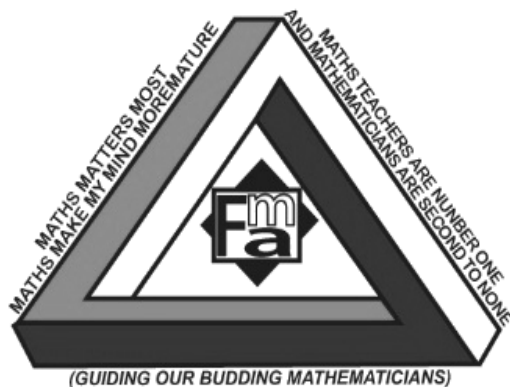


FIJI MATHEMATICS ASSOCIATION



FIJI MATHEMATICS COMPETITION (FMC) YEAR 11

Wednesday 6th September 2017

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. Write $(1 + \sqrt{5})^3$ in the form $\mathbf{a + b\sqrt{5}}$, where a and b are integers.
A. $12 + \sqrt{5}$ B. $12 + 8\sqrt{5}$ C. $16 + \sqrt{6}$ D. $16 + 8\sqrt{5}$ E. $16 + 8\sqrt{6}$
2. The area of a trapezium is given by $(x^2 + 5x + 6) \text{ cm}^2$. If the two parallel sides have lengths of $(x + 1) \text{ cm}$ and $(x + 5) \text{ cm}$, find the perpendicular height in terms of x .
A. $(x + 2) \text{ cm}$ B. $(x - 2) \text{ cm}$ C. $(x - 4) \text{ cm}$ D. $(x + 4) \text{ cm}$ E. $(x - 6) \text{ cm}$
3. What is the sum of the values of the y coordinates of the points of intersection of the line $y + 2x - 4 = 0$ and the hyperbola $y = \frac{x-2}{x+\frac{1}{2}}$?
A. 2 B. 4 C. 6 D. 8 E. 10
4. The mean of x , 3 , $4x - 3$, $x + 4$, -16 , 9 , and $x - 4$ is 4 . What is the median of the 7 numbers?
A. 2 B. 2.5 C. 3 D. 4 E. 5
5. Which of the following is the simplified form of $\frac{x^2 + 4x}{x^2 + x - 12}$?
A. $\frac{x+4}{x-3}$ B. $\frac{x-12}{4x}$ C. $\frac{x-3}{x}$ D. $\frac{x}{x-3}$ E. $x-3$
6. What is the exact value of $\sin 60^\circ$?
A. $\frac{1}{\sqrt{2}}$ B. $\frac{\sqrt{3}}{2}$ C. $\sqrt{3}$ D. $\frac{1}{2}$ E. $\frac{1}{\sqrt{3}}$
7. The roots of the equation $2x^2 - 10x + 12 = 0$ are
A. 5 and 6 B. -5 and -6 C. 2 and 3 D. -2 and -3 E. 2 and -3
8. The number of significant figures in the number 0.050502 is equal to
A. 8 B. 7 C. 6 D. 5 E. 4
9. Petrol and oil are mixed in the ratio 3:2 to make fuel for a lawn mower. How much oil will 15L of fuel contain?
A. 2000ml B. 3500ml C. 6000ml D. 5litres E. 6.5litres
10. $(0.2)^3 \times 0.8$ equals
A. 0.008 B. 0.16 C. 0.0064 D. 0.064 E. 0.64
11. The sum of the prime numbers between 50 and 60 is
A. 59 B. 112 C. 161 D. 167 E. 220
12. A traveller to NZ from Fiji receives 60cents in NZ currency for each of his Fiji Dollar. To receive 960 NZ dollars, the amount in Fiji dollars he would need to change is
A. \$576 B. \$600 C. \$960 D. \$1600 E. \$2000

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13. 8 men take 14 days to paint a building. How many days will 4 men take?
A. 4 B. 7 C. 14 D. 20 E. 28
14. The gradient of a straight line is $-\frac{3}{2}$ and it cuts the x-axis at the point (4,0). The equation of the line is
A. $2y+3x=8$ B. $2y+3x=12$ C. $y=\frac{-3}{2}x+4$ D. $2y=3x+4$ E. $2y=3x-8$
15. When simplified $2 \log 5 + \log 4 - \log 20$ equals
A. $\log 20$ B. $2 \log 5$ C. $\log 5$ D. $\log 4$ E. $\log 80$
16. When factorized $x^2 - 25$ is equal to
A. $x^2 - 5^2$ B. $(x-5)(x-5)$ C. $(x-5)(5+x)$
D. $(x+25)(x+25)$ E. $(x+5)(x+5)$
17. What is $-2xy^2 + 5x - 3xy^2 - 3x$ equal to?
A. $5xy^2 - 2x$ B. $5xy^2 - 8x$
C. $5xy^2 + 2x$ D. $7xy^2 + 2x$ E. $2x - 5xy^2$
18. Which of the following is an arithmetic sequence ?
A. $\langle 16, 8, 4, \dots \rangle$ B. $\langle 3, 6, 9, \dots \rangle$
C. $\langle 1, 5, 25, \dots \rangle$ D. $\langle 10, -20, 40, \dots \rangle$ E. $\langle 84, 256, 442, \dots \rangle$
19. The **determinant** of the following matrix is: $\begin{bmatrix} 5 & -6 \\ 2 & -3 \end{bmatrix}$
A. 3 B. 5 C. -3 D. 27 E. 32
20. The value for θ in $\sin \theta = 0.866$ is, where $0^\circ \leq \theta \leq 360^\circ$
A. 60° and 240° B. 60° and 120°
C. 60° and 300° D. 60° only E. 60° and 330°
21. The **mean** and **median** of the scores given on the right is:
A. 4 and 4
B. 6 and 8
C. 6 and 10
D. 8 and 8
E. 8 and 10
- | Score | Frequency |
|-------|-----------|
| 7 | 4 |
| 8 | 3 |
| 9 | 2 |
| 10 | 1 |
22. In a student council election, Sahiba received 60% of the votes and Abdul received all the rest. Sahiba received 55 more votes than Abdul. How many students voted?
A. 275 students B. 285 students C. 302 students D. 265 votes E. 145 votes

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23. Half the sum of 2 numbers is 15 and half their difference is 4. Which of the following represents the two equations?
- A. $(x + y) = \frac{15}{2}$ and $(x - y) = \frac{4}{2}$
- B. $15(x + y) = \frac{1}{2}$ and $4(x - y) = \frac{1}{2}$
- C. $\frac{1}{2}(x + y) = 15$ and $\frac{1}{2}(x - y) = 4$
- D. $\frac{1}{2} \times x + y = 15$ and $\frac{1}{2} \times x - y = 4$
- E. $x + y / 2 = 15$ and $2x + 2y = 15$
24. Which of the following correctly expresses n as the subject of $v = \frac{3mn^2}{r}$?
- A. $n = \pm \frac{v\sqrt{r}}{3m}$
- B. $n = \pm r \sqrt{\frac{v}{3m}}$
- C. $n = \pm \frac{r\sqrt{v}}{3m}$
- D. $n = \pm \sqrt{\frac{rv}{3m}}$
- E. $n = \pm \sqrt{\frac{3m}{rv}}$
25. How many square centimetres are in 0.0075 square metres?
- A. 0.75 B. 7.5 C. 75 D. 7500 E. 75000
26. Richard is a fisherman. John claims that Richard over-estimates the size of his fish by 25%. Richard describes one fish as 40cm long. What does John claim is the length of Richard's fish?
- A. 10cm B. 30cm C. 32cm D. 50cm E. 55cm
27. Five straight lines are drawn on the plane. The maximum possible number of intersection points of the five lines is:
- A. 10 points B. 8 points C. 6 points D. 4 points E. 2 points.
28. I am three times as old as my son. Five years later I shall be two and a half times as old as my son. What is my age?
- A. 25 years B. 35years C. 40 years D. 45years E. 50 years.
29. Three blocks and one top balance 15 marbles. One top balances one block and seven marbles. Find the number of marbles that balance one top.
- A. 2 marbles B. 3 marbles C. 6 marbles D. 8 marbles E. 9 marbles.
30. Two trains are approaching each other on a long straight section of track. One train is going 5 kilometres per hour and the other is going 3 kilometres per hour. At the time when the trains are 3 kilometres apart a mosquito starts flying from the front of the slower train towards the faster train. When it reaches the faster train it immediately turns around and flies back towards the slower train. If the trains are one kilometre apart when the mosquito first returns to the slower train, what is the speed at which the mosquito is flying, measured in kilometres per hour?
- A. 15km/hr B. 20 km/hr C. 7km/hr D. 32 km/hr E. 34 km/hr