St. Paul's College

F.3 Mid-year Examination 2022-2023

MATHEMATICS
PAPER 2

Multiple Choice Questions

Time Allowed: 50 minutes

Name: _____ Class: _____ Class No. _____

INSTRUCTIONS

1. Read carefully the instructions on the Multiple Choice Answer Sheet. Write down the subject, your candidate number, class and class number in the spaces provided and mark the corresponding boxes with an HB pencil.

2. All questions carry equal marks.

3. Answer ALL questions. You are advised to use an HB pencil to mark all the 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.

4. You should mark only ONE answer for each question. If you mark more than one answer, you will receive no marks for that question.

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

6. No marks will be deducted for wrong answers.

There are 30 questions in this section. (45 Marks)
Choose the best answer for each question.

1. $x^3(2x+x)=$

   A. $3x^3$.

   B. $3x^4$.

   C. $2x^5$.

   D. $2x^6$.

2. $\dfrac{12^{666}}{8^{333}}=$

   A. $\left(\dfrac{3}{2}\right)^{333}$.

   B. 3^{333}.

   C. 9^{333}.

   D. 18^{333}.

3. It is given that $3^{2\,022} \approx 5.48500519\times10^{964}$ and $2\,022^{292} \approx 1.94131570\times10^{965}$. If $x = 3^{2\,022} + 2\,022^{292}$, then

   A. $x = 2.49\times10^{964}$ (correct to 3 significant figures).

   B. $x = 2.49\times10^{965}$ (correct to 3 significant figures).

   C. $x = 2.49\times10^{1\,929}$ (correct to 3 significant figures).

   D. $x = 2.49\times10^{1\,930}$ (correct to 3 significant figures).

4. $2^{12}+7\times2^9+2^3-2^2=$

   A. 111100000010_2.

   B. 111100000110_2.

   C. 1111000000100_2.

   D. 1111000001100_2.

5. If $2h+k+7=5h+2k=10$, then $h=$

   A. -24.

   B. -5.

   C. 4.

   D. 51.

6. If a, b and c are constants such that $ax(x+b)+6\equiv(x+c)(x-3)$, then $b=$

   A. -5.

   B. -2.

   C. -1.

   D. 1.

7. $2ah-3h-10ak+15k+8a-12=$

   A. $(2a-3)(h-5k+4)$.

   B. $(2a-3)(h+5k-4)$.

   C. $(2a+3)(h-5k+4)$.

   D. $(2a+3)(h+5k-4)$.

8. $9-36m^2+60mn-25n^2=$

   A. $(3-6m-5n)(3+6m+5n)$.

   B. $(3-6m-5n)(3+6m-5n)$.

   C. $(3-6m+5n)(3+6m+5n)$.

   D. $(3-6m+5n)(3+6m-5n)$.

9. If x is an even number satisfying the inequality $\frac{4-x}{3}\geq\frac{x-9}{2}$, then the greatest possible value of x is

   A. 4.

   B. 6.

   C. 7.

   D. 8.

10. If $p > q$ and $k < 0$, which of the following must be true?

I. $p + k > q + k$

II. $p - q > k$

III. $\frac{p}{k^2} < \frac{q}{k^2}$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

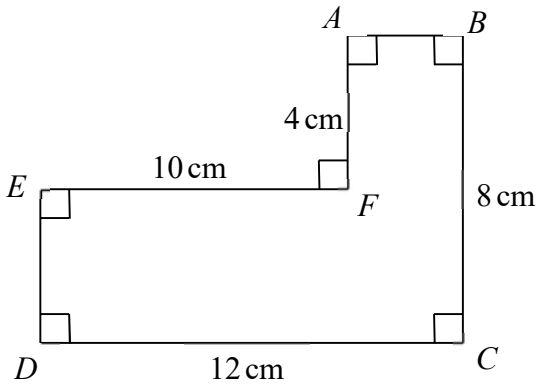
11. In the figure, $ABCDEF$ is a hexagon, where all the measurements are correct to the nearest cm. Let x cm^2 be the actual area of the hexagon. Find the range of values of x.

A. $39 < x < 59$

B. $39 < x < 73$

C. $53 < x < 59$

D. $53 < x < 73$



12. It is given that x and y are in inverse proportion. If x is decreased by 20%, find the percentage change in the value of y.

A. +25%

B. +20%

C. –20%

D. –25%

13. If $4a = 5b = 6c$, then $a : b : c =$

A. $4:5:6$.

B. $6:5:4$.

C. $10:12:15$.

D. $15:12:10$.

14. Ken is 15% taller than Aidan. It is given that the sum of the height of Ken and the height of Aidan is not less than 344 cm . If the height of Ken is x cm, which of the following is the range of values of x?

A. $x > 184$

B. $x \geq 184$

C. $x > 186$

D. $x \geq 186$

15. The cost of brand A tea is $\$210$ per kg. If 3 kg of brand A tea and 2 kg of brand B are mixed so that the cost of the mixture is $\$180$ per kg, find the cost of brand B tea.

A. $\$135$ per kg

B. $\$150$ per kg

C. $\$160$ per kg

D. $\$780$ per kg

16. A sum of money is deposited at an simple interest rate of $r\%$ per annum for 30 months. If the amount obtained is 15% more than the sum of money deposited, then r =

A. 0.005.

B. 0.06.

C. 0.5.

D. 6.

17. A sum of $\$4\,000$ is deposited at an interest rate of 12% per annum for 2 years, compounded monthly. Find the amount correct to the nearest dollar.

A. $\$1\,078$

B. $\$1\,079$

C. $\$5\,078$

D. $\$5\,079$

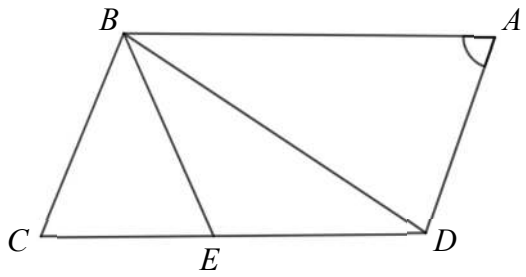
18. In the figure, $ABCD$ is a parallelogram. E is a point on CD such that $BE = DE$ and $\angle BEC = 80°$. If $AB = BD$, find $\angle BAD$.

A. 50°

B. 60°

C. 70°

D. 80°



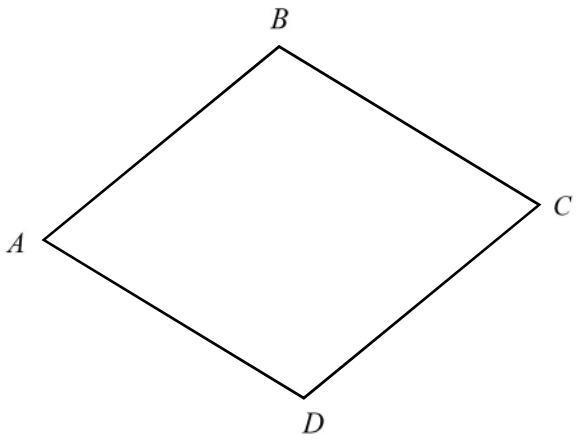
19. In the figure, $ABCD$ is a rhombus, where $AC = 40$ cm. If the perimeter of $ABCD$ is 100 cm, then the distance between B and D is

A. 15 cm.

B. 18 cm.

C. 30 cm.

D. 36 cm.



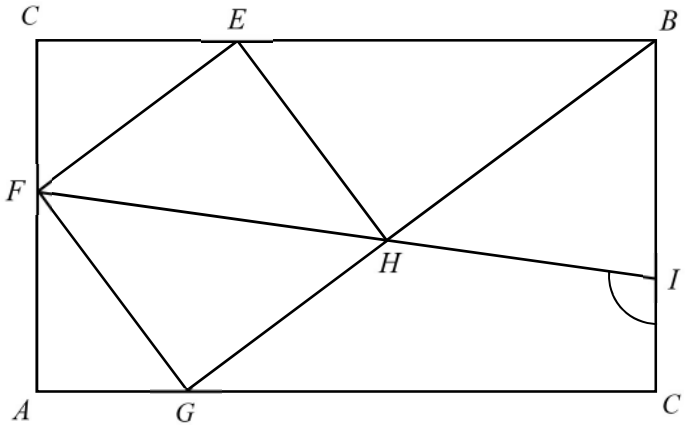
20. In the figure, $ABCD$ is a rectangle. E, F and G are points lying on AB, AD and CD respectively such that $EFGH$ is a square. FH is produced to meet BC at the point I. It is given that BHG is a straight line. If $\angle CBG = 62°$, then $\angle CIH =$

A. 107°.

B. 108°.

C. 134°.

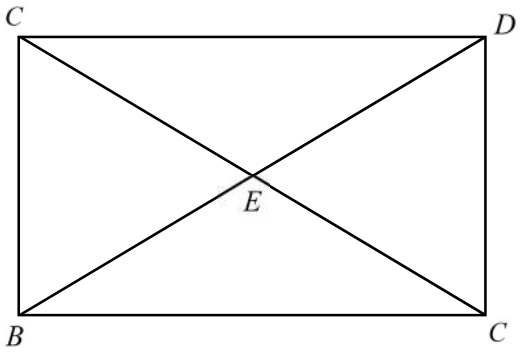
D. 135°.



21. In the figure, $ABCD$ is a rectangle. AC and BD intersect at the point E. Denote the mid-point of BC by F. If $AB = DE$, which of the following are true?

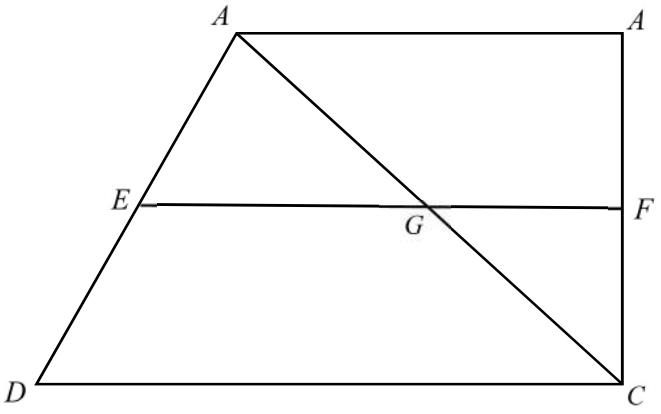
I. $\angle ACB = 30°$.
II. $AD : AE = \sqrt{3} : 1$
III. $AB = 2EF$.

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



22. In the figure, $ABCD$ is a trapezium, where $AD // BC$. E and F are the mid-points of AB and CD respectively. AC and EF intersect at the point G. If $AC = BC = 20$ cm, $FG = 8$ cm, $BC // EF$ and $\angle CFE = 90°$, then the area of the trapezium $ABCD$ is

A. 216 cm^2.
B. 256 cm^2.
C. 432 cm^2.
D. 512 cm^2.



23. If $m > 0 > n$, which of the following must be true?

I. $mn < 0$
II. $m + n < 0$
III. $3m^2 - 5mn + 2n^2 > 0$

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

24. A point P is reflected with respect to the x-axis to the point Q. Q is then rotated anticlockwise about the origin through $90°$ to the point R. If the coordinates of the point R are $(7,-5)$, find the y-coordinate of P.

A. -7

B. -5

C. 5

D. 7

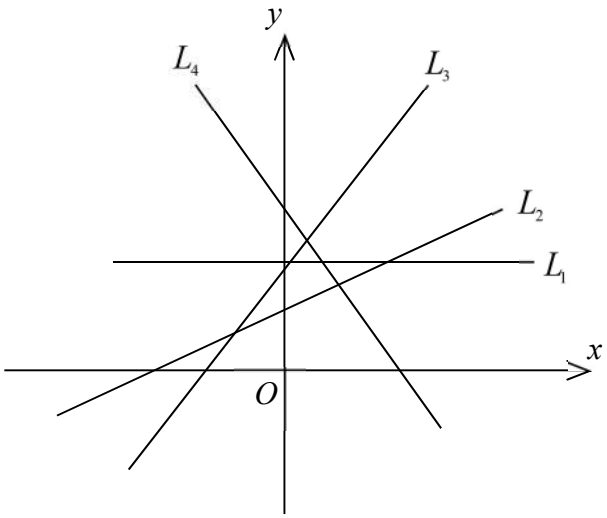
25. Which of the following lines has the greatest slope?

A. L_1

B. L_2

C. L_3

D. L_4



26. The straight line passing through $A(12,20)$ and $B(8,12)$ cuts the x-axis at the point C. Find the coordinates of C.

A. $(-4,0)$

B. $(0,-4)$

C. $(0,2)$

D. $(2,0)$

27. The coordinates of the points D and E are $(-21,22)$ and $(4,62)$ respectively. If F is a point lying on DE such that the x-coordinate of F is -1, find the y-coordinate of F.

A. 30

B. 32

C. 52

D. 54

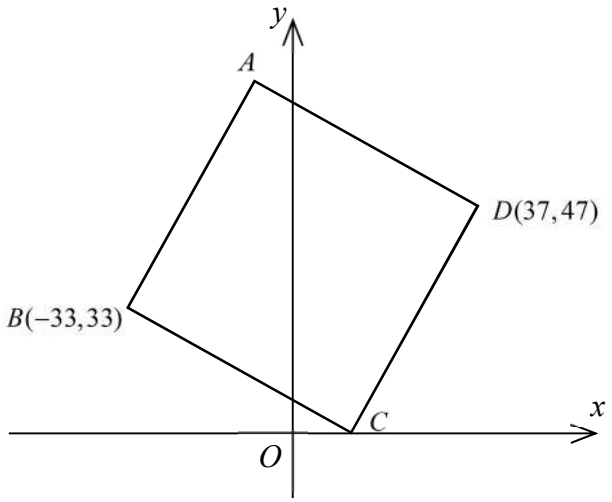
28. In the figure, $ABCD$ is a rhombus with C lying on the x-axis, find the coordinates of C.

A. $(4,0)$

B. $(0,4)$

C. $(10,0)$

D. $(0,10)$



29. The coordinates of the points A, B and C are $(2,12)$, $(4,5)$ and $(11,11)$ respectively. If D is a point such that $ABCD$ is a parallelogram, find the coordinates of D.

A. $(-5,6)$

B. $(9,18)$

C. $(13,4)$

D. $(18,17)$

30. In the figure, $ABCD$ is a square. F is a point on AB. BC is produced to E such that $DE = DF$. Which of the following are true?

I. $\Delta CDE \cong \Delta ADF$

II. $\angle DFE = 45°$

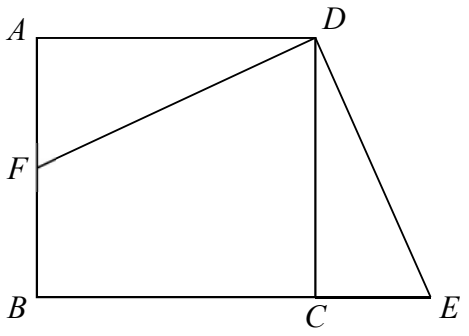
III. $\Delta FDE \sim \Delta ADC$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III



End of Paper

Form 3 Mathematics Core Paper 2
2022-2023 Mid-year Exam

Question	Answer	Question	Answer	Question	Answer
1	B	11	B	21	D
2	D	12	A	22	A
3	B	13	D	23	C
4	C	14	B	24	D
5	C	15	A	25	C
6	A	16	D	26	D
7	A	17	D	27	D
8	D	18	C	28	C
9	B	19	C	29	B
10	A	20	A	30	D