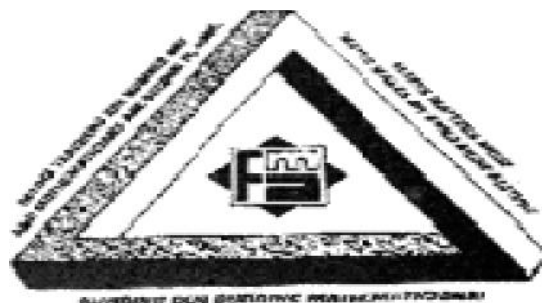


FIJI MATHEMATICS ASSOCIATION



FIJI MATHEMATICS COMPETITION

(FMC)

FORM 6

Thursday 11th July 2013

Time Allowed: 1 Hour 15 minutes

Note:

Calculators are NOT permitted.

Diagrams are NOT drawn to scale.

Instructions:

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

1. Which of the following is NOT true?

A. $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

B. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

C. $\sqrt{a+b} = \sqrt{a} + \sqrt{b}$

D. $\sqrt{a^2} = a$

E. $(\sqrt{a})^2 = a$

2. Which of the following is equivalent to $\log 32$?

A. $\log 8 - \log 4$

B. $\log 8 + \log 4$

C. $\log 8 \times \log 4$

D. $\log \frac{8}{4}$

E. $\frac{\log 8}{\log 4}$

3. Which of these equations has equal roots?

A. $x^2 = -7x - 12$

B. $x^2 = -4x$

C. $x^2 = 2x - 1$

D. $x^2 = -16$

E. $x^2 - 3x + 2 = 0$

4. For a set of numbers, which of the following changes would NOT affect their standard deviation?

A. Multiply all the numbers by 3

B. Multiply some the numbers by 3

C. Dividing all the numbers by 3

D. Increase all the numbers by 3

E. Dividing all the numbers by 0

5. The matrix that represents a reflection in the x axis is

A. $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

B. $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

C. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

D. $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$

E. $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

6. The slope and the y-intercept of the line $2x + 6y = 4$ are respectively.

A. 2, 4

B. -2, 4

C. $\frac{1}{3}, \frac{-2}{3}$

D. $\frac{-1}{3}, \frac{2}{3}$

E. 2, 6

7. Three fair coins are tossed. The probability of getting one head and two tails in any order is

A. $\frac{3}{8}$

B. $\frac{1}{8}$

C. $\frac{1}{4}$

D. $\frac{5}{8}$

E. $\frac{1}{2}$

8. The value of $\sum_{m=0}^3 \frac{1}{m+1}$

A. 0

B. $\frac{13}{12}$

C. $\frac{25}{12}$

D. $\frac{1}{4}$

E. $\frac{1}{2}$

9. A function is defined as $g(x) = \frac{10}{x-2} + 3$. Which of the equations given below is the equation of the horizontal asymptote of $g(x)$.

A. $y = 3$

B. $x = 2$

C. $y = 2$

D. $x = 2$

E. $y = -2$

10. Solve for x in the equation $\frac{5(6x^2-14)}{2} + 7 = 32$

A. $x = 2$

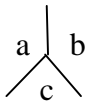
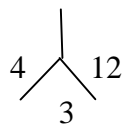
B. $x = -2$

C. $x = \frac{1}{2}$

D. $x = \pm 2$

E. $x = \frac{-1}{2}$

11. If $0 < x < 90$ and $\sin x = \frac{3}{5}$, then what is the value of $\tan x$?
 A. $\frac{4}{5}$ B. $\frac{3}{4}$ C. $\frac{4}{3}$ D. $\frac{5}{3}$ E. $\frac{5}{4}$
12. The mean mark in a mathematics quiz for a class of 30 students is 47.5. If the mark for one student was later reduced by 9, the new mean would be
 A. 57.5 B. 47.5 C. 47.2 D. 37.5 E. 57.2
13. 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. $y + 2x - 1 = 0$
14. The sum of the first ten terms of the arithmetic sequence $\langle 16, 13, 10, \dots \rangle$ is
 A. -3 B. -11 C. 11 D. 8 E. 25
15. Simplify the expression $(-8a^4b^2)(-5a^4b^4) \div (20a^3b^{-8})$
 A. $2a^5b^6$ B. $2a^5b^{14}$ C. $2a^{-5}b^{14}$ D. $2a^5$ E. $2a^5b^{-6}$
16. The line $y = 3 - x$ intersects the parabola $y = 3x - x^2$ in two points (x_1, y_1) and (x_2, y_2) . What is $y_1 + y_2$.
 A. 1 B. 3 C. 4 D. 0 E. 2
17. The value of p for which $(x - 2)$ is a factor of $f(x) = x^3 + 2x^2 - px - 6$ is
 A. 5 B. 4 C. 2 D. -2 E. -5
18. In form 601, the probability that Alpana has a handkerchief is 0.54 and the probability that she has a home-made lunch is 0.68. The probability that she has both a handkerchief and a home-made lunch is 0.25. What is the probability that Alpana will have either a handkerchief or a home-made lunch?
 A. 0.03 B. 0.29 C. 0.43 D. 0.97 E. 0.68
19. What is the equation of the line passing through the points $(a, 2b)$ and $(a, 3b)$?
 A. $x = a$ B. $y = a$ C. $y = x - b$ D. $y = x + b$ E. $y = x + a$
20. If matrix $M = \begin{pmatrix} 2 & 4 \\ 1 & -3 \end{pmatrix}$ then $|M|$ equals
 A. 11 B. -2 C. -6 D. 2 E. -10
21. Navneet and Ashneel placed pieces of coloured paper in an envelope. There are 3 red, 2 green and 4 yellow pieces. A piece is withdrawn at random from the envelope and without replacement another piece is drawn. The probability that both the pieces drawn are red is
 A. $\frac{1}{3}$ B. $\frac{2}{27}$ C. $\frac{1}{9}$ D. $\frac{1}{12}$ E. $\frac{2}{3}$
22. Sweta Raj is a great mathematician. She has a set of five numbers. The average of the first three is 20 and the average of the last two is 10. What is the average of all the five numbers?
 A. 6 B. 16 C. 13 D. 15 E. 30

23. If $\frac{m}{m+2n} = -3$, then the value of $\frac{m}{n}$ is
 A. $\frac{1}{2}$ B. $\frac{-3}{2}$ C. 1 D. $\frac{-2}{3}$ E. $\frac{3}{2}$
24. The expression $1 - \frac{1}{1+\sqrt{3}} + \frac{1}{1-\sqrt{3}}$ in simplest surd form equals:
 A. $1 - \sqrt{3}$ B. 1 C. 2 D. $\frac{1}{1-\sqrt{3}}$ E. $\frac{1}{1+\sqrt{3}}$
25. The average of three numbers is 5. The average of their reciprocals is $\frac{17}{72}$. Their product is 96. What is the median of the three numbers?
 A. 4 B. 3 C. 2 D. 8 E. 6
26. Simplify $\frac{a^n \times a^{n+2}}{a^5}$
 A. a^{n+3} B. a^{2n+3} C. a^{2n+2} D. a^{n-3} E. a^{2n-3}
27. Shishneel placed tennis balls in cylindrical containers which contains 3 balls in close fit, that is the balls touch the sides, top and bottom of the container. What fraction of the volume of the container is occupied by the balls? (Volume of sphere is $\frac{4}{3}\pi r^3$).
 A. $\frac{1}{3}$ B. $\frac{1}{2}$ C. $\frac{r^3}{3}$ D. $\frac{2r^2}{h}$ E. $\frac{2}{3}$
28. All prices are to rise by 10% as a result of a new tax. Raj, a shopkeeper increases the cost of a particular item by \$5 before the new tax comes into effect. As a result of the 2 price rises, this item now costs \$55. What was the original cost of the item?
 A. \$49.50 B. \$50 C. \$45 D. \$40 E. \$45.50
29.  means $\frac{ab}{c} + \frac{bc}{a} + \frac{ac}{b}$, what is the value of 
 A. 26 B. 29 C. 24 D. 28 E. 12
30. Solve $3^{2x} - 10 \times 3^x + 9 = 0$ (Hint: Let $A = 3^x$)
 A. $x = 2$ B. $x = 0$ C. $x = -1$ D. $x = -2$ E. $x = 0$ and $x = 2$