# College of Charleston
Math Meet 2026
Written Test – Level 1

1. Factor $x^2 + 2ax + a^2 - bx - ba - cx - ca$ completely. *One* of the factors is:
   (A) $x - a$ (B) $x - a - b - c$ (C) $x + a - b - c$
   (D) $x + a + b + c$ (E) $x + b$

2. A boat is anchored in the middle of a still lake when its fuel tank begins to leak, causing a circular slick on the surface of the lake. If the radius of the slick is growing at a constant rate of 2 ft/min, approximately how much area will the slick cover after 1 hour?
   (A) $(120)^2 \pi$ square feet (B) $(60)^2 \pi$ square feet (C) $(120)\pi$ square feet
   (D) $(240)^2 \pi$ square feet (E) 240π square feet

3. How many positive integers between 100 and 999 are divisible by 7?
   (A) 126 (B) 127 (C) 128 (D) 129 (E) 130

4. What is $a + b$ if the five digit number $19a9b$ is divisible by 36?
   (A) 8 (B) 12 (C) 13
   (D) 15 (E) none of these

5. Find all real solutions of $8^{(x^2-x)/3} = 4^{x-1}$. Add the solutions together. The result is:
   (A) -2 (B) 2 (C) 3
   (D) 5 (E) None of these

6. Some positive integers can be written as a sum of two nonzero perfect squares. For example, $17 = 1 + 16$ and $18 = 9 + 9$. It happens to be true that there are two different ways to write 185 as a sum of two nonzero perfect squares. $185 = 16 + 169$ and $185 = 64 + 121$. What is the smallest number that can be written as a sum of two nonzero perfect squares in two different ways?
   (A) 61 (B) 65 (C) 72
   (D) 185 (E) none of these

7. Which of the following is equivalent to "If I'm an alien, then I'm not a hairy frog"?
   (A) If I'm a hairy alien, then I'm not a frog
   (B) If I'm not hairy, then I'm an alien frog
   (C) If I'm not a hairy frog, then I'm not an alien
   (D) If I'm an alien frog, then I'm hairy
   (E) none of these

8. If 70% of the population of North America have seen the Atlantic Ocean and 60% have seen the Pacific Ocean, what is the smallest possible value for the percentage of North Americans who have seen both oceans?
   (A) 42% (B) 60% (C) 70% (D) 30% (E) 20%

9. Let C be the circle of radius $\sqrt{5}$ centered at $(5, 0)$. Find the set of all numbers m such that $y = mx$ intersects C **twice**.

   (A) $[0, 1)$ (B) $[-1, 1]$ (C) $(-1/2, 1/2)$

   (D) $(-1/\sqrt{3}, 1/\sqrt{3})$ (E) $[-1/\sqrt{5}, 1/\sqrt{5}]$

10. Circle C_1 has radius 2 and is centered at the point $(0, 0)$. Circle C_2 has radius 2 and is centered at the point $(0, 2)$. Find the distance between the points of intersection of C_1 and C_2.

    (A) $\sqrt{3}$ (B) $2\sqrt{3}$ (C) $2\sqrt{2}$

    (D) $3\sqrt{2}$ (E) None of these

11. The points $(1, 3)$ and $(7, 11)$ are vertices of a square at opposite ends of a diagonal of the square. Find the coordinates of the other vertex of the square that has $x > 1$.

    (A) $(6, \dfrac{11}{2})$ (B) $(\dfrac{20}{3}, 5)$ (C) $(12, 1)$

    (D) $(8, 4)$ (E) none of these

12. A circle is inscribed in a square. The square is inscribed in another circle. If the radius of the smaller circle is r, what is the ratio of the area of the smaller circle to the area of the larger circle?

    (A) 2 (B) $1/2$ (C) 4 (D) $1/4$ (E) $2/r$

13. How many rectangles are in the accompanying figure?
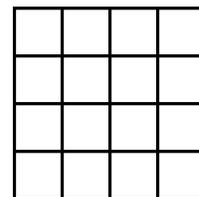
    (A) 30   (B) 50   (C) 60   (D) 81   (E) 100

14. If we rotate the curve $y = x^2 - 2x + 2$ by $180°$ around the point $(3, 2)$, what curve do we get?

    (A) $y = -x^2 + 10x - 22$ (B) $y = x^2 - 10x + 28$ (C) $y = -x^2 - 2x - 2$

    (D) $y = x^2 + 2x - 2$ (E) none of these

15. Vertices P, Q, and R of parallelogram $PQRS$ lie on a circle, while vertex S lies inside the circle (see diagram). Line QS intersects the circle at point T. If angle PTR is 60 degrees and angle SPT is 25 degrees, what is angle TRS in degrees?
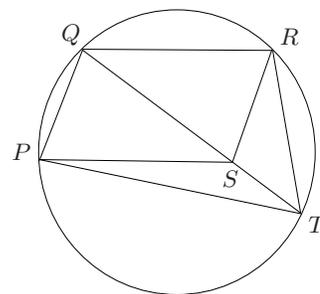
    (A) 20   (B) 25   (C) 30   (D) 35   (E) 40

16. Express the number
$$0.\overline{21} = 0.21212121\ldots$$
    as a rational number a/b in lowest terms. What is $a + b$?

    (A) 20 (B) 40 (C) 60 (D) 80 (E) 189

17. Find the units digit of $1! + 2! + 3! + 4! + \cdots + 1000!$
    (A) 1   (B) 3   (C) 5   (D) 7   (E) 9

18. Let $p(x)$ be a polynomial of the form $p(x) = ax^2 + bx + a$ which has $(3x - 2)$ as a factor.
    What is $\dfrac{p(0)}{p(1)}$?
    (A) -6 (B) -5 (C) 0 (D) 5 (E) 6

19. Find the number of real solutions to the equation

$$x^5 + x^4 + x^3 + x^2 + x + 1 = 0.$$

    (A) 5   (B) 4   (C) 3   (D) 2   (E) 1

20. When all of the students at her school were ranked according to their academic performance (with no ties), Sue happened to be both the 50th best and the 50th worst. How many students attend her school?
    (A) 50   (B) 75   (C) 99   (D) 100   (E) 101

21. A pair of dice is tossed. Find the probability that the sum of the dots on the top of the dice is less than 4.
    (A) $\dfrac{1}{18}$ (B) $\dfrac{1}{12}$ (C) $\dfrac{1}{4}$
    (D) $\dfrac{1}{3}$ (E) none of these

22. A signal is made by placing 3 flags, one above the other, on a flagpole. If there are 7 flags available and each one looks different than the others, how many signals are possible?
    (A) 21 (B) 210 (C) 35 (D) 350 (E) 735

23. A coin is biased so that the probabilities of heads and tails are $2/3$ and $1/3$ respectively. A second coin is biased so that the probabilities of heads and tails are $3/5$ and $2/5$ respectively. If both coins are tossed, find the probability of at least one head.
    (A) $\dfrac{13}{15}$ (B) $\dfrac{2}{5}$ (C) $\dfrac{8}{15}$
    (D) $\dfrac{3}{5}$ (E) None of the above

24. A line through the point $(-4, 1/2)$ and perpendicular to $x - 2y + 10 = 0$ has equation $2X + BY + C = 0$. The value of C is
    (A) -8.5 (B) -5 (C) 5
    (D) 7.5 (E) none of these

25. Let A be the point $(1, 1)$, B be the point $(-5, 13)$, and C be the point $(6, 8)$. Let P be the point on segment AB so that the area of $\triangle APC$ is half of the area of $\triangle ABC$. What is P?
    (A) $(-1, 5)$ (B) $(-2, 7)$ (C) $(-3, 9)$
    (D) $(-4, 11)$ (E) none of these

2026 Answers / Level 1 Test

1.	C	10.	B	19.	E
2.	A	11.	D	20.	C
3.	C	12.	B	21.	B
4.	A	13.	E	22.	B
5.	C	14.	A	23.	A
6.	E	15.	D	24.	D
7.	A	16.	B	25.	B
8.	D	17.	B		
9.	C	18.	A		