

Mathematics

1. If the set $A \subseteq B$, which statement below is true ().
- A) $A \cup B = \mathbb{R}$ B) $A \cap B = A$
C) $A \cap B = B$ D) $A \cap B = \emptyset$
2. If $U = \{1, 2, 3, 4\}$, $A = \{1, 3\}$, then the complementary set $C_U A = ()$.
- A) $\{2, 4\}$ B) $\{1, 3\}$ C) $\{1, 2, 3, 4\}$ D) $\mathbb{R}$
3. If $ac > bc$, then ().
- A) $a > b$ B) $a < b$ C) $c > 0$ D) $c \neq 0$
4. The domain of the function $y = \log_2(x-2)$ is ().
- A) $\{x | x > -2\}$ B) $\{x | x > 0\}$ C) $\{x | x > 2\}$ D) $\{x | x \neq 2\}$
5. $y = \sin^2 x$ is a(n) () function.
- A) odd B) even C) neither even nor odd D) monotonic
6. The function $y = \cos x$ is increasing on ().
- A) $[0, \pi]$ B) $[\pi, 2\pi]$ C) $[-\frac{\pi}{2}, \frac{\pi}{2}]$ D) $[\frac{\pi}{2}, \frac{3\pi}{2}]$
7. $\tan \alpha = -\frac{4}{3}$, $\pi < \alpha < 2\pi$. Then $\sin \alpha = ()$.
- A) $-\frac{3}{5}$ B) $-\frac{4}{5}$ C) $\frac{4}{3}$ D) $\frac{3}{4}$
8. The Inverse function of $y = x^2 + 1 (x > 0)$ is ().
- A) $y = -\sqrt{x-1}$ B) $y = -\sqrt{x+1}$ C) $y = \sqrt{x-1}$ D) $y = \sqrt{x+1}$

9. $\tan \frac{2\pi}{3} = (\quad)$.

- A) $-\frac{1}{2}$ B) $-\frac{\sqrt{3}}{2}$ C) $-\frac{\sqrt{3}}{3}$ D) $-\sqrt{3}$

10. The geometric mean of 4 and 9 is ().

- A) 6 B) ± 6 C) $13/2$ D) $\pm 13/2$

11. Let $\{a_n\}$ be an arithmetic sequence and $a_2 + a_3 + a_4 = 6$. Then $a_3 = (\quad)$.

- A) 1 B) 2 C) 3 D) 4

12. M and $N(1,2)$ are two points symmetric about the origin. The coordinate of M is ().

- A) $(-1,2)$ B) $(1,-2)$ C) $(-1,-2)$ D) $(2,1)$

13. The line l is perpendicular to the line $2x + y = 0$, The slope of l is ().

- A) 2 B) -2 C) $-\frac{1}{2}$ D) $\frac{1}{2}$

14. If $\sin \alpha = -\frac{1}{3}$, then $\cos \alpha = (\quad)$.

- A) $\frac{2}{3}$ B) $\pm \frac{2}{3}$ C) $\pm \frac{2\sqrt{2}}{3}$ D) $\frac{2\sqrt{2}}{3}$

15. Which line below is parallel to the line $2x + 4y - 1 = 0$ ().

- A) $x - 2y - 1 = 0$ B) $x + 2y - 1 = 0$
C) $x - 2y - \frac{1}{2} = 0$ D) $x - 2y + \frac{1}{2} = 0$

16. If $\cos \alpha = \frac{1}{2}$, then $\cos 2\alpha = (\quad)$.

- A) $1/2$ B) $-1/2$ C) $7/8$ D) $-7/8$

17. The crossing point between the lines $x+y=0$ and $2x-y-3=0$ is ().

- A) (1,1) B) (1,-1) C) (-1,1) D) (-1,-1)

18. The center point of the circle $x^2 + y^2 - 2x - 1 = 0$ 的圆心坐标是().

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

19 The eccentricity of the hyperbola $2x^2 - y^2 = 2$ is ().

- A) $\frac{\sqrt{3}}{3}$ B) $\sqrt{3}$ C) 1 D) $\frac{\sqrt{2}}{2}$

20 Which statement below is true ()

- A) $\sin 380^\circ > 0$ B) $\cos 200^\circ > 0$
C) $\tan 190^\circ < 0$ D) $\sin 310^\circ > 0$