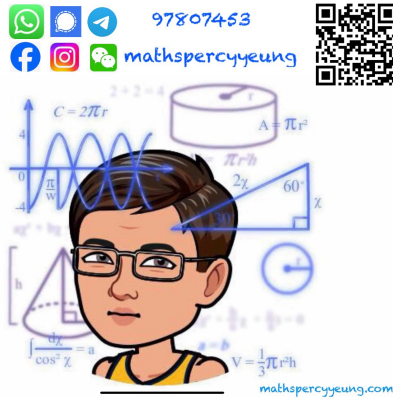


20-21 F.5
1st TERM EXAM
MATH CP
PAPER 2

MC



2020 – 2021

Form 5 First Term Examination

MATHEMATICS Compulsory Part

PAPER 2

5th January, 2021. (Tuesday)
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.

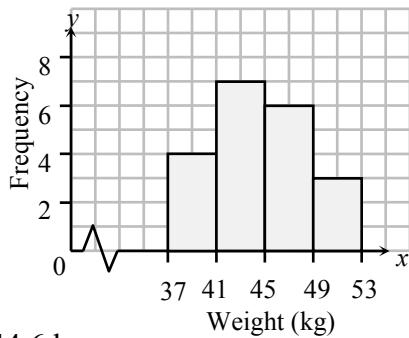
There are 24 questions in Section A and 12 questions in Section B.

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

Choose the best answer for each question.

Section A

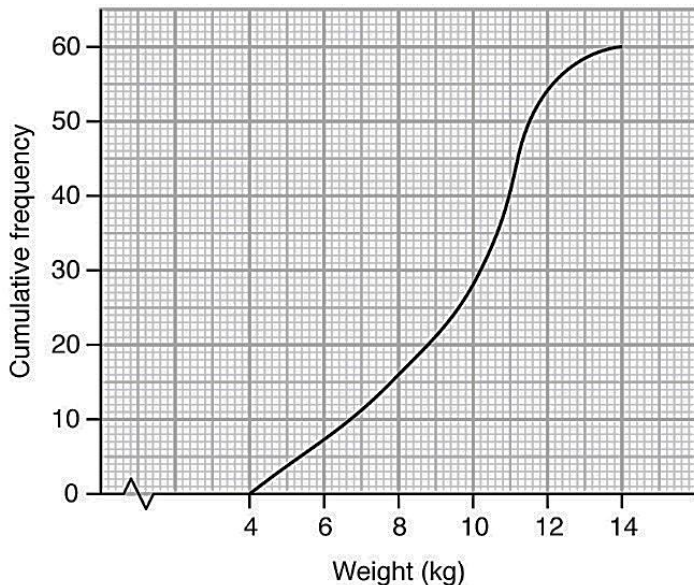
1. The histogram shows the distribution of the weights of a group of children. Find the mean of the weights of this group of children.



- A. 44.6 kg
- B. 46.4 kg
- C. 46.6 kg
- D. 48.6 kg

2. The figure shows the cumulative frequency curve of the distribution of the weights of 60 school bags.

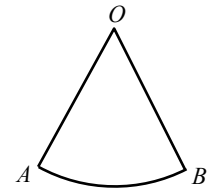
Weights of 60 school bags



Find the inter-quartile range of the weights of the school bags.

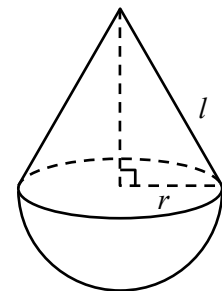
- A. 3.4 kg
- B. 3.6 kg
- C. 3.8 kg
- D. 4.0 kg

3. In the figure, \widehat{AB} is an arc of a circle with centre O . If the length of \widehat{AB} and the radius of the circle are equal, find $\angle AOB$ correct to the nearest degree.



- A. 57°
- B. 60°
- C. 61°
- D. 115°

4. In the figure, a hemisphere and a right circular cone with the same base. The volume of the cone is the same as the volume of the hemisphere. Let r and l be the base radius and the slant height of the cone respectively, then



- A. $l = 2r$.
- B. $l = 4r$.
- C. $l = \sqrt{3}r$.
- D. $l = \sqrt{5}r$.

5. If β is a root of the equation $3x^2 + 2x - 3 = 0$, then $6\beta^2 + 4\beta - 7 =$

- A. 4.
- B. 0.
- C. -1.
- D. -4.

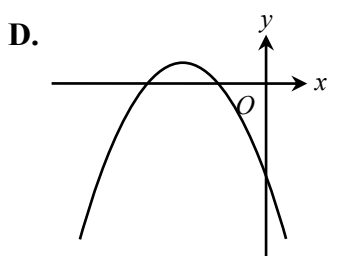
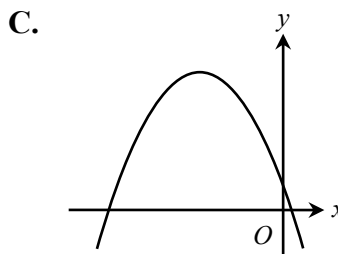
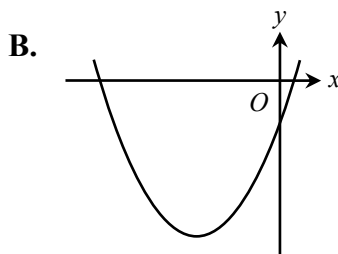
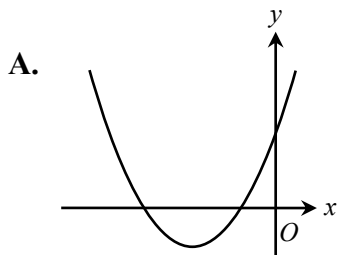
6. Let k be a constant. If the quadratic equation $5x^2 - 2kx - k = 0$ has equal roots, then $k =$

- A. -5 .
- B. 5 .
- C. 0 or 5 .
- D. -5 or 0 .

7. If $f(x) = 2x^2 - 5x + 3$, then $f(2k - 1) =$

- A. $8k^2 - 18k + 10$.
- B. $8k^2 - 18k + 20$.
- C. $16k^2 - 36k + 20$.
- D. $16k^2 - 72k + 40$.

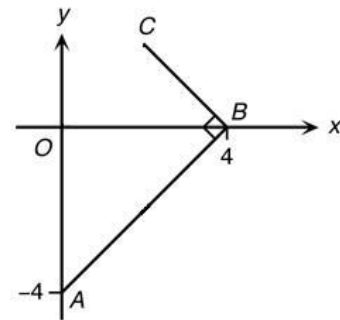
8. If $-2 < a < -1$, which of the following may represent the graph of $y = (ax - 1)^2 + a$?



9. Let $f(x) = x^{2020} + mx^{2019}$, where m is a constant. When $f(x)$ is divided by $x + 1$, the remainder is 4. Find the remainder when $f(x)$ is divided by $x - 1$.

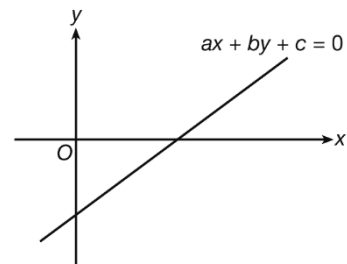
- A. -4
- B. -2
- C. 2
- D. 4

10. In the figure, BC is perpendicular to AB . Find the equation of BC .



- A. $4x + y + 1 = 0$
- B. $4x + y - 1 = 0$
- C. $x + y + 4 = 0$
- D. $x + y - 4 = 0$

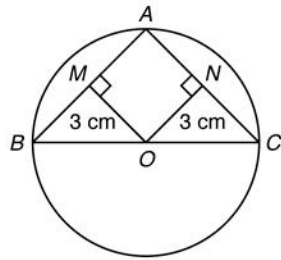
11. The figure shows the graph of the straight line $ax + by + c = 0$. If c is a negative real number, which of the following is true?



- A. $a < 0$ and $b > 0$
- B. $a < 0$ and $b < 0$
- C. $a > 0$ and $b > 0$
- D. $a > 0$ and $b < 0$

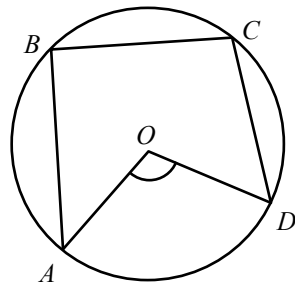
12. In the figure, BC is a diameter of the circle. AMB and ANC are straight lines. If $OM \perp AB$, $ON \perp AC$ and $OM = ON = 3\text{ cm}$. Find $\angle ABC$.

- A. 40°
 B. 45°
 C. 50°
 D. 55°



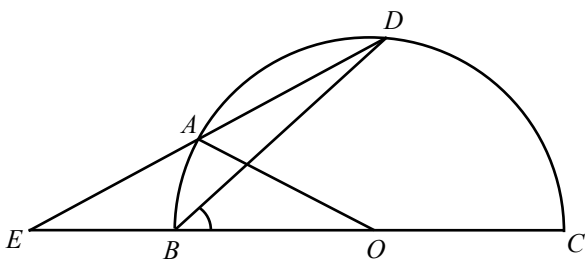
13. In the figure, O is the centre of circle $ABCD$. If $\angle BAO = 32^\circ$, $\angle BCD = 106^\circ$ and $\angle CDO = 50^\circ$, then $\angle AOD =$

- A. 88°
 B. 94°
 C. 96°
 D. 100°



14. In the figure, O is the centre of the semi-circle $ABCD$. DA produced and CB produced meet at E . If $OA = EA$ and $\angle OAE = 124^\circ$, then $\angle CBD =$

- A. 28°
 B. 42°
 C. 56°
 D. 62°



15. The solutions of the compound inequality

$$x - 4 > 2 \text{ or } \frac{1-2x}{3} \leq x - 3 \text{ are}$$

- A. $x \geq 2$
 B. $x > 6$
 C. $2 \leq x < 6$
 D. $x \leq 2$ or $x > 6$

16. How many integral solutions does the compound inequality ' $2x + 5 < 11$ and $3 - 2x \leq 7$ ' have?

- A. 3
 B. 4
 C. 5
 D. 6

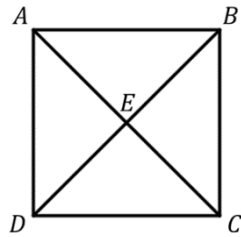
17. It is given that z varies directly as the square of x and inversely as y . Which of the following must be a constant?

- A. $\frac{zx^2}{y}$
 B. $\frac{z}{x^2y}$
 C. $\frac{x}{y^2z}$
 D. $\frac{x^2}{yz}$

18. It is given that y varies directly as \sqrt{x} . If x is increased by 125%, then y is

- A. increased by 25%.
 B. decreased by 25%.
 C. increased by 50%.
 D. decreased by 50%.

19. In the figure, $ABCD$ is a square and its diagonals intersect at E . P is a moving point inside or on the square such that P is equidistant from AB and AD . The locus of P is



- A. BE .
 B. BD .
 C. AE .
 D. AC .

20. Consider two fixed points $A(-3, 6)$ and $B(5, 4)$. Find the equation of the locus of a moving point P which is equidistant from A and B .

- A. $2x - 4y + 15 = 0$
 B. $4x - y + 1 = 0$
 C. $10x + 8y - 41 = 0$
 D. $(x+2)^2 + (y+10)^2 = 70$

21. The equation of the circle C is $2x^2 + 2y^2 + 10x + 6y - 183 = 0$. Which of the following is/are true?

- I. The origin lies inside C .
 II. The coordinates of the centre of C are $(-5, -3)$.
 III. The diameter of C is less than 20.

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

22. The stem-and-leaf diagram below shows the distribution of the test scores of 24 students in a class.

Stem (tens)	Leaf (units)
6	4 4 5 6 6 6 8 9 9
7	0 0 2 5 5 6 7 8
8	1 3 5 5 6 8 9

Find the inter-quartile range of the distribution.

- A. 14
 B. 15
 C. 16
 D. 17

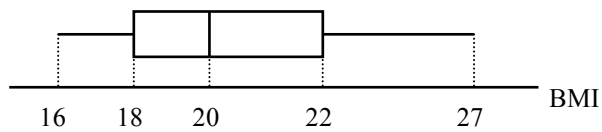
23. The table shows the waiting times of 25 customers to buy a cup of coffee in a coffee shop.

Waiting time (min)	1	2	3	4	5
Frequency	9	7	4	3	2

Find the standard deviation of the waiting times correct to 3 significant figures.

- A. 3.55 min
 B. 2.28 min
 C. 1.41 min
 D. 1.28 min

24. The box-and-whisker diagram below shows the distribution of the body mass index (BMI) of a group of students. If the BMI exceeds 22, the student is overweight.



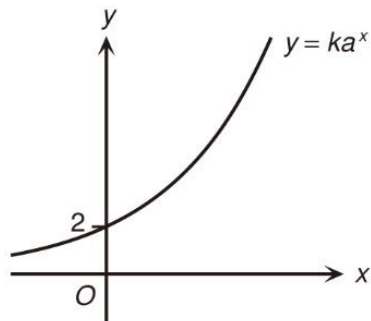
The percentage of overweight students is

- A. 25%.
- B. 50%.
- C. 70%.
- D. 75%.

Section B

25. In the figure, the y -intercept of the graph of $y = ka^x$ is 2. Find the value of k .

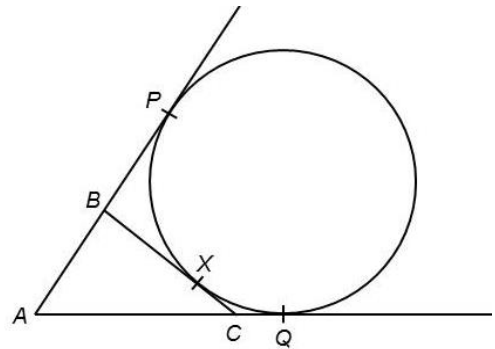
- A. $\frac{1}{2}$
- B. $-\frac{1}{2}$
- C. 2
- D. -2



26. Given that $\log 2 = x$ and $\log 3 = y$, express $\log\left(\frac{45}{4}\right)$ in terms of x and y .

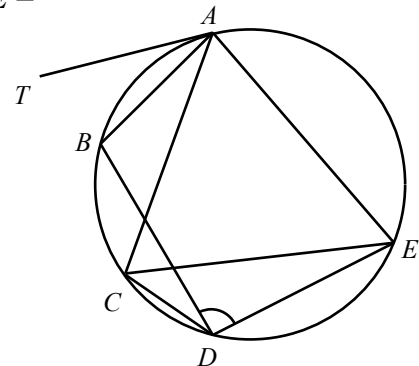
- A. $3x - 2y + 1$
- B. $3x - 2y - 1$
- C. $2y - 3x + 1$
- D. $2y - 3x - 1$

27. In the figure, ABP , ACQ and BXC are tangents to the circle at P , Q and X respectively. If the perimeter of $\triangle ABC$ is 27 cm, find the length of AP .



- A. 9 cm
- B. 12 cm
- C. 13.5 cm
- D. 15 cm

28. In the figure, TA is the tangent to the circle $ABCDE$ at the point A . If $\angle ACE = 63^\circ$, $\angle AEC = 55^\circ$ and $\angle TAB = 30^\circ$, then $\angle BDE =$



- A. 68° .
- B. 87° .
- C. 93° .
- D. 118° .

29. The real part of $i^{20} - 2i^{21} + 4i^{22} - 6i^{23}$ is

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

30. Solve the inequality $4x^2 - 5x + 1 \leq 0$.

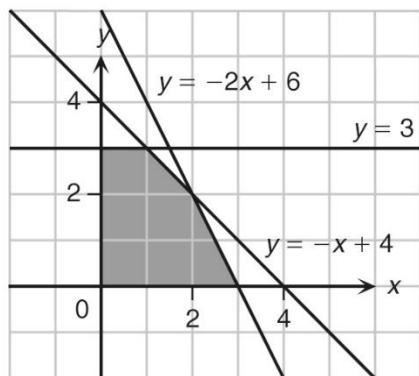
- A. $-1 \leq x \leq -\frac{1}{4}$
 B. $\frac{1}{4} \leq x \leq 1$
 C. $x \leq -1$ or $x \geq -\frac{1}{4}$
 D. $x \leq 1$ or $x \geq \frac{1}{4}$

31. Find the maximum and the minimum values of the function $P = 5x + y + 3$

subject to the constraints $\begin{cases} y \leq 3x \\ x + y \leq 8 \\ y \geq 0 \end{cases}$

	<u>Maximum</u>	<u>Minimum</u>
A.	40	0
B.	40	3
C.	43	0
D.	43	3

32. If (h, k) is a point in the shaded region, which of the following must be true?



- I. $0 \leq k \leq 3$
 II. $h + k \leq 4$
 III. $2h + k \leq 6$

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

33. Solve $3^{2x} - 5(3^x) + 4 = 0$.

- A. $x = 0$ or 0.79 (cor. to 2 d.p.)
 B. $x = 0$ or 1.26 (cor. to 2 d.p.)
 C. $x = 1$ or 1.33 (cor. to 2 d.p.)
 D. $x = 1$ or 4

34. Jonathan gets 73 marks in a test and his standard score is -1.5 . If the mean for Jonathan's class in the test is 76 marks, find the standard deviation of the marks for Jonathan's class in the test.

- A. 2
 B. 3
 C. 4
 D. 4.5

35. The lifetimes of brand *A* light bulbs are normally distributed with a mean of 4000 h and a standard deviation of 200 h. Assume that 68 %, 95 % and 99.7 % of the data lie within one, two and three standard deviation from the mean respectively. Find the percentage of brand *A* light bulbs with lifetimes more than 4200 h.

- A. 2.5%
 B. 16%
 C. 31.5%
 D. 32.5%

36. The mean and the standard deviation of a data set are \bar{x} and σ . If 7 is subtracted from each datum in the data set, find the mean and the standard deviation of the new data set.

	<u>Mean</u>	<u>Standard deviation</u>
A.	\bar{x}	σ
B.	\bar{x}	$\sigma - 7$
C.	$\bar{x} - 7$	σ
D.	$\bar{x} - 7$	$\sigma - 7$

END OF PAPER

