

1. The product  $p^6 \times p^2 \times p$  equals
- A.  $p^9$       B.  $p^{10}$       C.  $p^{12}$       D.  $p^{62}$
2. Which of the following surds is equal to  $\sqrt{20}$  ?
- A.  $2\sqrt{5}$       B.  $4\sqrt{5}$       C.  $\pm 2\sqrt{5}$       D.  $\pm 4\sqrt{5}$
3. The expression  $\log 8 + \log 4$  can be simplified to
- A.  $\log 32$ .      B.  $\log 12$       C.  $\log 4$       D.  $\log 2$
4. When simplified  $8 + \sqrt{7} + 6\sqrt{7}$  is equal to
- A.  $8 + 7\sqrt{7}$       B.  $14 + 2\sqrt{7}$       C.  $\sqrt{57}$       D.  $\sqrt{28}$
5. If a polynomial  $f(x)$  is divided by  $x + 2$ , the **remainder** is
- A.  $f(-2)$       B.  $f(2)$       C.  $f(x + 2)$       D.  $f(x - 2)$
6. The graph of  $y = f(-x)$  is obtained by **reflecting** the graph of  $y = f(x)$  in the
- A.  $x$  - axis.      B.  $y$  - axis.      C. line  $y = x$ .      D. line  $y = -x$ .
7.  $\sqrt{9^{16}x^2}$  is equal to
- A.  $3^{4x}$ .      B.  $9^{8x^2}$ .      C.  $\pm 3^{4x}$ .      D.  $\pm 9^{8x^2}$
8. The solution to  $x^2 \leq 4$  is
- A.  $x \leq \pm 2$       B.  $-2 \leq x \leq 2$       C.  $-2 < x < 2$       D.  $x \leq 2$
9. When simplified  $(4^3)^2$  is equal to
- A.  $4^5$       B.  $4^6$       C.  $4^9$       D.  $4^{32}$
10.  $\frac{-1}{2+\sqrt{3}}$  is equivalent to
- A.  $-2 - \sqrt{3}$       B.  $\sqrt{3} - 2$       C.  $2 + \sqrt{3}$       D.  $2 - \sqrt{3}$

11. The sum of the first  $n$  terms of a sequence is  $2n^2 + 3$ . The first two terms of the sequence are  
 A.  $\langle 3, 2, \dots \rangle$     B.  $\langle 3, 5, \dots \rangle$     C.  $\langle 5, 6, \dots \rangle$     D.  $\langle 5, 11, \dots \rangle$
12. What is the value of  $9\sin^2\theta + 9\cos^2\theta$ ?  
 A. 0    B. 1    C. 9    D. 18
13. In which quadrant is the sine of an angle positive but its cosine is negative?  
 A. 4<sup>th</sup>    B. 3<sup>rd</sup>    C. 2<sup>nd</sup>    D. 1<sup>st</sup>
14. The solution set of  $|5 - 3x| \geq 1 - x$  is  
 A.  $x \geq 1.5$     B.  $1.5 \leq x \leq 2$     C. Real numbers    D. Integers
15. If you begin reading at the top of page  $x$  of your favourite story book and stop reading at the bottom of page  $y$ , the number of pages you have read is  
 A.  $x - y$     B.  $y - x$     C.  $y - x + 1$     D.  $y - x - 1$
16. The range of the relation  $(x - 3)^2 + (y - 5)^2 = 4$  is  
 A.  $3 \leq y \leq 4$     B.  $3 \leq y \leq 5$     C.  $1 \leq y \leq 9$     D.  $3 \leq y \leq 7$
17. A square is transformed by the matrix  $\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$ .  
 By what factor does the length of the square increase?  
 A. 9    B. 6    C. 4    D. 3
18. A cube of edge length 3 units is painted. It is then cut into 27 one-unit cubes.  
 How many faces of the one-unit cubes are not painted?  
 A. 27    B. 54    C. 100    D. 108
19. An aeroplane takes 2 hours and 15 minutes to fly from Island A to Island B. If it were to decrease its speed by 10%, how long would the trip take?  
 A. 135 min    B. 1h 50 min    C. 2h 20 min    D. 2h 30 min
20. Deepa has 450g of salt and flour mix. How many grams of flour should she add to reduce the percentage of salt in the mixture to 90% of what it was?  
 A. 10    B. 30    C. 45    D. 50

21. The 5 tyres of a car ( 4 road tyres and a spare) were each used equally on a car that had travelled 25 000km. The number of kilometres of use of each tyre was
- A. 20 000                      B. 10 000                      C. 6250                      D. 5 000
22. The value of  $2^{2024} + 2^{2024}$  is
- A.  $2^{2025}$                       B.  $2^{4048}$                       C.  $4^{2024}$                       D.  $4^{4048}$
23. A car 3.5 m long is travelling at 70km/h and overtakes a 16.5 m long truck in 7.2 s. What is the speed of the truck?
- A. 60km/h                      B. 65km/h                      C. 69km/h                      D. 80km/h
24. How many multiples of 4 are there between 1 and 999?
- A. 249                      B. 250                      C. 349                      D. 999
25. A set of scores has a standard deviation of 9. If each score is **multiplied** by 10, the **new** standard deviation will be
- A. 90                      B. 19                      C. 10                      D. 9
26. A set of quiz scores is normally distributed with mean of 20 and standard deviation of 4. Within which interval will the quiz scores **very probably** lie?
- A. 8 to 20                      B. 12 to 28                      C. 16 to 24                      D. 8 to 32
27. Which of the following line represents an asymptote of  $y = \frac{x}{x-2}$ ?
- A.  $x = -2$                       B.  $y = 1$                       C.  $x = 1$                       D.  $y = 2$
28. Ryan rolls a pair of standard 6-sided fair dice. The probability of getting a four and a three is
- A.  $\frac{2}{6}$                       B.  $\frac{2}{36}$                       C.  $\frac{1}{36}$                       D. 1
29. For which value of  $x$  is  $x(x - 2)$  a minimum?
- A. 2                      B. 1                      C. 0.5                      D. 0
30. For a function  $f(x)$ ,  $f'(x) = -2x$ . The function  $f(x)$  is increasing in the interval
- A.  $x \leq 0$                       B.  $x < 0$                       C.  $x > 0$                       D.  $x \geq 0$