

20-21 F.5 1st TERM UT – MATH – CP

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MATH CP

2020 – 2021
Form 5 First Term Uniform Test

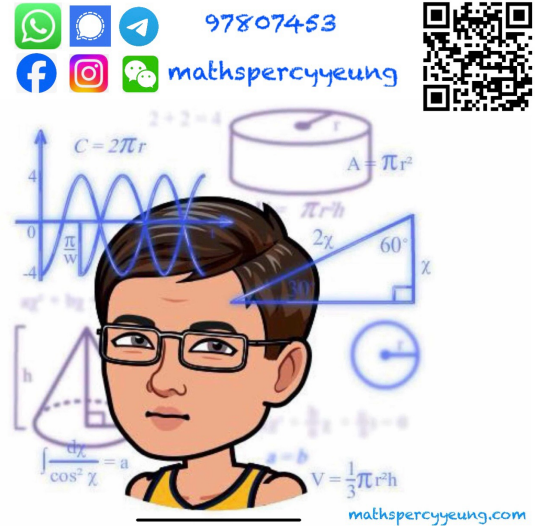
MATHEMATICS Compulsory Part Question-Answer Book

2nd November, 2020.
8:15 am – 9:45 am (1.5 hour)

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 FOUR sections, A, B(1), B(2) and C.
3. Answer ALL questions in Section A. You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured. You should mark only ONE answer for each question. If you mark more than one answer, you will receive NO MARKS for that question.
4. Attempt ALL questions in Sections B and C. 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. Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.
5. The diagrams in this paper are not necessarily drawn to scale.



Section	Marks
A Total	/ 36
B (19 – 20)	/ 8
B (21 – 24)	/ 23
B Total	/ 31
C Total	/ 19
TOTAL	/ 86

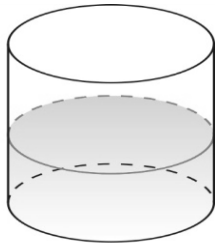
Section A (36 marks)

Choose the best answer for each question.

1. $\frac{(3x^4)^3}{3x^{-2}} =$

- A. $3x^5$.
- B. $3x^7$.
- C. $9x^9$.
- D. $9x^{14}$.

2. The figure shows a cylindrical container of base radius 8 cm. It contains water of volume $1152\pi \text{ cm}^3$. Find the depth of water in the container.



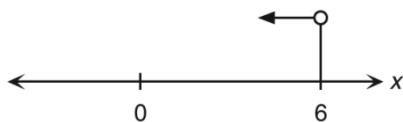
- A. 12 cm
- B. 18 cm
- C. 24 cm
- D. 72 cm

3. If $a > b$, which of the following must be true?

- I. $a^2 > b^2$
- II. $a - k > b - k$, where $k < 0$
- III. $-a < -b$

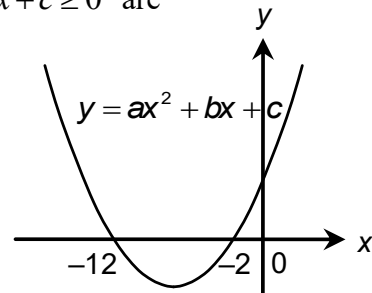
- A. I only
- B. II only
- C. I and III only
- D. II and III only

4. The following graphical representation is the solutions of



- A. ' $x < 5$ and $x \leq 6$ '.
- B. ' $x < 6$ and $x < 7$ '.
- C. ' $x < 5$ or $x \leq 6$ '.
- D. ' $x < 6$ or $x < 7$ '.

5. The figure shows the graph of $y = ax^2 + bx + c$. The solutions of $ax^2 + bx + c \geq 0$ are



- A. $-12 \leq x \leq -2$.
- B. $-12 < x < -2$.
- C. $x \leq -12$ or $x \geq -2$.
- D. $x < -12$ or $x > -2$.

6. Consider the following values of x and y .

x	1	4	9	36
y	18	9	6	3

Which of the following about the relation between x and y is true?

- A. y varies directly as x^2 .
- B. y varies inversely as x .
- C. y varies inversely as x^2 .
- D. y varies inversely as \sqrt{x} .

7. If x^2 varies as the square root of y , which of the following must be a constant?

- A. $\frac{\sqrt{y}}{x^2}$
- B. $\frac{x^2}{y}$
- C. $x^2\sqrt{y}$
- D. x^2y

8. It is given that u varies partly as h and partly as the square of k . When $h = k = 1$, $u = 5$ and when $h = k = 2$, $u = 14$. Find the value of h when $u = 96$ and $k = 3$.

- A. 26
- B. 23
- C. 20
- D. 17

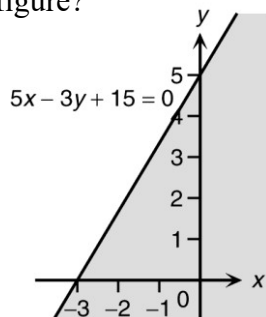
9. It is given that y varies as x^2 . If x is decreased by 20%, then

- A. y is increased by 24%.
- B. y is decreased by 20%.
- C. y is decreased by 36%.
- D. y is decreased by 40%.

10. The point $(a, 5)$ satisfies the inequality $-2x - 5y - 12 \leq 0$. The smallest possible value of a is

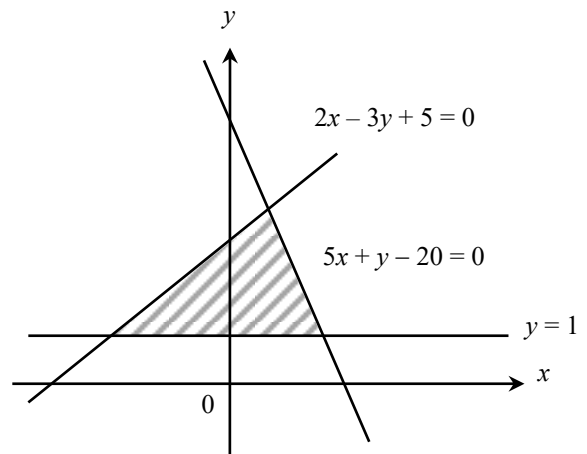
- A. 18.5.
- B. 6.5.
- C. -6.5.
- D. -18.5.

11. Which of the following inequalities has its solutions represented by the shaded region in the figure?



- A. $5x - 3y + 15 > 0$
- B. $5x - 3y + 15 < 0$
- C. $5x - 3y + 15 \geq 0$
- D. $5x - 3y + 15 \leq 0$

12. Which of the following systems of inequalities has its solution represented by the shaded region in the figure?

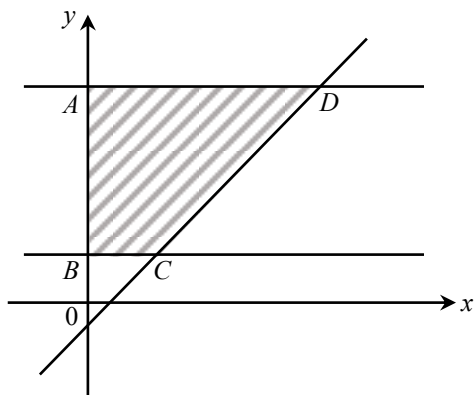


- A.
$$\begin{cases} 2x - 3y + 5 \geq 0 \\ 5x + y - 20 \leq 0 \\ y \geq 1 \end{cases}$$
- B.
$$\begin{cases} 2x - 3y + 5 \leq 0 \\ 5x + y - 20 \leq 0 \\ y \geq 1 \end{cases}$$
- C.
$$\begin{cases} 2x - 3y + 5 \geq 0 \\ 5x + y - 20 \geq 0 \\ y \geq 1 \end{cases}$$
- D.
$$\begin{cases} 2x - 3y + 5 \geq 0 \\ 5x + y - 20 \leq 0 \\ y \leq 1 \end{cases}$$

13. A factory produces two types of tissue paper, original flavour and new flavour. The amount of weekly production of new flavour should be at most twice that of original flavour. Let x be the amount of weekly production of original flavour tissue paper and y be the amount of weekly production of new flavour tissue paper. Which of the following is true?

- A. $2x - y \leq 0$
- B. $2x - y \geq 0$
- C. $2x + y \leq 0$
- D. $2x + y \geq 0$

14. In the figure, AD and BC are parallel to the x -axis. If (x, y) is a point lying in the shaded region $ABCD$ (including the boundary), at which point does $2x + 3y$ attain its greatest value?



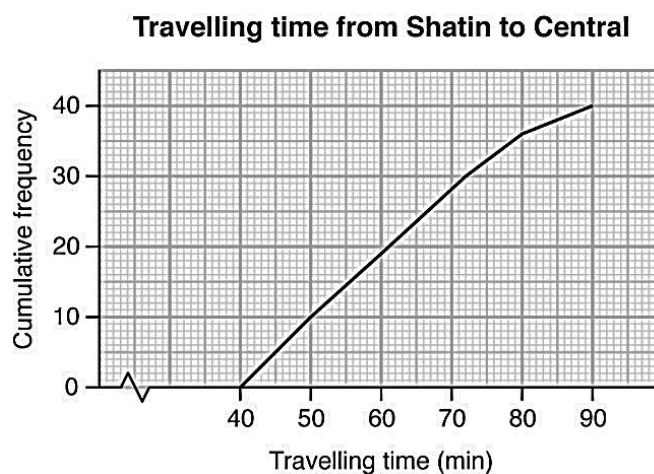
- A. A
 B. B
 C. C
 D. D
15. Let a and b be real numbers, then $(a + bi)(a - bi) =$
- A. $a^2 - b^2$.
 B. $a^2 + b^2$.
 C. $a^2 - b^2i$.
 D. $a^2 + b^2i$.
16. If $\log 2 = a$ and $\log 3 = b$, then $\log_6 5 =$

- A. $\frac{\log(1-a)}{\log(a+b)}$.
 B. $\frac{1}{\log(a+b)}$.
 C. $\frac{1-a}{a+b}$.
 D. $\frac{1}{a(a+b)}$.

17. Find the mean and the range of the data set $\{102, 32, 8, 92, 100, 82, 46, 78, 36\}$.

	<u>Mean</u>	<u>Range</u>
A.	64	94
B.	64	102
C.	78	94
D.	78	102

18. The following cumulative frequency polygon shows the distribution of the travelling time of 40 people from Shatin to Central.



Find the inter-quartile range of the travelling time of the 40 people.

- A. 18 min
 B. 20 min
 C. 22 min
 D. 50 min

21. (a) Solve the compound inequality $\frac{-2(x+1)}{3} \geq -2$ or $x+1 < \frac{6+x}{2}$.

(b) Write down all positive integers that satisfy both inequalities. (4 marks)

Section B(2) (19 marks)

22. The total cost of producing n computers is $\$C$. It is given that C is the sum of two parts, one part varies directly as n and the other part is a constant. When $n = 10$, $C = 20\,400$ and when $n = 15$, $C = 30\,400$.

(a) Find the total cost of producing 4 computers. (4 marks)

(b) Mary claims that if the cost per computer is $\$2010$, the total cost must be less than $\$80\,000$. Do you agree? Explain your answer. (2 marks)

Answers written in the margins will not be marked.

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27. A factory produces two types of watches: 'Elegant' and 'Sporty'. Let x and y be the numbers of 'Elegant' and 'Sporty' watches the factory can produce daily. The factory cannot produce more than 40 watches a day. Furthermore, the number of 'Elegant' watches produced daily cannot be less than half of the number of 'Sporty' watches. The costs for producing 'Elegant' and 'Sporty' watches are \$600 and \$1200 respectively. The daily budget for making watches cannot exceed \$36 000.

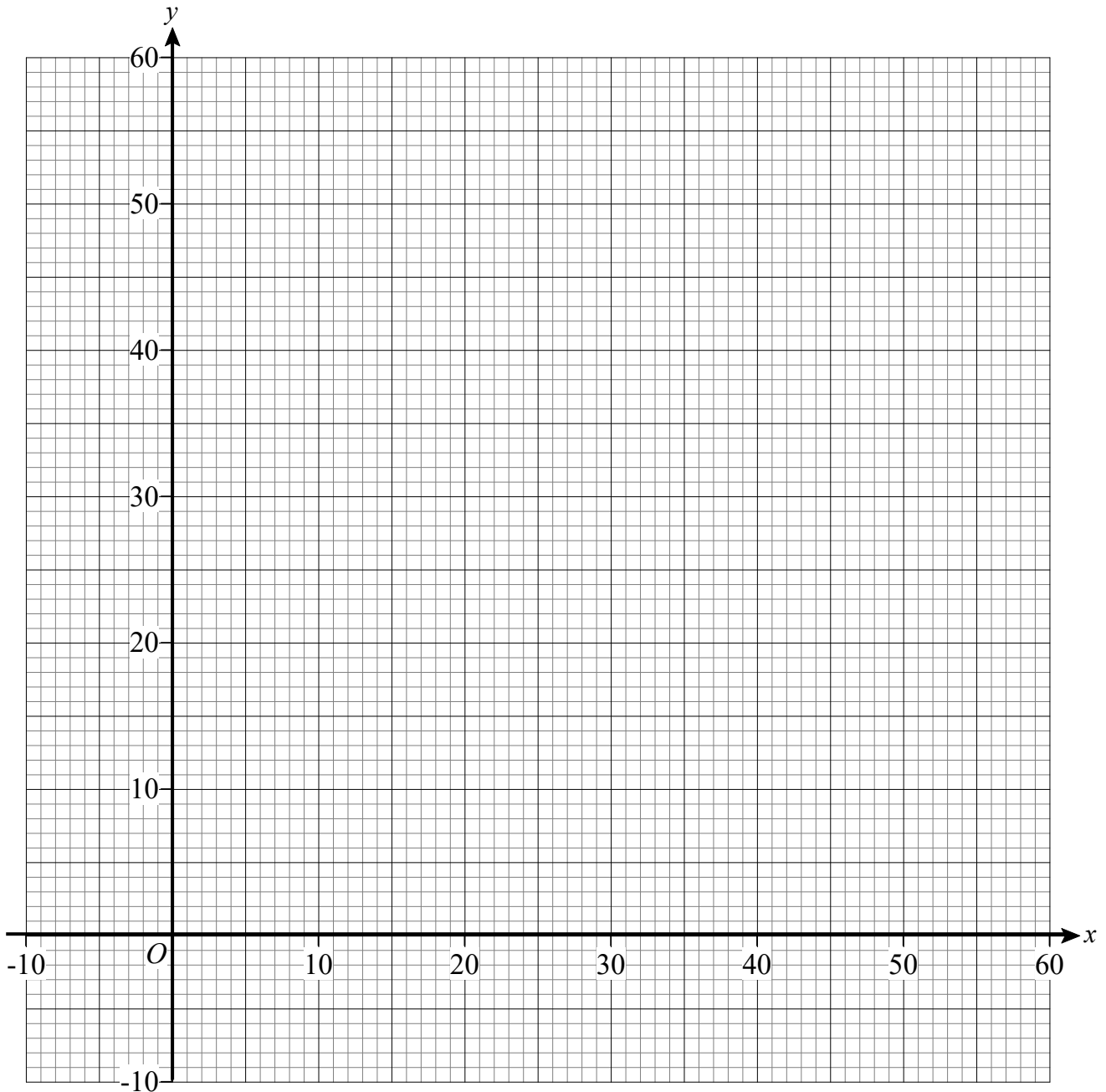


Figure 1

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