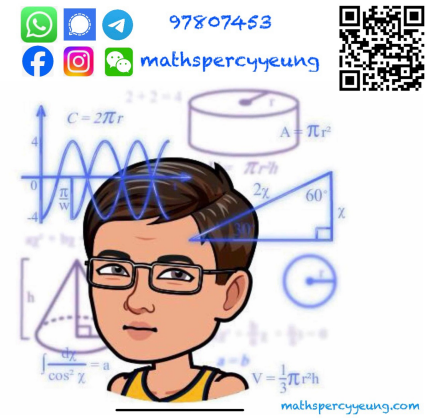
17 – 18 F.5
2nd TERM UT
MATH CP
PAPER 2
MC



2017 – 2018
Form 5 Second Term Uniform Test

MATHEMATICS Compulsory Part

PAPER 2

17th April, 2018
10:00 am – 10:45 am (45 minutes)

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 18 questions in Section A and 9 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. $8^{202} \times 9^{101} =$
   A. 6^{909}.
   B. 24^{202}.
   C. 36^{101}.
   D. 72^{303}.

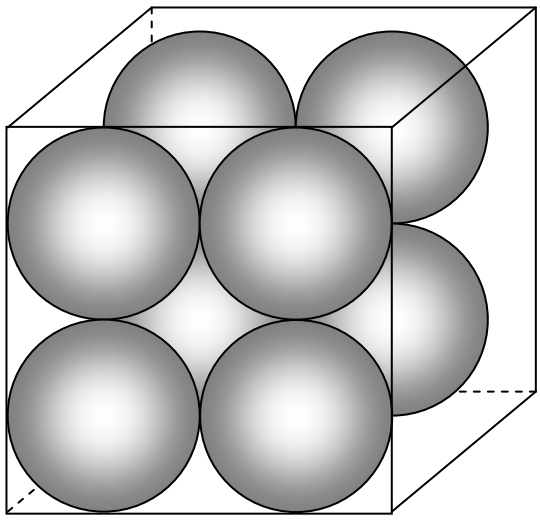
2. If $\dfrac{1-\dfrac{1}{a}}{1+\dfrac{2}{b}} = 2$, then $a =$
   A. $-\dfrac{1}{4}$.
   B. $1+\dfrac{b}{4}$.
   C. $\dfrac{b}{b+4}$.
   D. $-\dfrac{b}{b+4}$.

3. $4x^2 - y^2 - 4x + 1 =$
   A. $(2x+y+1)(2x+y-1)$.
   B. $(2x+y+1)(2x-y+1)$.
   C. $(2x+y-1)(2x-y-1)$.
   D. $(2x-y+1)(2x-y-1)$.

4. The solution of $\dfrac{3}{2} - \dfrac{2x+1}{4} \geq \dfrac{4-3x}{8}$ or $-\dfrac{6-4x}{3} < 2$ is
   A. $x < 3$.
   B. $x \leq 6$.
   C. $x \leq 10$.
   D. all real numbers.

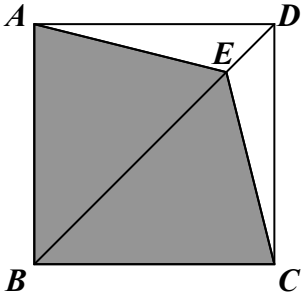
5. If a and b are non-zero numbers with $a > b$, which of the following must be true?
   I. $a^2 > b^2$
   II. $\dfrac{1}{a} < \dfrac{1}{b}$
   III. $\dfrac{a}{b} > 1$
   A. None
   B. I only
   C. III only
   D. I, II and III

6. In the figure, 8 identical spheres can be put into a cubic container with a cover. If the total volume of the 8 spheres is 288π cm^3, then the total external surface area of the container is



   A. 54 cm^2.
   B. 144 cm^2.
   C. 216 cm^2.
   D. 864 cm^2.

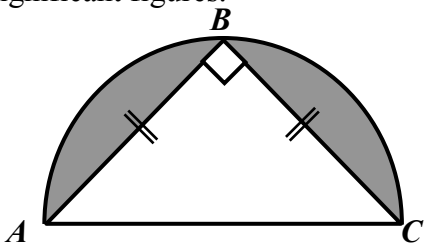
7. In the figure, $ABCD$ is a square of side 6 cm. If $DE = \sqrt{2}$ cm, then the area of the shaded region $ABCE$ is



A. 9 cm^2.
B. 18 cm^2.
C. 27 cm^2.
D. 30 cm^2.

8. If the compass bearing of A from B is N68°E, the true bearing of B from A is
A. 068°.
B. 112°.
C. 248°.
D. 292°.

9. In the figure, ABC is a semicircle. If the area of ΔABC is 32 cm^2 and $AB = BC$, find the area of the shaded region correct to 3 significant figures.



A. 15.1 cm^2
B. 16.7 cm^2
C. 18.3 cm^2
D. 19.8 cm^2

10. $\dfrac{\cos\theta}{\sin 150°} + \dfrac{\cos(180° + \theta)}{\tan^2 30°} =$
A. $-\cos\theta$.
B. $5\cos\theta$.
C. $2\cos\theta + 3\sin\theta$.
D. $2\cos\theta - 3\sin\theta$.

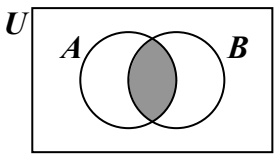
11. In ΔABC, $AB : BC : CA = 21 : 29 : 20$. Find $\dfrac{\sin C}{\tan B}$.
A. $\dfrac{20}{29}$
B. $\dfrac{441}{580}$
C. $\dfrac{580}{441}$
D. $\dfrac{29}{20}$

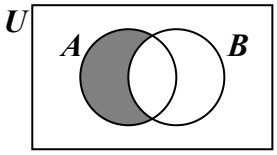
12. It is given that a varies directly as the square root of b and inversely as the square of c. Which of the following is a/are constant(s).
I. $\dfrac{ac^2}{\sqrt{b}}$
II. $\dfrac{a^2c^4}{b}$
III. $\dfrac{ac^2}{b}$

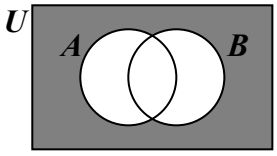
A. I and II only
B. I and III only
C. II and III only
D. I, II and III

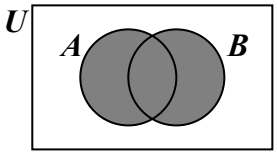
13. Suppose z is partly constant and partly varies as x^2. When $x = 0$, $z = 5$, when $x = 2$, $z = 9$. Find z when $x = 3$.
A. 8
B. 14
C. 15
D. 33

14. Which of the following shaded regions of the Venn diagrams may represent $A \cup B$?

A. 

B. 

C. 

D. 

15. A bag contains n red marbles and 8 yellow marbles. If a marble is drawn randomly from the bag, then the probability of choosing a red marble is $\frac{1}{n-1}$. Find the value of n.

A. 3
B. 4
C. 5
D. 7

16. Two fair dice are thrown. Find the probability that the greatest common factor of the two numbers thrown is 1.

A. $\frac{4}{7}$
B. $\frac{11}{18}$
C. $\frac{7}{12}$
D. $\frac{23}{36}$

17. The coordinates of the points X and Y are (7, –11) and (–3, –9) respectively. If Z is a point such that $XZ = YZ$, find the equation of the locus of Z.

A. $5x - y - 20 = 0$.
B. $5x + y - 20 = 0$.
C. $x^2 + y^2 + 5x - y - 20 = 0$.
D. $2x^2 + 2y^2 + 5x - y - 20 = 0$

18. The equation of the circle C is $x^2 + y^2 - 12x - 8y + 23 = 0$. The coordinates of the points P, Q and R are (1, 2), (11, 6) and (8, 9) respectively. Which of the following is/are true?

I. PQ is a diameter of C.
II. R lies inside C.
III. Area of ΔPQR : Area of $C = 21 : 29\pi$

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

Section B

19. Solve $x^2 - 6x + 5 \geq 0$ and $13x < 5\sqrt{3} + 8x$.

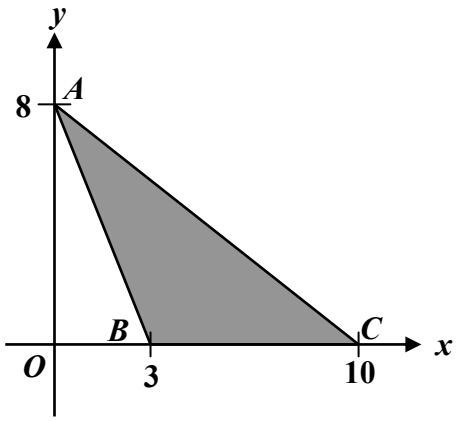
A. $x \leq 1$.

B. $x < \sqrt{3}$.

C. $\sqrt{3} < x \leq 5$

D. $x < \sqrt{3}$ or $x \geq 5$

20. In the figure, AB and AC are straight lines. Which of the following systems of inequalities has its solution represented by the shaded region(including the boundary) in the figure?



A. $\begin{cases} x \geq 0 \\ 8x + 3y \leq 24 \\ 4x + 5y \geq 40 \end{cases}$

B. $\begin{cases} x \geq 0 \\ 8x + 3y \leq 24 \\ 4x + 5y \leq 40 \end{cases}$

C. $\begin{cases} y \geq 0 \\ 8x + 3y \geq 24 \\ 4x + 5y \geq 40 \end{cases}$

D. $\begin{cases} y \geq 0 \\ 8x + 3y \geq 24 \\ 4x + 5y \leq 40 \end{cases}$

21. Consider the following system of inequalities.

$$\begin{cases} x \geq 0 \\ 0 \leq y \leq 2 \\ x + 3y \geq 3 \\ x + 2y \leq 5 \end{cases}$$

Let D be the region which represents the solution of the above system of inequalities. If (x, y) is a point lying in D, then the least value of $4y - 3x + 2$ is

A. –19.

B. –13.

C. 7.

D. 10.

22. For $0° \leq \theta < 360°$, how many roots does the equation $2\sin^2\theta + \cos\theta = 2$ have?

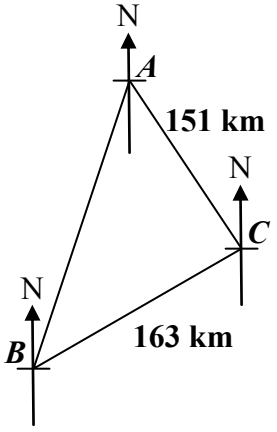
A. 1

B. 2

C. 3

D. 4

23. In the figure, the bearing of A from B is 025° and the bearing of A from C is 344°. It is known that AC = 151 km and BC = 163 km. Find the distance between A and B correct to the nearest 0.1 km.



A. 15.5 km

B. 210.0 km

C. 243.4 km

D. 15.5 km or 243.4 km

24. There are 26 students in class A and 27 students in class B. If 5 students are selected from the two classes to form a team consisting of at least 3 students from class A, how many different teams can be formed?

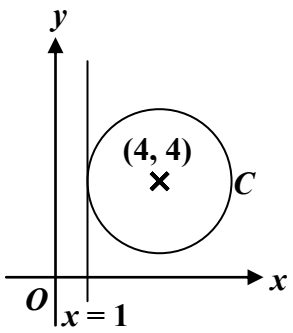
A. 1 315 250
B. 1 382 030
C. 1 406 925
D. 1 487 655

Cancel #25

25. How many ways of rearrangement of letters are there in the word "MATHEMATICS" such that the first letter is not C and the last letter is E?

A. 3 246 542
B. 3 258 810
C. 3 265 920
D. 3 274 030

26. In the figure, the coordinates of the centre of the circle is (4, 4). If C touches the straight line $x = 1$, find the equation of C.



A. $x^2 + y^2 - 8x - 8y + 23 = 0$
B. $x^2 + y^2 - 4x - 4y + 23 = 0$
C. $x^2 + y^2 + 4x + 4y + 69 = 0$
D. $x^2 + y^2 + 14x + 12y = 0$

27. The coordinates of two vertices of a triangle are (–9, –2) and (0, k). If the coordinates of the circumcentre of the triangle are (–4, 2), then k =

A. –3 or 7.
B. –2 or 5.
C. 1 or 4.
D. 3 or 6.

End of Paper