2021-2022 S5
2ⁿᵈ TERM UT
MATH CP
PAPER 2

MC

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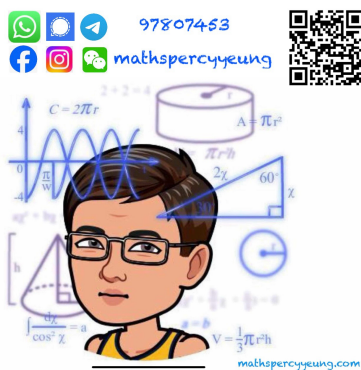
$2021 - 2022$
S5 Second Term Uniform Test

MATHEMATICS Compulsory Part

PAPER 2

7ᵗʰ June, 2022
Time Allowed: 45 minutes
Total Marks: 27

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF PAPER**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your 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.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

There are 19 questions in Section A and 8 questions in Section B.

The diagrams in this paper are not necessarily drawn to scale.

Choose the best answer for each question.

Section A

1. $\dfrac{\left(a^2 b^{-3}\right)^2}{a^{-2} b} =$

 A. $\dfrac{a^2}{b^5}$.

 B. $\dfrac{a^6}{b^6}$.

 C. $\dfrac{a^6}{b^5}$.

 D. $\dfrac{a^6}{b^7}$.

2. Solve $3 - 2x > 4 + 2x$.

 A. $x < \dfrac{1}{4}$

 B. $x > \dfrac{1}{4}$

 C. $x < -\dfrac{1}{4}$

 D. $x > -\dfrac{1}{4}$

3. $\dfrac{2}{1+x} - \dfrac{2}{1-x} - \dfrac{4x}{x^2 - 1} =$

 A. 0.

 B. $\dfrac{1}{1-x}$.

 C. $\dfrac{1-7x}{x^2 - 1}$.

 D. $\dfrac{3x+1}{1-x^2}$.

4. A number is decreased by 50% and then increased by x%. If the number so obtained is the same as the original number, then $x =$

 A. 120.

 B. 100.

 C. 75.

 D. 50.

5. If $0° < \theta < 90°$ and $\sin\theta = \dfrac{k}{2}$, then $\cos\theta =$

 A. $\dfrac{\sqrt{4-k^2}}{2}$.

 B. $\dfrac{\sqrt{4+k^2}}{2}$.

 C. $\dfrac{2}{\sqrt{4-k^2}}$.

 D. $1 - \dfrac{k}{2}$.

6. The running speeds of three boys A, B and C are in the ratios $a:b:c$. Find the ratios of the times that A, B and C take to complete a 1500 m race.

A. $\dfrac{1}{a}:\dfrac{1}{b}:\dfrac{1}{c}$

B. $a:b:c$
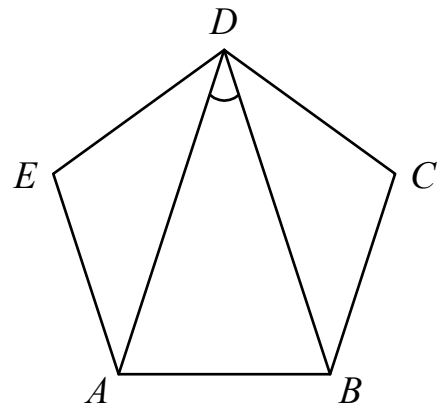
C. $\dfrac{a}{b}:\dfrac{b}{c}:\dfrac{c}{a}$

D. $c:b:a$

7. The minimum value of $\cos^2 3x$ is

A. 1.

B. 0.

C. -1.

D. -3.

8. If a and b are non-zero real numbers and $a > b$, which of the following must be true?

I. $a^2 > b^2$

II. $\dfrac{1}{a} > \dfrac{1}{b}$

III. $a^3 > b^3$

A. I only

B. II only

C. III only

D. I, II and III

9.

In the figure, $ABCDE$ is a regular pentagon. $\angle ADB =$

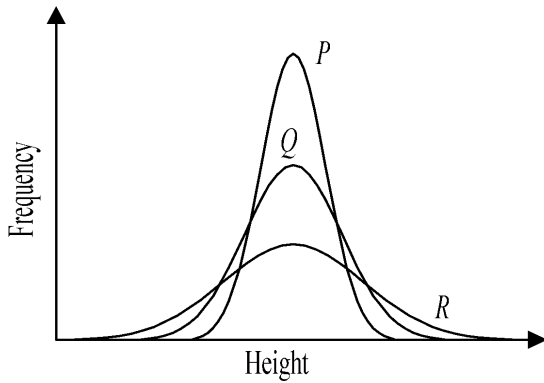A. $30°$.

B. $36°$.

C. $40°$.

D. $54°$.

10. Find the mean of the distribution.

Class mark	Frequency
$m - 8$	3
$m - 4$	1
m	2
$m + 4$	6

A. $m - 4$

B. $m - 2$

C. $m - \dfrac{1}{2}$

D. $m - \dfrac{1}{3}$

11.

In the figure, P, Q and R are curves showing the frequency distributions of the heights of students in three schools, each having the same number of students. Which distribution has the greatest standard deviation and which the smallest?

	Greatest	Smallest
A.	P	Q
B.	P	R
C.	R	Q
D.	R	P

12. A moving point P is equidistant from two intersecting straight lines. The locus of P is

A. a circle.

B. a straight line.

C. a pair of parallel lines.
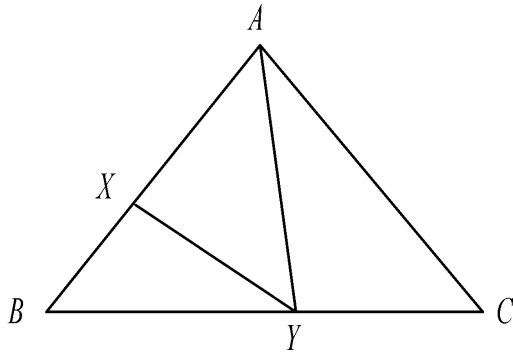
D. a pair of perpendicular lines.

13.
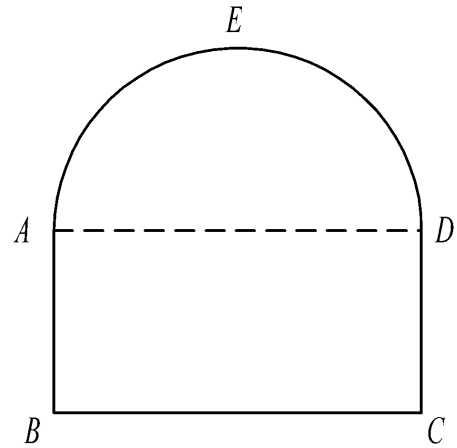
The perimeter of the given figure $ABCDE$ is $2(\pi + 4)$ cm. The upper portion AED is a semi-circle and the lower portion $ABCD$ is a rectangle. $AB : BC = 1 : 2$. What is the area of the given figure?

A. 8 cm^2

B. 4π cm^2

C. $4(\pi + 2)$ cm^2

D. $2(\pi + 4)$ cm^2

14. Given that $\sin\theta - \cos\theta = \dfrac{1}{2}$, what is the value of $\sin\theta\cos\theta$?

A. $\dfrac{1}{4}$

B. $\dfrac{3}{8}$

C. $\dfrac{1}{2}$

D. $\dfrac{3}{4}$

15.

In the figure, X and Y are points on AB and BC respectively such that $AX : XB = 3 : 2$ and $BY : YC = 4 : 3$. If the area of $\triangle ABC$ is 70 cm^2 , then the area of $\triangle AXY$ is
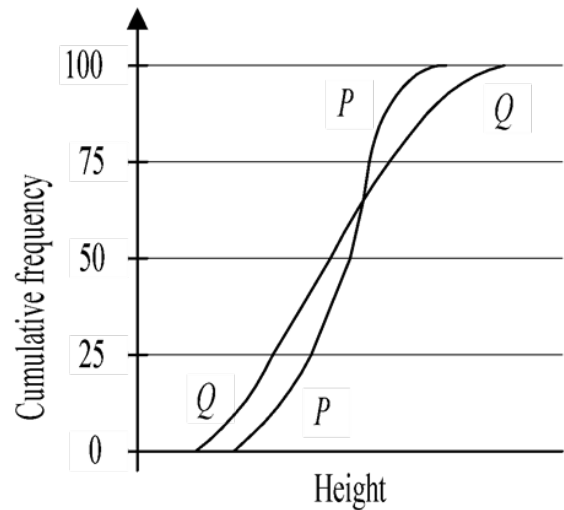
A. 16 cm^2.

B. 24 cm^2.

C. 30 cm^2.

D. 42 cm^2.

16. Simplify $\dfrac{\sin(180° + \theta)\tan(270° - \theta)}{\cos(-\theta)}$.

A. -1

B. 1

C. $-\tan\theta$

D. $\tan^2\theta$

17. A circle has its centre at $(3, 4)$ and passes through the origin. Its equation is

A. $x^2 + y^2 - 6x - 8y = 0$.

B. $x^2 + y^2 - 6x - 8y + 25 = 0$.

C. $x^2 + y^2 + 6x + 8y = 0$.

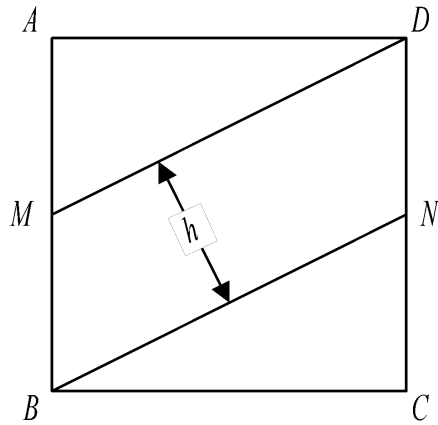D. $x^2 + y^2 - 6x - 8y - 25 = 0$.

18.

In the figure, P and Q are the cumulative frequency curves for the heights of two groups of students, each having 100 students. Which of the following must be true?

I. range of P < range of Q

II. median of P < median of Q

III. the upper quartile of P < the upper quartile of Q

A. I only

B. I and II only

C. I and III only

D. I, II and III

19.

In the figure, *ABCD* is a square of side 2*a*. *M* and *N* are the mid-points of *AB* and *CD* respectively. *h* is the height of the parallelogram *MBND*. *h* =

A. $\dfrac{2}{\sqrt{3}}a$.

B. $\dfrac{\sqrt{5}}{2}a$.

C. $\dfrac{2}{\sqrt{5}}a$.

D. $\dfrac{1}{2}a$.

Section B

20. There are 12 boys and 8 girls in a class. $\dfrac{1}{4}$ of the boys and $\dfrac{1}{4}$ of the girls wear glasses. What is the probability that a student chosen at random from the class is a boy not wearing glasses or a girl wearing glasses?

A. $\dfrac{1}{4}$

B. $\dfrac{9}{20}$

C. $\dfrac{11}{20}$

D. $\dfrac{13}{20}$

21. The probability that John will win a game is $\dfrac{1}{3}$ and the probability that he will lose is $\dfrac{2}{3}$. What is the probability that he will win exactly two games in the three games?

A. $\dfrac{2}{9}$

B. $\dfrac{1}{9}$

C. $\dfrac{2}{27}$

D. $\dfrac{1}{27}$

22. If $0^{\circ} \leq \theta < 360^{\circ}$, find the number of roots of the equation $4\sin^2 \theta \cos \theta = \cos \theta$ has.

A. 3

B. 4

C. 5

D. 6

23. In a test, the mean of the test scores is 68 marks. Peter gets 46 marks in the test and his standard score is −2.2. If Susan gets 52 marks in the test, then her standard score is

A. −2.5.

B. −1.6.

C. −0.6.

D. 1.6.

24. There are 10 boys and 5 girls in a class. If 6 students are selected from the class to form a committee, what is the probability that the committee consists of at most 2 girls?

    A. $\dfrac{102}{143}$

    B. $\dfrac{6}{13}$

    C. $\dfrac{60}{143}$

    D. $\dfrac{3}{143}$

25. A queue is formed by 6 boys and 2 girls. If no girls are next to each other, how many different queues can be formed?

    A. 1 440

    B. 10 080

    C. 30 240

    D. 35 280

26. Find the real part of the complex number $\dfrac{2i^{12} + 3i^{13} + 4i^{14} + 5i^{15} + 6i^{16}}{1-i}$.

    A. -3

    B. -1

    C. 1

    D. 3

27. The equation of a circle is $x^2 + y^2 - 2x + 5y - 7 = 0$. Which of the following is/are true?

    I.   The circle passes through the point $(-1, 1)$.

    II. The centre of the circle lies in the second quadrant.

    III. The circle intersects the x-axis at two points.

    A. II only

    B. III only

    C. II and III only

    D. I, II and III

END OF PAPER