

HW F2 2021-2022 first term exam I

2021-22
1st Term
F.2 MATHS
PAPER 1

2021-2022 First Term Examination

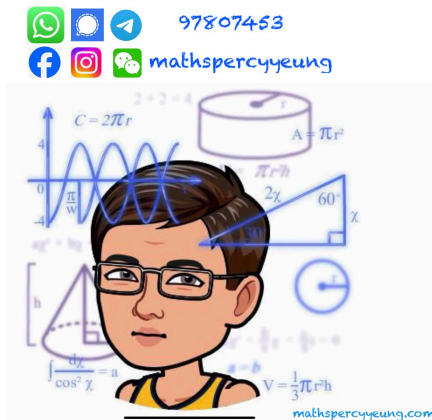
F.2 MATHEMATICS Paper 1

Question-Answer Book

8 : 30 a.m. - 10 : 00 a.m. (90 mins.)

Date : 14th January , 2022 .

This paper must be answered in English .



4. Write all your answers in the spaces provided in this Question-Answer Book.
5. Show all steps and geometrical reasons clearly.
6. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
7. The diagrams in this paper are not necessarily drawn to scale.

Mark	/100
Class Average	
Parent's Signature	

Name	
Class	
Class Number	

Question No.	Marker 's Use Only	
1-2		9
3-5		12
6-8		14
9-11		12
12-13		11
14-15		8
16-18		11
19		8
20		15
Total		100

For each question, write all your steps and answers in the spaces provided.

1. In the figure, $PQRSTUVW$ is formed by removing square $TUVW$ from rectangle $PQRS$. PQ , QR and VU are measured as 4.6 cm, 6.9 cm and 2.7 cm respectively, correct to the nearest 0.1 cm.

- (a) Find the range of the actual area of

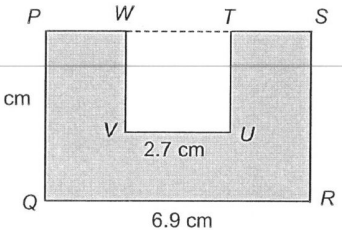
- (i) rectangle $PQRS$,
- (ii) square $TUVW$.

(4 marks)

- (b) Is it possible that the actual area of shaded region is 25 cm^2 ?

Explain your answer.

(2 marks)



2. The height of Tai Mo Shan is measured as 1 000 m. If the percentage error of the measurement is 5%, find the upper limit and the lower limit of the actual height of Tai Mo Shan.

(3 marks)

3. The length of a piece of string is measured as 5.3 m, correct to the nearest 0.2 m.
- (a) Find the upper limit of the length of the piece of string. (2 marks)
- (b) Is it possible to cut this string into 20 pieces of shorter string, with each length measured as 27 cm, correct to the nearest cm? Explain your answer. (2 marks)

4. Prove that $(2x)^2 - (4x + 3) = (2x + 1)(2x - 3)$ is an identity. (3 marks)

5. If $4(Ax - 2)(3x + 1) \equiv 24x^2 + Bx + C(1 - 2x)$, find the constants A , B and C . (5 marks)

6. By using suitable identities, expand the following expressions.
- (a) $\left(\frac{f}{3} + 4g\right)^2$ (2 marks)
- (b) $(2 + x)(-x + 2)(x^2 + 4)$ (2 marks)

7. Factorize the following.
- (a) $8a + 4 - 16ay - 8y + 2ax + x$ (2 marks)
- (b) $9x^2 + 12xy + 4y^2$ (2 marks)
- (c) $-\frac{4a^2}{9} + \frac{2ab}{3} - \frac{b^2}{4}$ (2 marks)

8. Factorize
- (a) $9r^3 - 36rs^2$ (1 mark)
- (b) $9r^3 - 36rs^2 - rs^2 + 2s^3$ (3 marks)

9. (a) Factorize $x^3 - x^2y + xy^2$.
 (b) Hence, factorize $x^3 + y^3$.

(1 mark)
 (2 marks)

12. (a) Make b the subject of the formula $\frac{a+4}{3} = \frac{b+1}{2}$.

(2 marks)

10. Simplify the following.

(a) $\frac{4a^2 - 4b^2}{3a^2 - 2ab + 3ab - 2b^2}$ (2 marks)

(b) $\frac{6m}{4m-20} - \frac{m}{30-6m}$ (3 marks)

- (b) Make h the subject of the formula $\frac{1}{h} + \frac{2}{k} = \frac{3}{c}$.

(3 marks)

11. (a) Factorize $a^2 + 16a + 64$.

(1 mark)

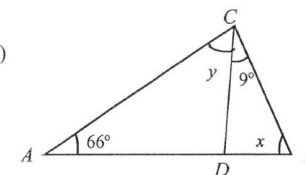
(b) Hence, simplify $\frac{b}{ab-2a} \div \frac{b^3}{a^2+16a+64} \times \frac{2-b}{8a+a^2}$.

(3 marks)

13. In the figure, ADB is a straight line. $\triangle ABC$ is an isosceles triangle with $AB = AC$. It is given that $\angle BAC = 66^\circ$ and $\angle BCD = 9^\circ$.

- (a) Find x and y .

(4 marks)



13. (b) Is $\triangle ACD$ an isosceles triangle? Explain your answer.

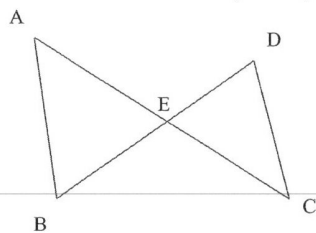
(2 marks)

14. If three times an exterior angle of a regular polygon is more than its interior angle by 60° , find the number of sides of the regular polygon.

(5 marks)

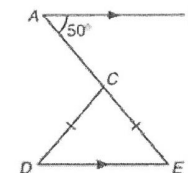
15. In the figure, AC intersects BD at E . Given that $\angle BAE = \angle CDE$ and $BE = CE$.
Prove that $\triangle ABE \cong \triangle DCE$.

(3 marks)



17. In the figure, ACE is a straight line, $CD = CE$ and $AB \parallel DE$. Find $\angle DCE$.

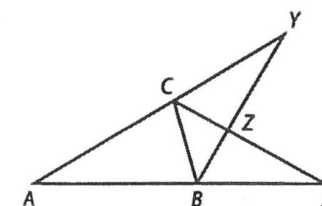
(3 marks)



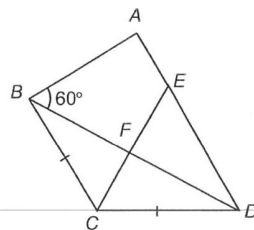
18. In the figure, ACY , ABX , CZX and BZY are straight lines.

$AB = AC$ and $AX = AY$. Prove that $\triangle BCY \cong \triangle CBX$.

(4 marks)



19. In the figure, $BC = DC$ and $\triangle CDE$ is an equilateral triangle. AED , BFD and CFE are straight lines. $\angle BCF = \angle FCD$ and $\angle ABF = 60^\circ$.



- (a) Find $\angle BCD$. (1 mark)
 (b) Find $\angle BAD$. (5 marks)
 (c) Suppose DC is extended to M such that $MB \perp BD$.

Is $\triangle BMC$ an equilateral triangle? Explain your answer. (2 marks)

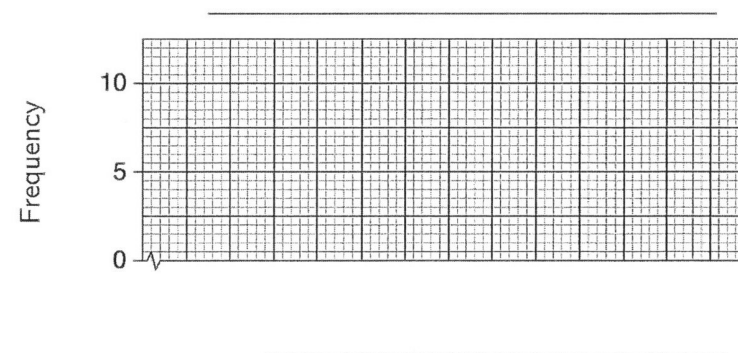
20. The following data show the weights (in kg) of 40 students.

35	51	40	32	33	41	47	50	30	35
34	41	35	47	49	42	51	46	39	38
32	44	39	32	48	53	44	49	35	33
31	46	36	37	54	39	49	50	30	37

- (a) Organize the data into the following frequency distribution table with 30 kg – 34kg as the first class interval. (4 marks)

Weight (kg)	Class boundaries (kg)	Class mark (kg)	Frequency
30 – 34			
35 – 39			
Total			

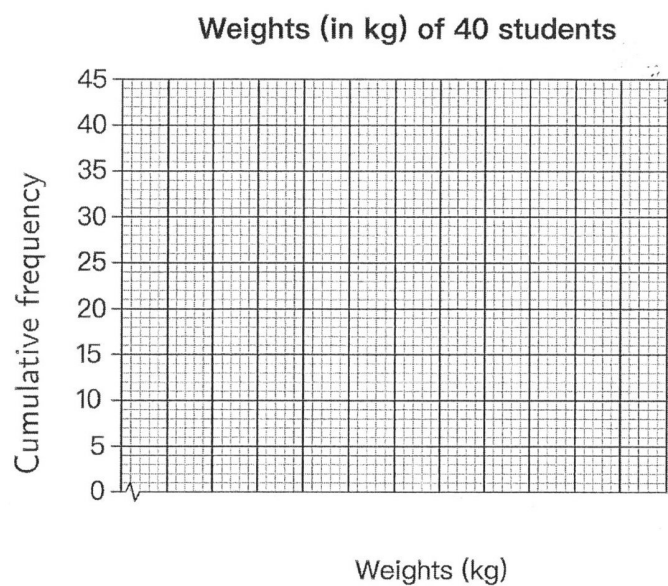
- (b) Draw a histogram to present the data. (3 marks)



20. (c) Complete the following cumulative frequency table. (3 marks)

Weight less than (kg)	29.5	34.5				
Cumulative frequency	0					

- (d) Based on the table in (c), draw a cumulative frequency polygon. (2 marks)



- (e) Find the following. (3 marks)

(i)	20 th percentile	
(ii)	The upper quartile	
(iii)	The median	

END OF PAPER