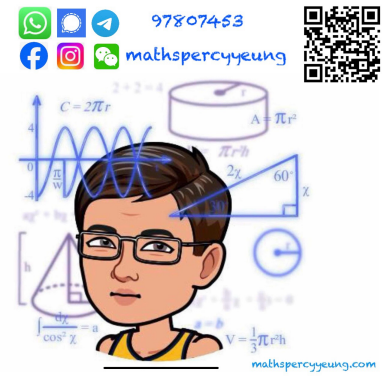
18-19 F.5
2nd TERM EXAM
MATH CP
PAPER 2
MC



2018 – 2019
Form 5 Second Term Examination

MATHEMATICS Compulsory Part

PAPER 2

6th June, 2019
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. $\dfrac{(9k^{-2})^2}{3k^2} =$

   A. $\dfrac{6}{k^2}$.

   B. $\dfrac{27}{k^2}$.

   C. $\dfrac{6}{k^6}$.

   D. $\dfrac{27}{k^6}$.

2. If $3x^4+5x^3-kx-12$ is divisible by $x+1$, find the value of k.

   A. -14
   B. -4
   C. 4
   D. 14

3. 0.927 456 3 =

   A. 0.93 (correct to 3 decimal places).
   B. 0.927 4 (correct to 4 significant figures).
   C. 0.927 46 (correct to 5 significant figures).
   D. 0.927 46 (correct to 6 significant figures).

4. If $2h-k=4h+3k=-5$, then $k=$

   A. -2.
   B. -1.
   C. 1.
   D. 2.

5. If h and k are constants such that $mx+(x-3)^2 \equiv x^2+10x+n$, then

   A. $m=10$ and $n=-9$.
   B. $m=10$ and $n=9$.
   C. $m=16$ and $n=-9$.
   D. $m=16$ and $n=9$.

6. If k is a constant such that the quadratic equation $kx^2+(3k+3)x+25=0$ has equal roots, then $k=$

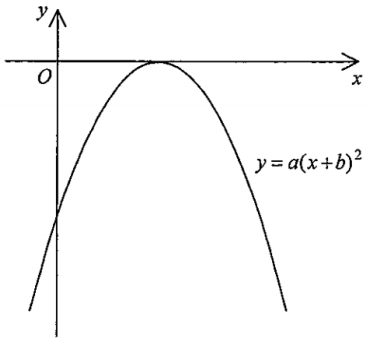
   A. -1.

   B. -5 or 5.

   C. $\dfrac{1}{9}$ or 9.

   D. $-\dfrac{1}{9}$ or -9.

7. The figure shows the graph of $y=a(x+b)^2$, where a and b are constants. 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 $b<0$

8. If $a > b > 0 > k$, which of the following must be true?

I. $\frac{1}{a} > \frac{1}{b}$

II. $\frac{1}{b} > \frac{1}{k}$

III. $ak > bk$

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

9. Solve $-5-3x>1$ and $\frac{2x}{3}-1>3$.

A. $x < -2$
B. $x > 6$
C. $-2 < x < 6$
D. no solution

10. If the base and the height of a right-angled triangle are both increased by x% so that the area of the triangle is increased by 125%, then $x =$

A. 25.
B. 50.
C. 125.
D. 150.

11. If a and b are non-zero numbers such that $(4a+2b):(5b-a)=9:7$, then $a : b =$

A. 17 : 43.
B. 31 : 37.
C. 37 : 31.
D. 43 : 17.

12. If z varies directly as square root of x and inversely as square of y, which of the following must be constant?

A. $\frac{x^2z}{y^2}$

B. $\frac{y^2z}{x^2}$

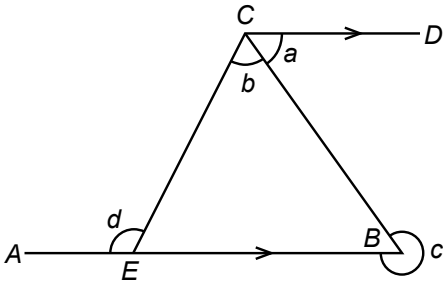
C. $\frac{xz^2}{y^4}$

D. $\frac{y^4z^2}{x}$

13. The lengths of two wires are measured as 20 cm and 4 cm respectively, correct to the nearest cm. Find the lower limit of the difference between the actual lengths of two wires.

A. 15 cm
B. 15.5 cm
C. 16 cm
D. 17 cm

14. In the figure, AEB is a straight line.



Which of the following must be true?

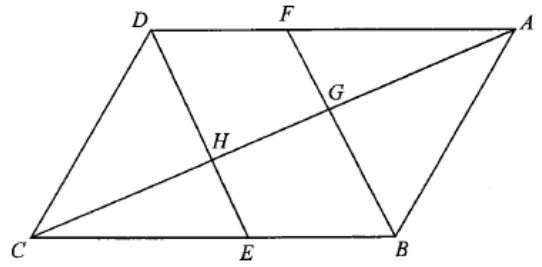
I. $a+b=d$

II. $a+c=360°$

III. $c+d=b+180°$

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

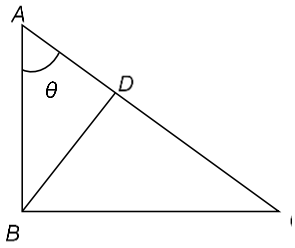
15. In the figure, $ABCD$ and $BEDF$ are parallelograms. E is a point lying on BC such that $BE:EC = 2:3$. AC cuts BF and DE at G and H respectively. If the area of ΔABG is 135 cm^2, then the area of the quadrilateral $DFGH$ is



A. 60 cm^2.
B. 81 cm^2.
C. 90 cm^2.
D. 144 cm^2.

16. In the figure, ADC is a straight line. $\angle ABC = \angle ADB = 90°$. If $AB = k$, then $CD =$

A. $k\cos\theta$.
B. $\dfrac{k}{\cos\theta}$.
C. $\dfrac{k\cos\theta}{\sin^2\theta}$.
D. $\dfrac{k\sin^2\theta}{\cos\theta}$.

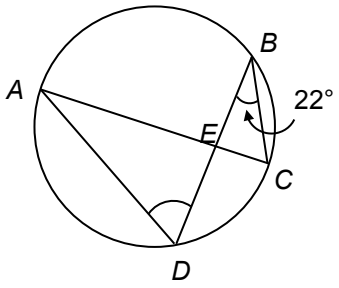


17. $\dfrac{\sin(180°-\theta)}{\cos\theta} - \dfrac{\cos\theta}{\cos(90°+\theta)} =$

A. 1.
B. $\dfrac{1}{\sin\theta\cos\theta}$.
C. $\sin\theta\cos\theta$.
D. $1+\tan^2\theta$.

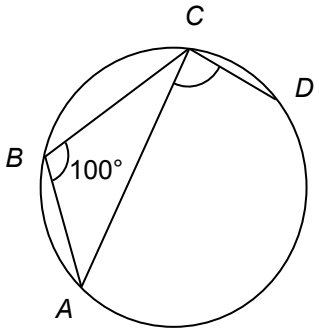
18. In the figure, AC is a diameter of the circle. AC and BD intersect at E such that $BE = DE$. If $\angle CBE = 22°$, then $\angle ADE =$

A. 46°.
B. 56°.
C. 68°.
D. 78°.



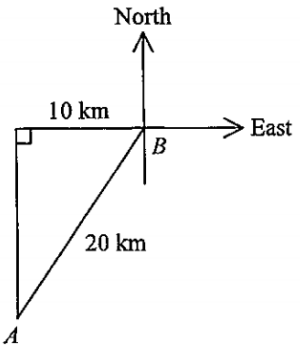
19. In the figure, $3AB = 2BC = 6CD$. If $\angle ABC = 100°$, then $\angle ACD =$

A. 60°.
B. 72°.
C. 84°.
D. 96°.



20. In the figure, the bearing of B from A is

A. 030°.
B. 060°.
C. 210°.
D. 240°.



21. If an exterior angle of a regular n-sided polygon is $(n+2)°$, which of the following is / are true?
    I. The value of n is 20.
    II. Each interior angle of the polygon is 160°.
    III. The number of folds of rotational symmetry of the polygon is 18.

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

22. $A(-12, 2)$ and $B(-8, -3)$ are two points in the rectangular coordinate plane. A is rotated clockwise about the origin O through 90° to A'. The equation of the straight line passing through A' and B is

A. $3x-2y+18=0$.

B. $3x+2y+30=0$.

C. $2x-3y+32=0$.

D. $2x+3y+25=0$.

23. The equations of the straight lines L_1 and L_2 are $x+2y=0$ and $2x-y=0$ respectively. If P is a moving point in the rectangular coordinate plane such that the perpendicular distance from P to L_1 is equal to the perpendicular distance from P to L_2, then the locus of P is a

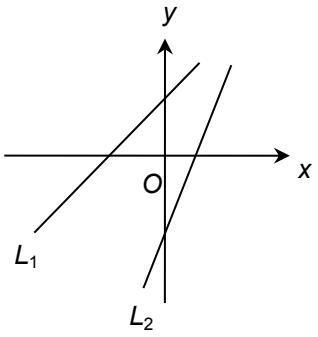
A. pair of parallel lines.

B. pair of perpendicular lines.

C. straight line.

D. circle.

24. In the figure, the equations of the straight lines L_1 and L_2 are $ax+by+1=0$ and $cx+dy-1=0$ respectively. Which of the following must be true?



I. $ac < 0$

II. $bd > 0$

III. $ad > bc$

A. I only

B. II only

C. I and III only

D. II and III only

25. The polar coordinates of the points P, Q and R are (3, 160°), (4, 280°) and (6, 340°) respectively. The perpendicular distance from Q to PR is

A. 2.

B. 3.

C. $2\sqrt{3}$.

D. $3\sqrt{3}$.

26. The equation of the circle C is $-x^2-y^2+4x+ky+20=0$. If the radius of C is 5 units and the centre of C lies in quadrant IV, then k =

A. –2.

B. 2.

C. –2 or 2.

D. –4 or 4.

27. In a test, there are two questions. The probability that Karen answers the first question correctly is 0.3 and the probability that Karen answers the second question correctly is 0.4. The probability that she answers at least one question correctly is

A. 0.88

B. 0.58

C. 0.46

D. 0.42

28. 12▼◆ is a 4-digit number, where ▼ and ◆ are integers from 0 to 9 inclusive. Find the probability that the 4-digit number is divisible by 5 but not divisible by 10.

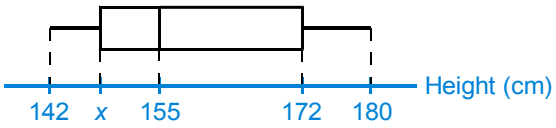
A. $\frac{1}{10}$

B. $\frac{9}{50}$

C. $\frac{1}{5}$

D. $\frac{49}{50}$

29. The box-and-whisker diagram below shows the distribution of the heights (in cm) of students in a class. If the inter-quartile range of the heights of the students is 24 cm, find x.



A. 152
B. 150
C. 148
D. 146

30. Consider the following 10 integers:

2	2	5	5	5
x	6	6	7	7

Let a, b and c be the mean, mode and median of the above integers respectively. Given that the range of the above integers is greater than 5, which of the following must be true?

I. $a \neq 5$
II. $b = 5$
III. $c > 5$

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

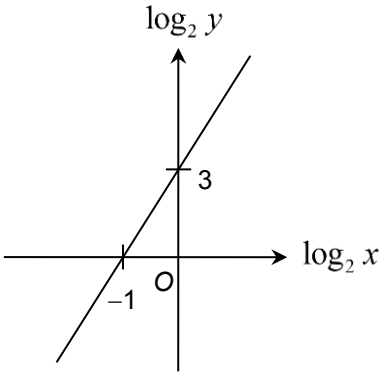
Section B

31. $\dfrac{1}{x^2-1} - \dfrac{1}{x-1} =$

A. $\dfrac{x}{1-x^2}$.
B. $\dfrac{x-2}{1-x^2}$.
C. $-\dfrac{x}{(x-1)^2}$.
D. $\dfrac{2-x}{(x-1)^2}$.

32. The graph in the figure shows the linear relation between $\log_2 x$ and $\log_2 y$. Which of the following must be true?

A. $y = 3x^3$
B. $y = 8x^3$
C. $y = 8x^4$
D. $y = x^3 + 8$



33. $11 \times 16^{11} + 12 \times 16^7 + 515 =$

A. A000B0000201_{16}.
B. B000C0000203_{16}.
C. A000B000020_{16}.
D. B000C000023_{16}.

34. Let k be a constant. If the roots of the quadratic equation $x^2 + kx = 2k$ are α and β, then $\alpha^2 + \beta^2 =$

A. k^2.
B. $-k^2 + 4k$.
C. $k^2 - 4k$.
D. $k^2 + 4k$.

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

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

36. Let O be the origin. A and B are points lying on the positive x-axis and the positive y-axis respectively such that the equation of AB is $4x+3y-12=0$. If a circle is inscribed in ΔOAB and touches AB at P, find the coordinates of P.

A. $\left(1,\dfrac{8}{3}\right)$
B. $\left(\dfrac{6}{5},\dfrac{12}{5}\right)$
C. $\left(\dfrac{9}{5},\dfrac{8}{5}\right)$
D. $\left(2,\dfrac{4}{3}\right)$

37. Consider the following system of inequalities:

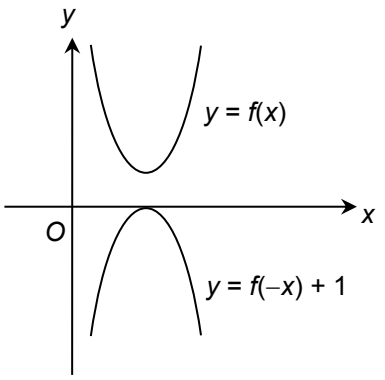
$$\begin{cases} y \le 9 \\ x-y-9 \le 0 \\ x+y-9 \ge 0 \end{cases}$$

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 $x-2y+43$ is

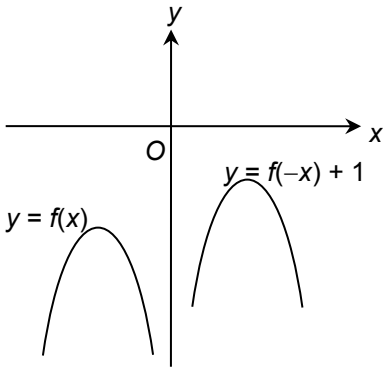
A. 25.
B. 43.
C. 52.
D. 61.

38. 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 system?

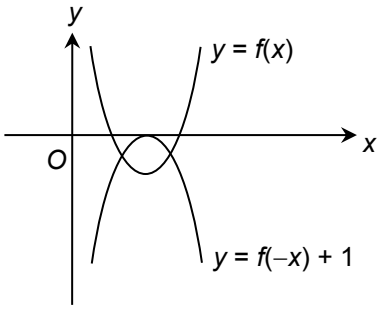
A.



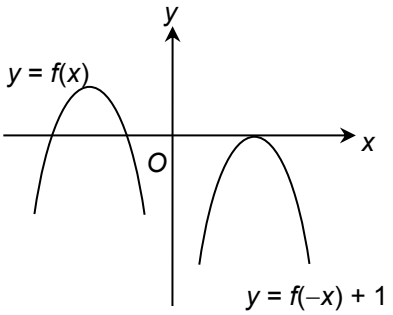
B.



C.



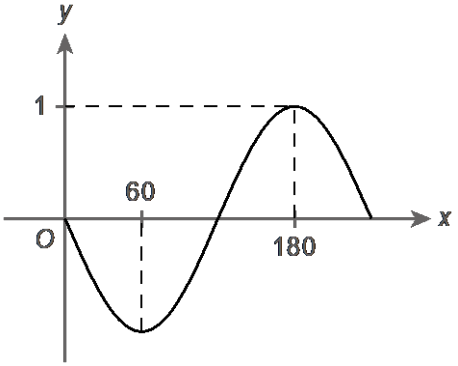
D.



39. For $0° \le \theta \le 360°$, how many roots does the equation $3\cos^2\theta = \cos\theta + 2$ have?

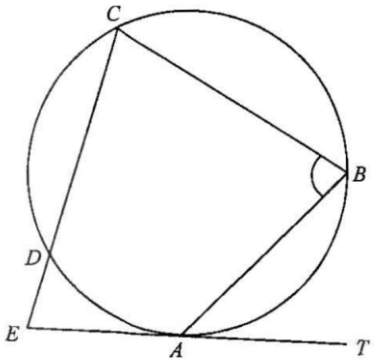
A. 2
B. 3
C. 4
D. 5

40. Let h and k be constants. If the figure shows the graph of $y = h\sin kx°$, then



A. $h = 1,\ k = \frac{2}{3}$.
B. $h = 1,\ k = \frac{3}{2}$.
C. $h = -1,\ k = \frac{3}{2}$.
D. $h = -1,\ k = \frac{2}{3}$.

41. In the figure, TA is the tangent to the circle $ABCD$ at the point A. CD produced and TA produced meet at the point E. It is given that $AB = CD$, $\angle BAT = 24°$ and $\angle AED = 72°$. Find $\angle ABC$.



A. 60°
B. 66°
C. 72°
D. 78°

42. If the variance of the four numbers a, b, c and d are 16, then the variance of $2(a-2)$, $2(b-2)$, $2(c-2)$ and $2(d-2)$ is

A. 64.
B. 32.
C. 16.
D. 4.

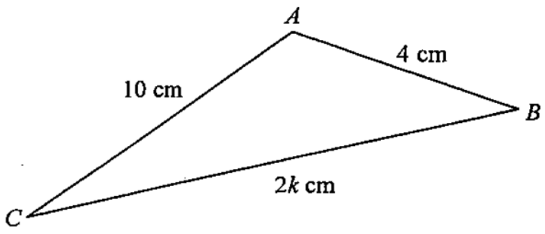
43. Let O be the origin. The coordinates of the points A and B are (0,60) and (96,48) respectively. Find the x-coordinate of the orthocentre of ΔOAB.

A. 6
B. 32
C. 45
D. 48

44. A queue is formed by 2 boys and 8 girls. If the first two persons in the queue are not boys, find the number of different queues can be formed.

A. 80 640
B. 2 257 920
C. 3 548 160
D. 3 628 800

45. In the figure, the area of $\Delta ABC =$



A. $\sqrt{(k^2+9)(49-k^2)}$ cm^2.
B. $\sqrt{(k^2+9)(49+k^2)}$ cm^2.
C. $\sqrt{(k^2-9)(49-k^2)}$ cm^2.
D. $\sqrt{(k^2-9)(49+k^2)}$ cm^2.

End of Paper