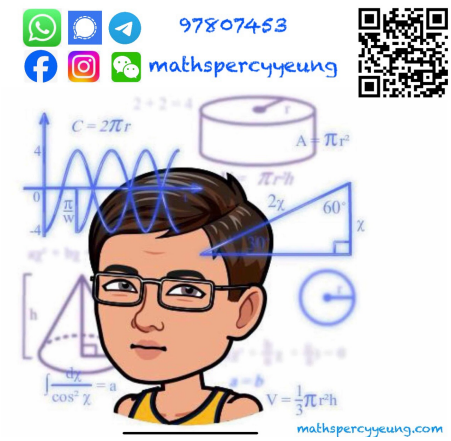
HTY S1 Final 2022-2023



Time Allowed: 1 hour 45 Minutes

This paper must be answered in English.

PART I (Short and Long Questions): (74 marks)

Answer ALL questions and write your answers in the spaces provided. Give reasons if necessary.

SECTION A(1) (21 marks)

1. **(a)** Round **up** 7.6543 to 3 decimal places. (1 mark)

(b) Round **down** 0.2037 to 2 significant figures. (1 mark)

(c) Round **off** 213.5 to the nearest integer. (1 mark)

2. **(a)** Simplify $(2x - 1)(x + 2) - (3x^2 - 5x - 2)$. (3 marks)

(b) Hence or otherwise, find the value of the expression in **(a)** when $x = -3$. (2 marks)

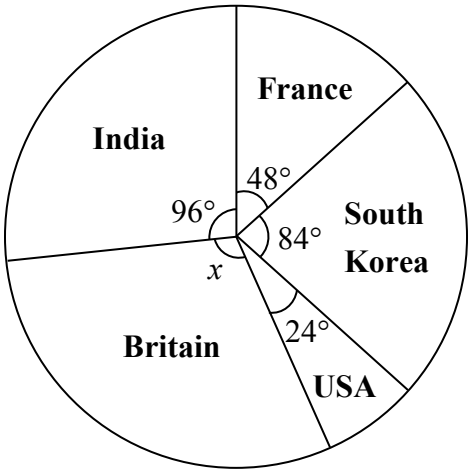
3. Simplify $\frac{\left(2a^2\right)^3\left(ab\right)^2}{4b}$. (4 marks)

4. **(a)** The marked price of the jacket is \$200, it is sold at a discount of 25%, find the selling price. (2 marks)

(b) If the profit percent is 20%, use the result of (a), find its cost price. (2 marks)

5. The following pie chart shows the distribution of the nationalities of students in a Spanish class. It is given that there are 9 students from Britain in the class.

Distribution of the nationalities of students in a Spanish class



(a) Find x. (1 mark)

(b) Find the total number of students in the class. (2 marks)

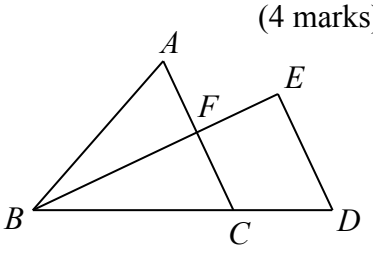
(c) Find the difference between the number of students from Britain and France in the class. (2 marks)

SECTION A(2) (27 marks)

6. In the figure, C is a point lying on BD such that AC // ED. AC and BE intersect at point F. It is given that $\angle BED = 86°$.

(a) Find $\angle BFC$. (2 marks)

(b) If $\angle BAC = 61°$ and $\angle ABC = 57°$, find $\angle FBC$. (4 marks)

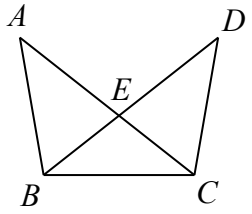


7. In the figure, AC and BD intersect at point E.

(a) It is given that $AB = DC$, $\angle ABE = \angle DCE$, prove that $\triangle ABE \cong \triangle DCE$. (3 marks)

(b) Prove that $\triangle ABC \cong \triangle DCB$. (3 marks)

(c) If $\angle BEC = 110°$, find $\angle DBC$. (3 marks)



8. The coordinates of point A are (3, 4).

(a) Point A is rotated anti-clockwise about the origin through 90º to point B.
Find the coordinates of B. (1 mark)

(b) Point B is reflected with respected to the x-axis to point C. Find the coordinates of C. (1 mark)

(c) Point C is translated rightwards by 7 units to point D. Find the coordinates of D. (1 mark)

(d) Find the area of the quadrilateral $ABCD$. (4 marks)

9. The price of a watch is \$5000 less than three times the price of a ring. Let \$$x$ be the price of a ring and given that the total price of 2 watches and 3 rings is \$485 000.

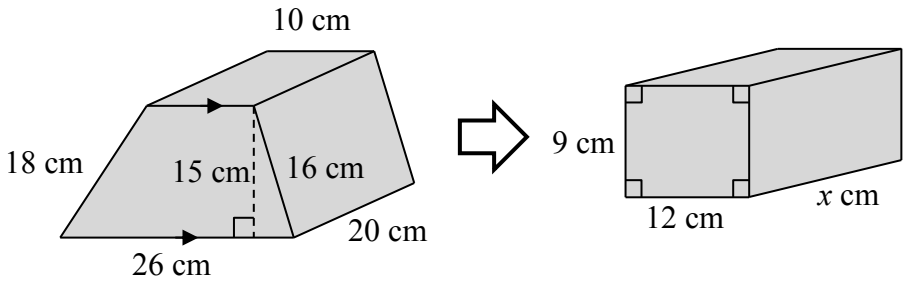
(a) Express the price of a watch in term of x. (1 mark)

(b) Hence, set up an equation in x and find the price of a ring. (2 marks)

(c) Hence, find the price of a watch. (2 marks)

SECTION B (26 marks)

10. The figure shows a right prisms A is melted and recast into a right prisms B.



Prism A Prism B

(a) Find x. (3 marks)

(b) Find the total surface area of right prism A. (3 marks)

(c) What is the percentage change of total surface area after recasting. (4 marks)
(*Give the answer correct to 3 significant figures.*)

11. The following back-to-back stem-and-leaf diagram shows the distribution of the scores of 20 male players and 20 female players in a game.

Scores of 20 male players and 20 female players in a game

Male players						Female players				
Leaf (1 point)					Stem (10 points)	Leaf (1 point)				
		7	6	4	0	***x***	6	8		
	8	6	***x***	4	1	2	3	3	5	6
			7	0	2	0	1	3	4	
9	9	5	4	1	3	5	6	8		
	8	7	6	3	4	9				
			4	0	5	0	1	8	***y***	

(a) Write down all possible values of x and y. (2 marks)

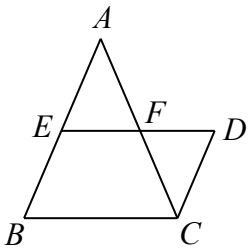
(b) Find the greatest possible score difference between the highest and lowest scores of female players. (3 marks)

(c) If the player who score 30 points or above could get a prize. Which team of players do you think got more prizes? Explain your answer. (3 marks)

12. In the figure, F is the midpoint of ED. It is given that AB // DC.

(a) Prove that $\triangle AEF \cong \triangle CDF$. (3 marks)

(b) It is given that the polygon $BCDE$ is a parallelogram, which the area is 96 cm^2. $BC = ED = 12$cm, find the area of polygon $AEBCDF$. (5 marks)



End of Part I

PART II (Multiple Choice Section): (26 marks)

Please mark the answers in the correct box in Multiple Choice Answer Sheet with an HB pencil. The answers should be filled as ■ in the answer sheet.

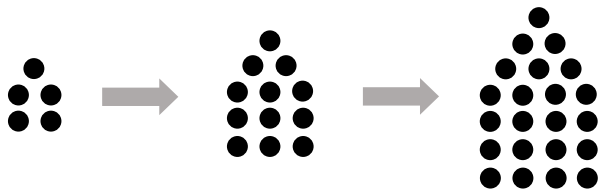
1. "The difference of 32 and 8 is divided by the product of 1.2 and 5" means

A. $(32 - 8 \div 1.2) \times 5$
B. $(1.2 \times 5) \div (32 - 8)$
C. $(32 \times 8) + (1.2 - 5)$
D. $(32 - 8) \div (1.2 \times 5)$

2. It is given that $A = 3^2 \times 5^3 \times 7^3$ and $B = 3^3 \times 5^2 \times 7^3$. The H.C.F. of A and B is

A. $3 \times 5 \times 7$
B. $3^2 \times 5^2 \times 7^2$
C. $3^2 \times 5^2 \times 7^3$
D. $3^3 \times 5^3 \times 7^3$

3. In the figure, the 1st pattern consists of 5 dots. For any positive integer n, the $(n + 1)$th pattern is formed by adding $(3n + 4)$ dots to the nth pattern. Find the number of dots in the 5th pattern.



A. 40
B. 46
C. 51
D. 57

4. Consider the formula $k = \dfrac{2a-b}{a-2b}$. If $a = -3$ and $b = -2$, then $k =$

A. –8
B. –4
C. 4
D. 8

5. There are 40 students in a classroom. If 55% of them are boys, how many girls are there in the classroom?

A. 18
B. 20
C. 22
D. 24

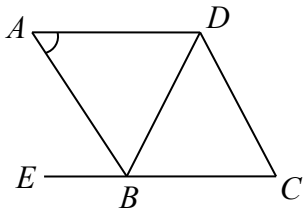
6. Consider the polynomial $2 - x - 3x^3 + x^4$. Which of the following are true?

I. The degree of the polynomial is 4.
II. The terms of the polynomial are arranged in ascending powers of x.
III. The coefficient of x is 1.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

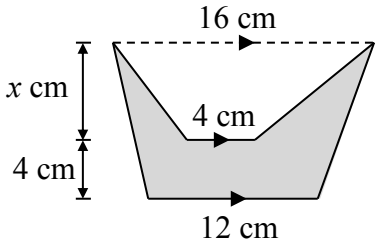
7. In the figure, B is a point lying on CE. It is given that $AD \parallel EC$, $\angle ABD = \angle ADB$ and $\angle DBC = \angle DCB$. If $\angle DCB = 66°$, then $\angle BAD =$

A. 48°
B. 50°
C. 52°
D. 54°

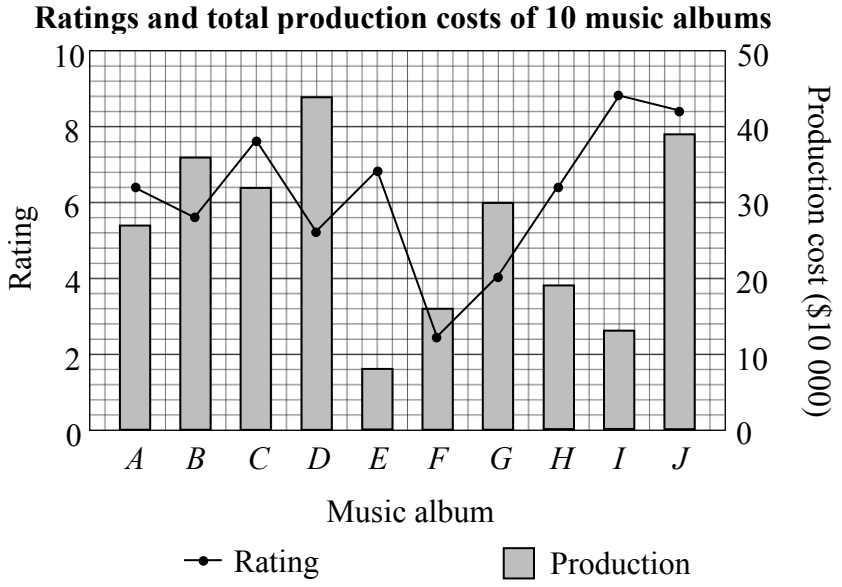


8. In the figure, if the area of the shaded region is 84 cm^2, then x =

A. 6
B. 7
C. 8
D. 9



9. The following statistical chart shows the ratings and the total production costs of 10 music albums.



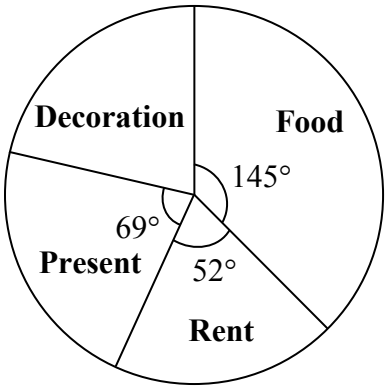
According to the above chart, which of the following are true?

I. Album *D* got the highest rating.
II. The total production cost of album *E* was the lowest.
III. The difference between the highest and lowest production costs was $360 000.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

10. The following pie chart shows the expenditure of organizing a party.

Expenditure of organizing a party



If the expenditure on decoration is \$7050, find the total expenditure of the party.

A. \$25 000
B. \$26 700
C. \$27 000
D. \$29 500

11. P is a point on a rectangular coordinate plane. If P is translated downwards by 3 units and then translated rightwards by 4 units to point $Q(a, b)$, then the coordinates of P are

A. $(a - 3, b + 4)$
B. $(a - 4, b + 3)$
C. $(a + 3, b - 4)$
D. $(a + 4, b - 3)$

12. It is given that h is a 5-digit number. By rounding up h to 3 significant figures, the result is 23 300. Which of the following can be the possible actual values of h?

I. 23 201
II. 23 299
III. 23 349

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

13. It is given that the units digit of a 5-digit number A is 0. Which of the following must be true?

I. A is divisible by 2.
II. A is divisible by 4.
III. A is divisible by 5.

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

End of Part II

End of Paper