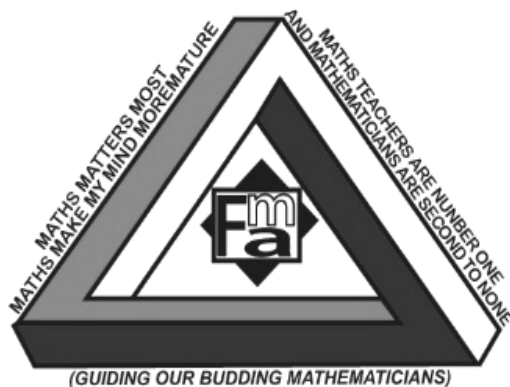


FIJI MATHEMATICS ASSOCIATION



FIJI MATHEMATICS COMPETITION (FMC) YEAR 11

Thursday 6th September 2018

Time Allowed: 1 Hour 15 minutes

Note:

Calculators are NOT permitted.

Diagrams are NOT drawn to scale.

Instructions:

1. Print your **Name** in the space provided and Shade the circle corresponding to your **Year** on the answer sheet.
2. Shade the circle corresponding to your answer with dark pencil on the answer sheet provided.
3. Multiple answers **will not be** accepted.

Year 11

1. Given that **a, b, c** are the elements of a set **p** which is associative .Which statement is correct about set **p**.

- A. $e \bullet a = a^{-1}$ B. $a \bullet a^{-1} = e$ C. $(a \bullet b) \bullet c = a \bullet (b \bullet c)$
 D. $a \bullet b = b \bullet a$ E. $a \bullet (b \# c) = a \bullet b \# a \bullet c$

2. If $x @ y = (x^2 - y)$, then $2 @ -3$ is :

- A. 2 B. 7 C. 10 D. -22 E. 14

3. A set $S = \{0, 1, 2, 3, 4\}$ is given under the operation ‘multiplication modulo 5’.

x	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	1	3
3	0	3	1	4	2
4	0	4	3	2	1

The inverse of 3 is:

- A. 0 B. 1 C. 2
 D. 3 E. 4

4. Jone and Sahil are jogging around a circular track in the park. The circumference of the track is 400m. Find the number of kilometres they jogged if they made two complete rounds around the track.

- A. 17 B. 16.6 C. 1600 D. 1.6 E. 16

5. The formula $C = \frac{5}{9}(F - 32)$ is used to convert temperature from Fahrenheit to degrees Celsius. If $C = 40^\circ$, Calculate F.

- A. 140 F B. 122F C. 232 F D. 392F E. 104 F

6. The expression: $(-8a^4b^2)(-5a^4b^4) \div (20a^3b^{-8})$ when simplified is equal to:

- A. $2a^5b^6$ B. $2a^5b^{14}$ C. $2a^{-5}b^{14}$ D. $2a^5$ E. $2a^5b^{-6}$

7. Which of the following relations is not a function?

- A. $y = x^2$ B. $y = 2x$ C. $1 = 2x + 2y$ D. $x^2 + y^2 = 1$ E. $y = 2x - 1$

8. The 10th term of the of the arithmetic sequence $\langle a, 2a, 3a, \dots \dots \rangle$ is:

- A. $50a$ B. $10a$ C. $1275a$ D. $2500a$ E. $2550a$

9. The vertex of the graph represented by the equation $y = (x + 2)^2$ is:

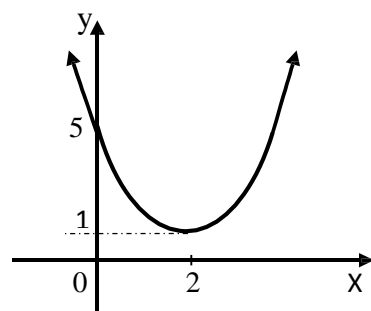
- A. (-2,-1) B. (-2,0) C. (2,-1) D. (2,1) E. (-1,-2)

10. The equation of the line that is parallel to $y = \frac{1}{2}x + 10$

- A. $y = 4x - 2$ B. $y = -2x + 4$ C. $y = -\frac{1}{2}x - 2$
 D. $y = -\frac{1}{2}x - 10$ E. $y = \frac{1}{2}x + 2$

11. The equation for the graph shown on the right is:

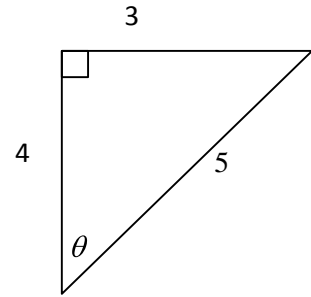
- A. $y = (x - 2)^2 + 5$ B. $y = (x + 2)^2 + 1$
 C. $y = (x - 2)^2 + 1$ D. $y = x^2 + 2x + 5$
 E. $y = (x - 2)^2 - 1$



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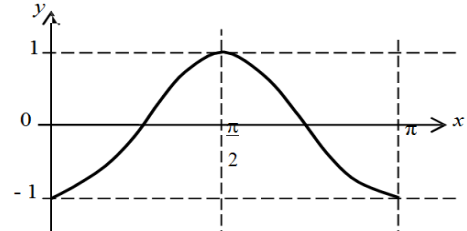
12. In the right angle triangle given on right, the value of $\tan \theta$ is equal to:

- A. $\frac{3}{5}$ B. $\frac{4}{5}$ C. $\frac{3}{4}$
D. $\frac{4}{3}$ E. $\frac{5}{3}$



13. The equation of the graph shown on right where $0 \leq x \leq \pi$ is

- A. $y = -\cos x$
B. $y = \cos(x + \pi)$
C. $y = \sin(x - \pi)$
D. $y = -\cos 2x$
E. $y = -\sin 2x$



14. Which of the following matrix is a singular matrix?

- A. $\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$ B. $\begin{pmatrix} 1 & 2 \\ 1 & 2 \end{pmatrix}$ C. $\begin{pmatrix} 1 & 1 \\ 2 & 1 \end{pmatrix}$ D. $\begin{pmatrix} 2 & 2 \\ 2 & 1 \end{pmatrix}$ E. $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$

15. The solution set of the trigonometric equation $\sin x = 0$ for $0^\circ \leq x \leq 360^\circ$ is:

- A. $x = (0, 180^\circ, 360^\circ)$ B. $x = (30^\circ, 120^\circ)$ C. $x = (120^\circ, 150^\circ)$
D. $x = (50^\circ, 210^\circ)$ E. $x = (30^\circ, 210^\circ)$

16. An athlete competes in the girls' discus event at school. She needs a mean distance of at least 39 m to qualify for the finals. Her first five throws have given her a mean distance of 38 m. What is the minimum distance she will need on her final throw (throw 6) to qualify?

- A. 39m B. 40m C. 42m D. 43m E. 44m

17. In an experiment, three students were asked whether they read daily newspaper or not. What is the probability that all three students say 'yes'.

- A. $\frac{7}{8}$ B. $\frac{3}{8}$ C. $\frac{1}{8}$ D. $\frac{5}{8}$ E. $\frac{6}{8}$

18. The table below shows the number of tries scored by a rugby club in a season.

Number of tries, x	1	2	3	4
Number of games, f	1	3	3	5

The **range(R)** and the **median(m)** of the number of tries scored are

- A. $R = 3, m = 3$ B. $R = 3, m = 4$ C. $R = 4, m = 3$.
D. $R = 4, m = 4$ E. $R = 4, m = 2$

19. A function, y , is given as $y = x^\pi$, where π is a constant. The derivative $\frac{dy}{dx}$ is equal to:

- A. $\frac{x^7}{7}$ B. x^6 C. 0 D. $6x^5$ E. $\frac{x^6}{6}$

20. The zeros of the cubic function: $F(x) = (x+2)(x+1)(x-1)$ is:

- A. $x = (-2, -1, 1)$ B. $x = (2, 1, 1)$ C. $x = (2, -1, 1)$
D. $x = (-2, -1, -1)$ E. $x = (-2, -1, 0)$

Year 11

21. After 20% discount, an item was sold for \$96. What was the original price of the item?

- A. \$76.80 B. \$115.20 C. \$120.00 D. \$101.00 E. \$116.00

22. The equation of a line which is perpendicular to the line $y = 2 - \frac{1}{2}x$ and passes through (0,1) is

- A. $y + x - 2 = 0$ B. $y + 2x - 1 = 0$ C. $2y - x + 2 = 0$
D. $y - 2x + 1 = 0$ E. $y + 2x - 1 = 0$

23. AB is diameter of a circle with the centre at (2, 0). If point A is at (-3, 2), then the coordinates of B are:

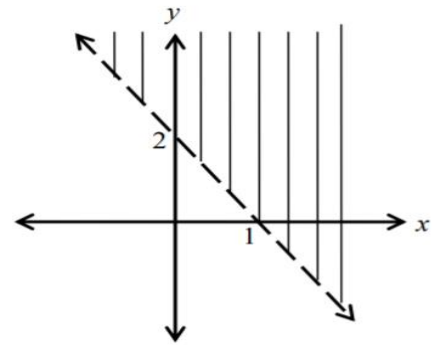
- A. (-7, 2) B. (-2, 7) C. (7, 2) D. (-2, -7) E. (7, -2)

24. The determinant of the matrix $\begin{pmatrix} 4 & 7 \\ 2 & 6 \end{pmatrix}$ is:

- A. 10 B. -10 C. 7 D. -7 E. 0

25. Which of the following inequality best fits the region given on the right?

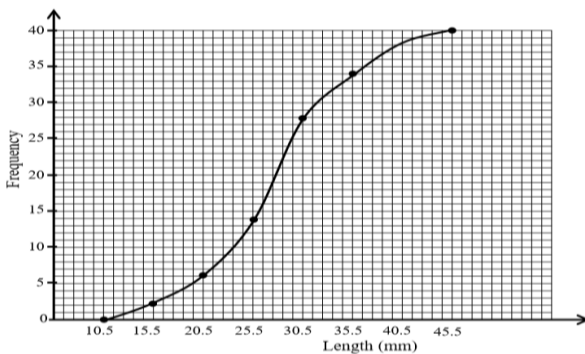
- A. $\{(x, y): y < -2x + 2\}$ B. $\{(x, y): y \leq -2x + 2\}$
C. $\{(x, y): y > -2x + 2\}$ D. $\{(x, y): y \geq -2x + 2\}$
E. $\{(x, y): y > 2x + 1\}$



26. The value of $\sum_{r=1}^3 (3X)$ is :

- A. 17 B. 15 C. 6
D. 9 E. 18

27. A Sample of leaves was collected from a flower garden and the length of the leaves was measured. The graph given below shows the result.



The inter quartile range is

- A. 8.5
B. 23.5
C. 32
D. 20
E. 10

28. What is the center of the circle $x^2 + y^2 = 9$?

- A. 6 B. 9 C. 3 D. 8 E. -9

29. The solution set for $3 - 2x - x^2 \leq 0$ is given by

- A. $x \geq -3$ or $x \geq 1$ B. $x \leq -3$ or $x \leq 1$ C. $x \leq 3$ or $x \geq 1$
D. $x \leq -3$ or $x \geq -1$ E. $x \leq -3$ or $x \geq 1$

30. Water in the tank is flowing at a rate of 10 litres per second. What volume of water is collected in the tank in 10 minutes.

- A. 600 litres B. 6000 litres C. 60000 litres D. 6 litres E. 9 litres