18-19 F.5 1st TERM EXAM-MATH-CP 2

97807453
mathspercyyeung
mathspercyyeung.com
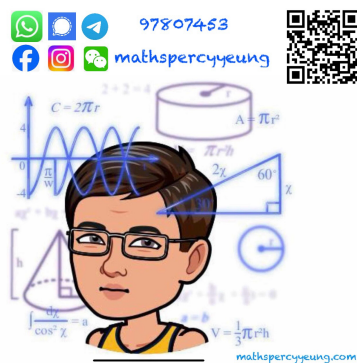
2018 – 2019
Form 5 First Term Examination

MATHEMATICS Compulsory Part

PAPER 2

2nd January, 2019.
10:30 am – 11:30 am (1 hour)

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 23 questions in Section A and 13 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. $(a^{2n})^3 =$
    A. a^{8n^3}.
    B. a^{2n+3}.
    C. a^{6n}.
    D. a^{5n}.

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

3. If $(\sqrt{3} - \sqrt{2})x = 1$, then $x =$
    A. $\sqrt{3} + \sqrt{2}$.
    B. $\dfrac{1}{\sqrt{3} + \sqrt{2}}$.
    C. $\dfrac{1}{\sqrt{3}} + \dfrac{1}{\sqrt{2}}$.
    D. $\dfrac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$.

4. The equation $x^2 + kx + k = 0$ has equal roots (k being a constant). $k =$
    A. 4 only.
    B. 0 or 4.
    C. 0 or -4.
    D. 4 or -4.

5. The costs of two kinds of coffee A and B are \$12/kg and \$20/kg respectively. In what ratio by weight should A and B be mixed so that the mixture will cost \$15/kg?
    A. $2:3$
    B. $4:3$
    C. $5:3$
    D. $3:5$

6. If $3x > -2y$ and $y < 0$, then
    A. $\dfrac{x}{y} > -\dfrac{3}{2}$.
    B. $\dfrac{x}{y} < \dfrac{2}{3}$.
    C. $\dfrac{x}{y} > -\dfrac{2}{3}$.
    D. $\dfrac{x}{y} < -\dfrac{2}{3}$.

7. The H.C.F. and L.C.M. of three expressions are xyz^2 and $x^3y^5z^4$ respectively. If two of the expressions are $x^2y^3z^3$ and x^3yz^2, find the third expression.
    A. xy^5z^4
    B. xy^3z^4
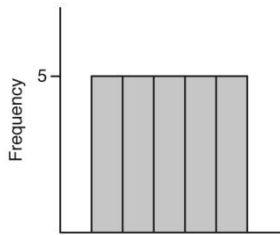   C. $x^2y^5z^3$
    D. $x^2y^5z^4$

8. In the figure, *EB* and *EC* are the angle bisectors of $\angle ABC$ and $\angle ACD$ respectively. If $\angle A = 40^\circ$, find $\angle E$.
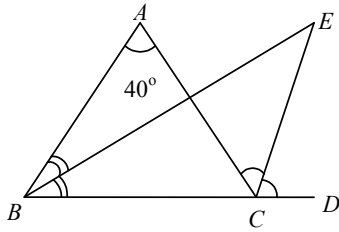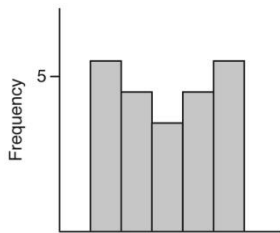

A. 40°

B. 30°

C. 25°

D. 20°

9. The following figures show the histograms of three distributions. Arrange them in ascending order of standard deviations.
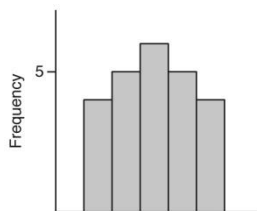
I.

II.

III.

A. I, II, III

B. I, III, II

C. III, I, II

D. III, II, I

10. How many non-negative integers satisfy both $-x + 3 \geq 3x - 5$ and $6x + 23 > 5$?
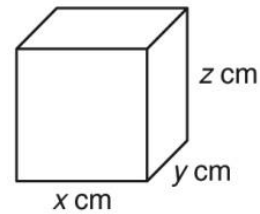
A. 2

B. 3

C. 4

D. 5

11. y varies partly as $\dfrac{1}{x}$ and partly as x. $y = 5$ when $x = 1$ and $y = \dfrac{25}{2}$ when $x = 4$. Find y when $x = 2$.

A. $\dfrac{5}{2}$

B. 4

C. $\dfrac{25}{4}$

D. 7

12. Consider the following cuboid:

Let V cm^3 be the volume of the cuboid and S cm^2 be the total surface area of the cuboid. Which of the following is/are true?

I. If z remains constant, then $V \propto xy$.

II. If z remains constant, then $S \propto xy$.

III. If x and y are constants, then S is partly constant and partly varies directly as V.

A. I only

B. I and II only

C. I and III only

D. II and III only

13. x and y are two variables. The table below shows some values of x and their corresponding values of y.

x	2	3	6	12
y	36	16	4	1

Which of the following may be a relation between x and y ?

A. $x \propto \sqrt{y}$

B. $x \propto \dfrac{1}{\sqrt{y}}$

C. $x \propto \dfrac{1}{y^2}$

D. $x \propto \dfrac{1}{y}$

14. If y varies directly as x, which of the following must be true?

I. $(y+2) \propto (x+2)$

II. $y \propto \dfrac{2}{3}x$

III. $y^3 \propto x^3$

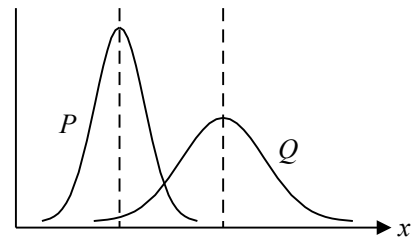A. I only

B. II only

C. I and III only

D. II and III only

15. If a polynomial f(x) is divisible by $x - 1$, then f($x - 1$) is divisible by

A. $x-2$.

B. $x+2$.

C. $x-1$.

D. x.

16. If A is greater than B by 20% and B is smaller than C by 30%, then

A. A is smaller than C by 6%.

B. A is greater than C by 6%.

C. A is smaller than C by 16%.

D. A is greater than C by 16%.

**17.** The graph shows the frequency curves of two symmetric distributions P and Q.


Which of the following is /are true?

I. The mean of $P <$ the mean of Q.

II. The mode of $P >$ the mode of Q.

III. The inter-quartile range of $P <$ the inter-quartile range of Q.

A. I only

B. I and III only

C. II and III only

D. I, II and III

18. The figure shows a circle with centre O. P and Q are points on the circumference of the circle such that the arc length of PQ is $\dfrac{1}{3}$ of the circumference. The tangents to the circle at P and Q intersect at R. Which of the following dotted lines / curves may represent the locus of R as P and Q move on the circle?
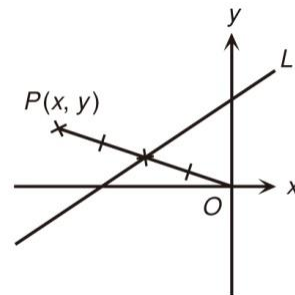
A.

B.

C.

D.
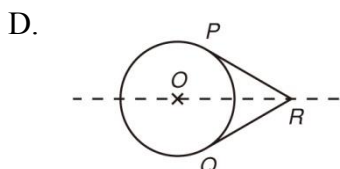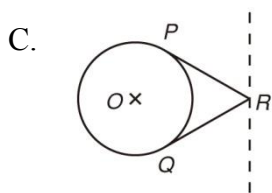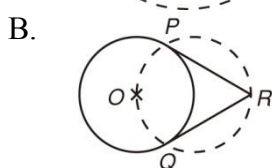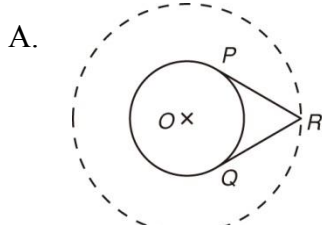
19. In the figure, a circle passing through the origin cuts the x-axis and the y-axis at $A(-3, 0)$ and $B(0, 4)$ respectively. Find the equation of the circle.
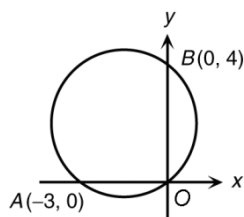
A. $x^2 + y^2 + 3x - 4y = 0$
B. $x^2 + y^2 - 3x + 4y = 0$
C. $x^2 + y^2 - 6x + 8y = 0$
D. $x^2 + y^2 = 0$

20. The figure shows straight line $L : 2x - 3y + 6 = 0$. $P(x, y)$ is a point where the mid-point of OP lies on L. Find the equation of the locus of P.

A. $2x - 3y = 0$
B. $2x - 3y - 6 = 0$
C. $2x - 3y - 12 = 0$
D. $2x - 3y + 12 = 0$

21. The table shows the mean marks of two classes of students in a Mathematics Examination.

	Number of students	Mean mark
Class A	38	72
Class B	42	54

A student in Class A has scored 91 marks. It is found that his score was wrongly recorded as 19 in the calculation of the mean mark for Class A in the above table. Find the correct mean mark of the 80 students in the two classes.

A. 61.65
B. 63.45
C. 63.65
D. 63.9

22. Which of the following equations represents a circle?
A. $(x - 2)^2 + (y + 3)^2 + 10 = 0$
B. $\left(x - \dfrac{30}{7}\right)^2 + \left(y + \dfrac{18}{5}\right)^2 = \sqrt{23}$
C. $(x + 7)^2 - \left(y - \dfrac{5}{2}\right)^2 = 82$
D. $3(x - 5)^2 + 4(y - 3)^2 = 6$

23. If the circumference of a circle $x^2 + y^2 + Dx - 6y - 3 = 0$ is 8π, find the value of D.

A. 4

B. 2

C. 4 or –4

D. 2 or –2

Section B

24. Solve $4x^2 - 9 \geq 0$.

A. $x \geq \dfrac{9}{4}$ or $x \geq -\dfrac{9}{4}$

B. $x \leq -\dfrac{9}{2}$ or $x \geq \dfrac{9}{4}$

C. $-\dfrac{3}{2} \leq x \leq \dfrac{3}{2}$

D. $x \leq -\dfrac{3}{2}$ or $x \geq \dfrac{3}{2}$

25. If p is a root of $ax^2 + bx + c = 0$, which of the following is a root of $a(\dfrac{x-3}{2})^2 + b(\dfrac{x-3}{2}) + c = 0$?

A. $\dfrac{p+3}{2}$

B. $\dfrac{p-3}{2}$
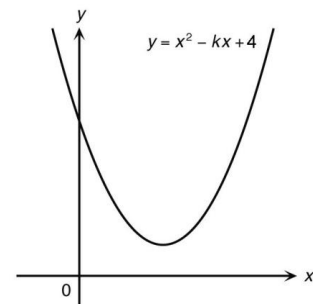
C. $2p - 3$

D. $2p + 3$

26. $(i-1) - \dfrac{i+3}{i-2} =$

A. 2.

B. $2i$.

C. $i + 1$.

D. $2i - 2$.

27. Solve $\log_2(x-1) + \dfrac{2}{\log_2(x-1)} = 3$.

A. $x = 1$

B. $x = 1$ or 5

C. $x = 2$ or 3

D. $x = 3$ or 5

28. In the figure, O is the centre and TD is the tangent to the circle at C. AFC, DFG and $AGOBT$ are straight lines. If $DG \perp AT$ and $\angle FAG = 26°$, find $\angle FDC$.
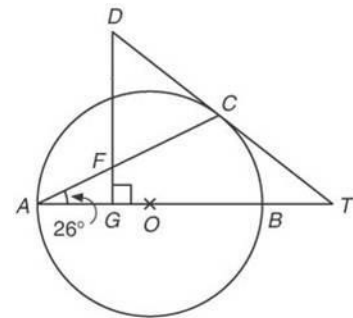
A. 52°

B. 54°

C. 56°

D. 58°

29. The figure shows the graph of $y = x^2 - kx + 4$, where $k > 0$. Find the range of possible values of k.

A. $0 < k < 4$

B. $-4 < k < 4$

C. $k > 4$

D. no solutions

30. The heights of 600 children of the same age are normally distributed with a mean of 120 cm and a standard deviation of 5 cm. How many children are there with heights between 110 cm and 125 cm?

   A.   180
   B.   408
   C.   489
   D.   585

31. A Mathematics quiz consists of 10 multiple choice questions. 2 marks will be awarded for each correct answer and no marks will be deducted for wrong answer. The mean and the standard deviation of the scores obtained by a group of students are 15 and 2 respectively. If Mary answers 9 questions correctly, find her standard score.

   A. -3
   B. -1.5
   C.   1
   D.   1.5

32. In the figure, TC is a tangent to the circle at C and $AB \mathbin{/\!/} DC$. If $\angle BCT = 48^\circ$, then $\theta =$
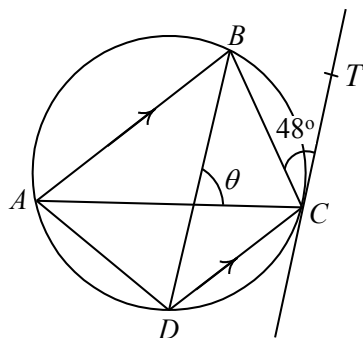
   A. 98°.
   B. 96°.
   C. 84°.
   D. 72°.

33. 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 is $\left(1, \ -\dfrac{5}{2}\right)$.

   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

34. The mean and standard deviation of a distribution of test scores are m and s respectively. If 3 is multiplied to each score and then 4 marks are added to each score of the distribution, what are the mean and standard deviation of the new distribution?

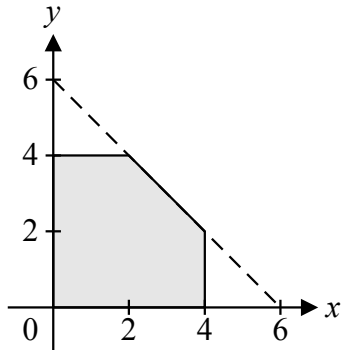|	Mean	Variance
A.	$3m$	$3s^2$
B.	$3m+4$	$9s^2$
C.	$3m+4$	$9s$
D.	$3m+4$	$3s+4$

35. If a datum '0' is added to a set of data with negative values only, which of the following must be true?

   I.   The range will increase.

   II.   The inter-quartile range will increase.

   III.   The standard deviation will increase.

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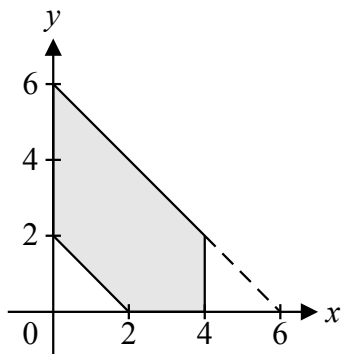   D.   I, II and III

36. Which one of the following shaded regions represents the solution of

$$\begin{cases} 2 \le x + y \le 6 \\ \quad 0 \le x \le 4 \\ \quad 0 \le y \le 4 \end{cases} ?$$
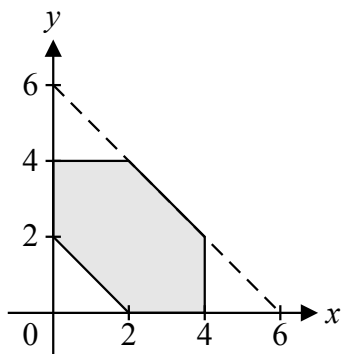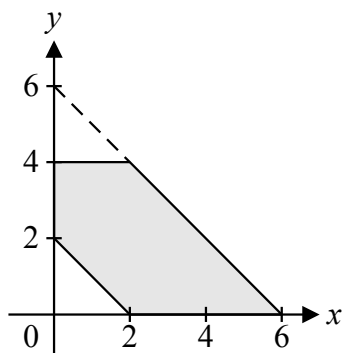
A.

B.

C.

D.

END OF PAPER