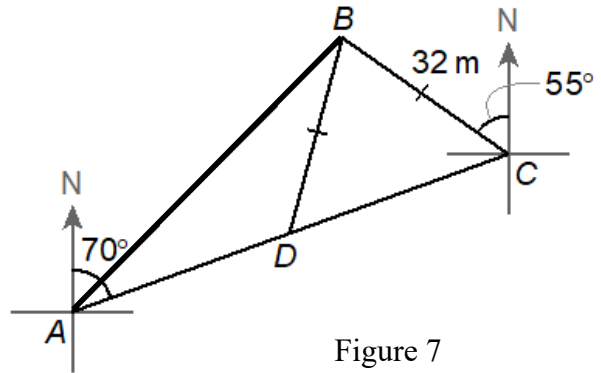
- (a) Maple is a girl getting 81 marks in class 5S. Find the standard score of Maple in class 5S. (2 marks)
- (b) 4 students are randomly chosen from class 5S whose scores are higher than 81 to participate in a Mathematics competition.
- (i) Find the probability that at least one girl is chosen.
 - (ii) Given that exactly 2 of the selected students getting the same mark, find the probability that both of them are boys. (5 marks)

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19. In Figure 7, A , B , C and D lie on the same horizontal plane. D is a point lying on AC such that $AD = DC$. It is given that the compass bearing of B from C is $N55^\circ W$ and that of C from A is $N70^\circ E$. $BD = BC = 32\text{m}$.

- (a) Find the length of DC . (3 marks)
- (b) Find the length of AB . (3 marks)
- (c) Find the area of $\triangle ABC$. (2 marks)



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