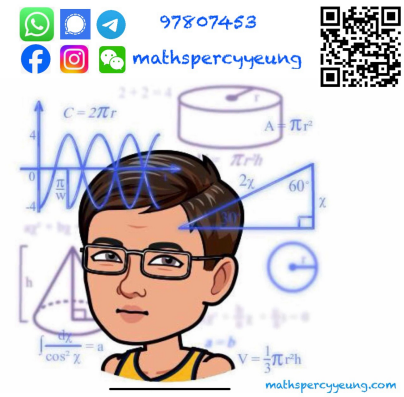
19-20 F.5
2nd TERM EXAM
MATH CP
PAPER 2
MC



2019 – 2020
Form 5 Second Term Examination

MATHEMATICS Compulsory Part

PAPER 2

26th June, 2020. (Friday)
11:00 am – 12:15 pm (1 hour 15 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 30 questions in Section A and 15 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. $(x-y)^2\,(x+y) =$

A. $x^3 - y^3$.

B. $x^3 - x^2y - xy^2 + y^3$.

C. $x^3 - x^2y + xy^2 - y^3$.

D. $x^3 + x^2y - xy^2 - y^3$.

2. If $\frac{p}{x+3} = \frac{q}{x-3}$, then $x =$

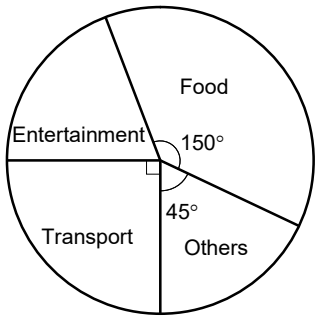
A. $\frac{p-q}{3(p+q)}$.

B. $\frac{q-p}{3(p+q)}$.

C. $\frac{3(p+q)}{p-q}$.

D. $\frac{3(p+q)}{q-p}$.

3. The pie chart shows the expenditure of Anita in a certain week. She spends \$ 900 on entertainment that week. Find her expenditure on transport that week.



A. \$ 1 050

B. \$ 1 080

C. \$ 1 350

D. \$ 1 800

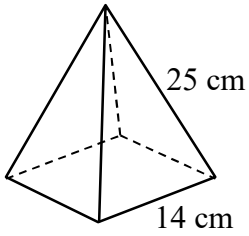
4. In the figure, the base of the solid right pyramid is a square. If the side length of the base is 14 cm and the length of each slant edge of the pyramid is 25 cm, find the total surface area of the pyramid.

A. 672 cm^2

B. 868 cm^2

C. 1 248 cm^2

D. 1 297 cm^2



5. Which of the following is a rational number?

A. $\cos 120°$

B. $3 + 4i$

C. 5π

D. $\sqrt{6}$

6. If $(x + 2k)(2x - k) = (x + 2k)^2$, $x =$

A. $\frac{k}{2}$.

B. $3k$.

C. $\frac{k}{2}$ or $-2k$.

D. $3k$ or $-2k$.

7. Let $f(x) = 3 - 5x$ and $g(x) = x + 5$. Solve the equation $f(-3x) = -3\,g(x)$.

A. $x = -1$

B. $x = -\frac{1}{3}$

C. $x = \frac{1}{9}$

D. $x = \frac{7}{9}$

8. Let c be a non-zero constant such that $2c^2x^2 - 3cx + c$ is divisible by $cx - 3$. Find the value of c.

A. -27

B. -18

C. -9

D. 9

9. Let k be a constant. If the graph of $y = -x^2 - 8x + k$ intersects the line $y = 3$ at only one point, find the value of k.

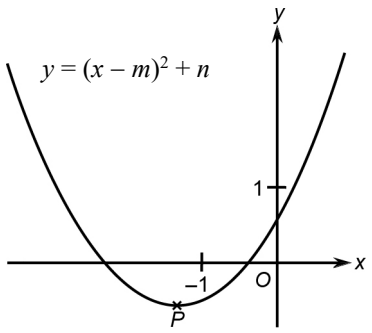
A. -19

B. -13

C. 13

D. 19

10. The figure shows the graph of $y = (x - m)^2 + n$, where m and n are constants.



If P is the vertex of the graph, which of the following must be true?

I. $m < -1$

II. $n > 0$

III. $m^2 + n > 1$

A. **I** only

B. **II** only

C. **I** and **III** only

D. **II** and **III** only

11. $P(2, -6)$ is reflected with respect to the x-axis to Q. If the straight line L passes through Q and $R(4, 0)$, find the equation of L.

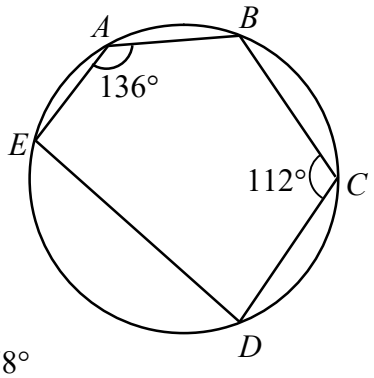
A. $x - y - 4 = 0$

B. $x - y + 4 = 0$

C. $3x - y - 12 = 0$

D. $3x + y - 12 = 0$

12. In the figure, $ABCDE$ is a circle. $\angle BAE = 136°$, $\angle BCD = 112°$ and $BC = CD$. Find $\angle CDE$.



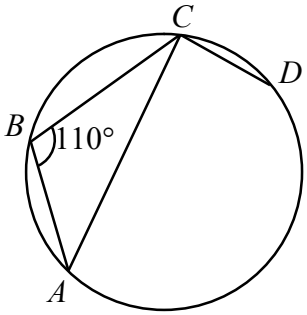
A. $78°$

B. $80°$

C. $88°$

D. $90°$

13. In the figure, $\overset{\frown}{AB} : \overset{\frown}{BC} : \overset{\frown}{CD} = 2 : 3 : 1$. If $\angle ABC = 110°$, $\angle ACD =$



A. $78°$.

B. $84°$.

C. $90°$.

D. $96°$.

14. If x varies directly as $(y-3)$,

A. x varies directly as y.

B. x varies inversely as y.

C. x is partly constant and partly varies directly as y.

D. x is partly constant and partly varies inversely as y.

15. If u varies inversely as v^2 and $u=3$ when $v=6$, find the value of u when $v=4$.

A. $\frac{4}{3}$

B. 2

C. $\frac{9}{2}$

D. $\frac{27}{4}$

16. It is given that y is the sum of two parts, one part is a constant and the other part varies as $\sqrt{x}$. When $x=9$, $y=4$ and when $x=49$, $y=16$. If $y=7$, $x=$

A. $\frac{\sqrt{6}}{3}$.

B. $\frac{4}{9}$.

C. 2.

D. 16.

17. $\frac{\sqrt[3]{a\sqrt{a}}}{\sqrt[3]{a}\sqrt{a}}=$

A. 1.

B. $a^{\frac{1}{3}}$.

C. $\frac{1}{a^{\frac{1}{3}}}$.

D. $\frac{1}{a}$.

18. The solutions of the compound inequality $2-x>5$ and $\frac{4x-1}{3}\le 7$ are

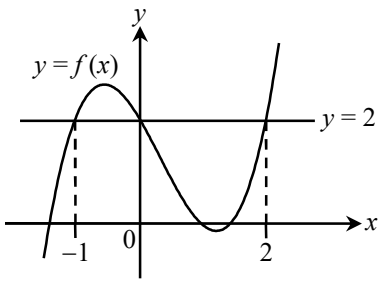
A. $x<-3$.

B. $-3<x\le\frac{11}{2}$.

C. $x\le\frac{11}{2}$.

D. no real solutions.

19. The figure shows the graph of $y=f(x)$ and the graph of $y=2$.



According to the figure, which of the following values of x can satisfy the inequality $f(x)-2>0$?

I. -1.3

II. 0.8

III. 2.5

A. **I** only

B. **III** only

C. **I** and **II** only

D. **II** and **III** only

20. If $\cos\theta=\frac{1}{k}$ and $0°\le\theta\le 90°$, $\tan\theta=$

A. $\sqrt{k^2-1}$.

B. $\sqrt{k^2+1}$.

C. $\frac{1}{\sqrt{k^2-1}}$.

D. $\frac{1}{\sqrt{k^2+1}}$.

21. $\dfrac{\sin(180°-\theta)}{\cos(90°+\theta)} =$

A. -1 .

B. $-\tan\theta$.

C. 1 .

D. $\tan\theta$.

22. For $0° \le x \le 360°$, the greatest value of $\dfrac{12}{4+2\sin x}$ is

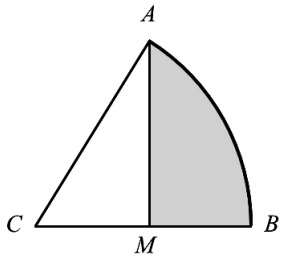
A. 2 .

B. 3 .

C. 4 .

D. 6 .

23. In the figure, C is the centre of the sector ACB. M is the mid-point of BC and AM is perpendicular to BC. If $AC = 6$ cm , find the area of shaded region AMB, correct to 3 significant figures.



A. 9.85 cm^2

B. 10.6 cm^2

C. 11.1 cm^2

D. 15.9 cm^2

24. If P is a moving point which maintains a fixed distance of 2 cm from a line segment of 4 cm , find the area enclosed by the locus of P .

A. 8 cm^2

B. 16 cm^2

C. $(8 + 4\pi)$ cm^2

D. $(16 + 4\pi)$ cm^2

25. Which of the following statements about the circle $4x^2 + 4y^2 + 12x - 20y + 9 = 0$ are true?

I. The centre of the circle is $(-6, 10)$.

II. The radius of the circle is 2.5 .

III. The origin lies inside the circle.

A. **I** only

B. **II** only

C. **I** and **III** only

D. **II** and **III** only

26. If a diameter of the circle $x^2 + y^2 + hx + 2y - 54 = 0$ passes through $(-2, 1)$ and $(1, 7)$, find the value of h .

A. 1

B. 3

C. 4

D. 6

27. Two numbers are randomly drawn at the same time from seven cards numbered 2 , 2 , 2 , 3 , 6 , 9 and 9 respectively. Find the probability that the product of the numbers drawn is 18 .

A. $\dfrac{1}{7}$

B. $\dfrac{1}{6}$

C. $\dfrac{2}{7}$

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

28. Consider the following data, where m and n are integers.

$7, m, 4, 5, n, 8, 5$

If the mean and the median are both 7, which of the following must be true?

I. The mean of m and n is 10.

II. $m \geq 7$

III. Inter-quartile range < 5

A. **I** and **II** only

B. **I** and **III** only

C. **II** and **III** only

D. **I**, **II** and **III**

29. The stem-and-leaf diagram shows the distribution of the marks of 20 students in a test where h and k are integers.

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

If the range of the marks is 41, which of the following cannot be a possible value of $h+k$?

A. 1

B. 3

C. 5

D. 7

30. The following table shows the distribution of the number of children of the families living in a building.

Number of children	0	1	2	3	4
Number of family	8	n	7	9	2

If the median number of children of these families is 1.5, find the standard deviation of the distribution correct to 3 significant figures.

A. 1.12

B. 1.17

C. 1.23

D. 1.41

Section B

31. If $x > 0$ and $x \neq 1$, $\dfrac{2\log\sqrt[3]{x} + \log x^4}{3\log\dfrac{1}{x}} =$

A. $-\dfrac{7}{3}$.

B. $-\dfrac{14}{9}$.

C. 14.

D. 21.

32. If a is a constant and $9^{x+1} - 6a \cdot 3^x + a^2 = 0$, $x =$

A. $\log(a-3)$.

B. $\log a - \log 3$.

C. $\log_3(a-1)$.

D. $\log_3 a - 1$.

33. Solve the inequality $(4x-3)^2 \leq 25$.

A. $-2 \leq x \leq 2$

B. $-\dfrac{1}{2} \leq x \leq 2$

C. $0 \leq x \leq 2$

D. $x \leq 2$

34. If a is a real number, the real part of $\dfrac{3+i^3}{a-i}$ is

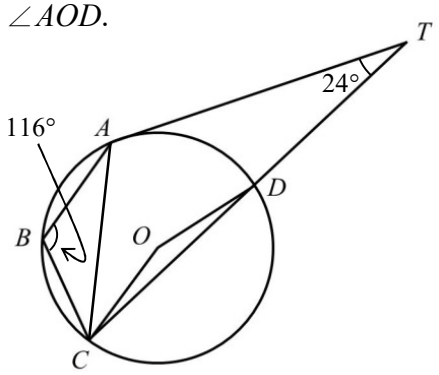
A. $\dfrac{3a+1}{a^2+1}$.

B. $\dfrac{3a+1}{a^2-1}$.

C. $\dfrac{3-a}{a^2+1}$.

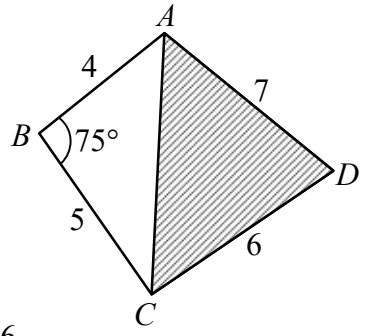
D. $\dfrac{3-a}{a^2-1}$.

35. In the figure, O is the centre of the circle $ABCD$. TDC is a straight line. TA is the tangent to the circle at A. If $\angle ABC = 116°$ and $\angle DTA = 24°$, find $\angle AOD$.



A. 80°
B. 84°
C. 88°
D. 92°

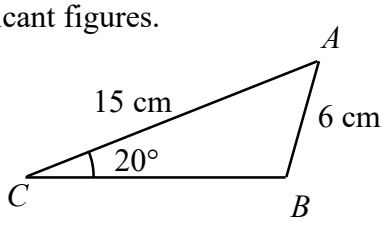
36. In the figure, $AB = 4$, $BC = 5$, $CD = 6$ and $AD = 7$. If $\angle ABC = 75°$, find the area of ΔACD, correct to 3 significant figures.



A. 9.66
B. 14.7
C. 16.0
D. 20.2

37. Solve the equation $3\cos\theta = 2\sin^2\theta$, where $0° \le \theta \le 360°$.
A. $\theta = 30°$ or $150°$
B. $\theta = 30°$ or $330°$
C. $\theta = 60°$ or $120°$
D. $\theta = 60°$ or $300°$

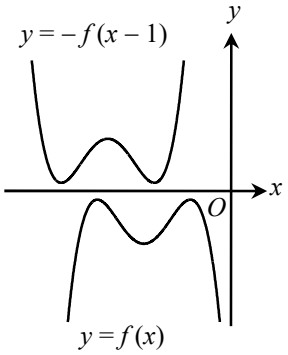
38. In the figure, ΔABC is an obtuse-angled triangle. $AC = 15$ cm, $AB = 6$ cm and $\angle ACB = 20°$. Find $\angle BAC$, correct to 3 significant figures.



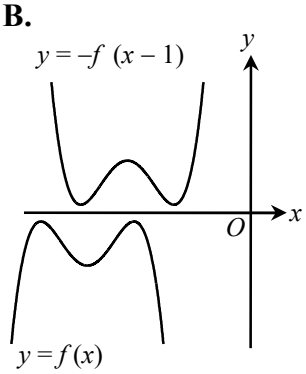
A. 36.8°
B. 38.8°
C. 56.8°
D. 58.8°

39. Which of the following may represent the graph of $y = f(x)$ and the graph of $y = -f(x-1)$ on the same rectangular coordinate plane?

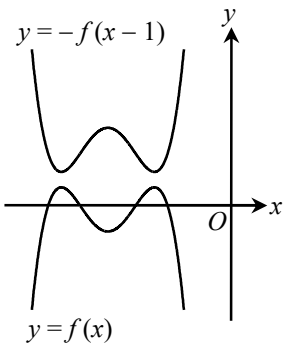
A.



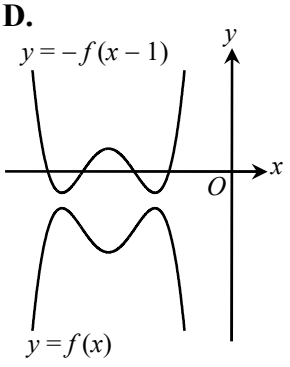
B.



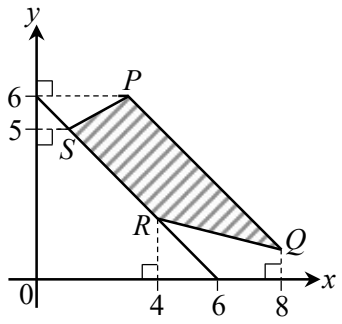
C.



D.



40. In the figure, the equation of PQ is $x + y = 9$.



If (x, y) is a point lying in the shaded region $PQRS$ (including the boundary lines), the minimum value of $x - 3y$ is

A. -17.

B. -16.

C. -15.

D. -14.

41. In a wardrobe, there are 8 different shirts, 4 different pairs of long trousers and 3 different pairs of short trousers. Johnny wants to select 1 shirt and 1 pair of trousers from them. How many choices does he have?

A. 15

B. 20

C. 56

D. 96

42. There are 10 boxes, 4 of which are empty and each of the remaining 6 contains a ball. An additional ball is now put into one of the 10 boxes at random. If a box is then randomly selected, what is the probability of selecting a empty box?

A. 0.3

B. 0.34

C. 0.36

D. 0.4

43. A music club is formed by 10 boys and 12 girls. If a team of 5 students from the club is selected for a performance and the team consists of at least 1 boy and 1 girl, how many different teams can be formed?

A. 7 470

B. 15 504

C. 25 290

D. 26 334

44. 3 women and 9 men participate in a singing competition. Each participant will perform once individually and the order of performance is randomly arranged. Find the probability that the 3 women perform successively.

A. $\frac{1}{10}$

B. $\frac{1}{22}$

C. $\frac{1}{132}$

D. $\frac{1}{220}$

45. The variance of a group of numbers $x_1, x_2, x_3, \ldots, x_n$ is 16. Find the variance of the group of numbers $2x_1 - 3, 2x_2 - 3, 2x_3 - 3, \ldots, 2x_n - 3$.

A. 29

B. 32

C. 61

D. 64

END OF PAPER