2026 SCSU MATH CONTEST
9^{th} and 10^{th} GRADE

DIRECTIONS: Select the BEST completion or response from among those given. Scientific and graphing calculators are allowed. Symbolic calculators are not allowed.

1. Welcome to the 2026 SCSU Math Contest! The first year SCSU hosted a math contest was 1968. In the table shown below, the number 1968 appears exactly once (in one row and one column). What is the sum of the number at the left of that row and the number at the top of that column?

   A. 13
   B. 48
   C. 89
   D. 139
   E. None of these

1	3	5	7	9	⋯
2	6	10	14	18	⋯
4	12	20	28	36	⋯
8	24	40	56	72	⋯
⋮	⋮	⋮	⋮	⋮	⋱

2. Aja's favorite numbers are a and b, and her favorite polynomial is $2x^3 - ax + b$. Two factors of Aja's favorite polynomial are $x + 2$ and $x - 1$. What is the value of $a + b$?

   A. 2 B. 5 C. 7 D. 10 E. 11

3. If the line $y = mx + 2$ intersects the circle $x^2 + y^2 = 1$ exactly once, then the value(s) of m is (are)…

   A. 2 B. ± 2 C. $\pm\frac{3}{2}$ D. $\pm\sqrt{2}$ E. $\pm\sqrt{3}$

4. The sum of three consecutive counting numbers is $\frac{1}{8}$ of their product. What is the smallest of the three counting numbers?

   A. 4 B. 6 C. 9 D. 12 E. 18

5. Suppose that Adam, Bethany, Carlos, Diana, Elijah, and Faisal buy movie tickets in the same row to sit next to each other during the movie. In how many ways can the six of them be arranged if Adam and Carlos must sit next to each other and Diana must sit at one of the ends?

   A. 24 B. 48 C. 72 D. 96 E. 120

6. If $\frac{b}{a} = 2$ and $\frac{c}{b} = 3$, then $\frac{a+b}{b+c} = \ldots$

   A. $\frac{1}{3}$ B. $\frac{3}{8}$ C. $\frac{3}{5}$ D. $\frac{2}{3}$ E. $\frac{3}{4}$

7. The ones digit of the number 3^{2026} is …

   A. 1 B. 3 C. 5 D. 7 E. 9

8. Lana was researching local history of science inventions when she came across an obscure research paper. In it, a new method of making a certain chemical was discussed, stating that the method needs to be performed at 150 degrees. Unfortunately, the author was using an unusual temperature scale with degrees in $°S$. The paper mentioned that water freezes at 50 $°S$ and boils at 200 $°S$. Assuming all temperature scales are linear, convert the stated $150°S$ into Fahrenheit ($°F$). Lana knows water freezes at $32°F$ and boils at $212°F$.

   A. $120°F$ B. $152°F$ C. $176°F$ D. $180°F$ E. Not enough information

9. The difference of two positive integers is 6 and the difference of their squares is 48. What is the sum of these two integers?

A. 4 B. 8 C. 16 D. 21 E. 42

10. How many collections of four letters that begin with the letter A or end with the letter C, *but not both*, can be formed using the first nine letters of the alphabet if letters may be repeated?

A. 560 B. 672 C. 1296 D. 1458 E. 1620

11. If the population of bacteria doubles every 20 minutes, how many minutes (to the nearest minute) does it take the population to triple?

A. 30 B. 32 C. 36 D. 40 E. 42

12. A student attempted to compute the average, A, of x, y, and z by computing the average of x and y, and then computing the average of the result and z. Whenever $x < y < z$, the student's final result is …

A. always greater than A.
B. always less than A.
C. sometimes less than A and sometimes equal to A
D. sometimes greater than A and sometimes equal to A
E. always correct.

Residents	2	3	4	5	6	7
Households	2	10	29	x	5	1

Chart for #13

13. A survey of households is conducted and the number of residents in each household is recorded. The results are shown in the chart (above, right) but the number of households with 5 residents is missing. You know, though, that the mean number of residents in the households surveyed is 4.2. How many households were part of the survey?

A. 13 B. 20 C. 53 D. 54 E. 60

14. Find the sum of the distinct real solutions to the equation $|x^2 + 6x + 7| = 2$.

A. -9 B. -6 C. 0 D. 6 E. 9

15. Suppose you choose to make completely random guesses on the last three questions on this contest exam. What is the probability that you will answer at least two of the three questions correctly?

A. $\frac{4}{125}$ B. $\frac{12}{125}$ C. $\frac{13}{125}$ D. $\frac{36}{125}$ E. $\frac{61}{125}$

16. A rectangle of height w is inscribed in a semicircle of diameter 8. What is the area of the rectangle?

A. $2w\sqrt{2}$ B. w^2 C. $2w^2$ D. $2w\sqrt{32-2w^2}$ E. $2w\sqrt{16-w^2}$

17. A bag contains 2 pennies, 4 nickels, and 6 dimes. Six coins are drawn without replacement. If each coin has an equal probability of being drawn, what is the probability that the value of the coins drawn is at least 50 cents?

A. $\frac{1}{924}$ B. $\frac{37}{924}$ C. $\frac{127}{924}$ D. $\frac{5}{12}$ E. $\frac{181}{924}$

18. A pair of 10-sided dice are rolled. What is the probability that the sum of the dice is a prime number?

A. 0.3 B. 0.34 C. 0.36 D. 0.37 E. 0.4

19. Solve: $\frac{2}{x+2} \geq \frac{3}{x-1}$.

A. $[-8, \infty)$ B. $[-8, -2) \cup (1, \infty)$ C. $(-\infty, -8] \cup (-2, 1)$ D. $(-\infty, -8]$ E. $[-8, -2)$

20. Kris and Sue are walking at constant rates in opposite directions along the same route between A and B. Sue starts at A and Kris starts at B. They start at the same time and pass each other 3 hours later. Sue arrives at B 2.5 hours before Kris arrives at A. How many hours did it take Kris to walk from B to A?

A. 6 B. 6.5 C. 7 D. 7.5 E. 8

21. A triangle with sides of length 5, 5, and 6 units has area t. A triangle with sides of length 5, 5, and 8 units has area s. A rectangle with sides lengths of 3, 4, 3, and 4 units has area r. Which one of the following statements is true?

A. $t < s < r$ B. $s < t = r$ C. $r < t < s$ D. $r = t < s$ E. $r = s = t$

22. Ash constructs a geometric sequence and an arithmetic sequence, each starting with 9, such that the square of half of the seventh term of the arithmetic sequence equals the third term of the geometric sequence. What is the difference between the common ratio of the geometric sequence and the common difference of the arithmetic sequence, rounded to 1 decimal place?

A. 1.2 B. 1.5 C. 2.1 D. 3.0 E. Not enough information

23. In the figure below (left) two triangles are situated with sides on the x- and y- axes. Point A has coordinates (0,5), $m\angle AOB = 30°$ and $m\angle ABC = 150°$. What is the length of segment $\overline{OC}$?

A. $\frac{5\sqrt{3}}{3}$ B. $\frac{10\sqrt{3}}{3}$ C. $5\sqrt{3}$ D. 10 E. $\frac{20\sqrt{3}}{3}$

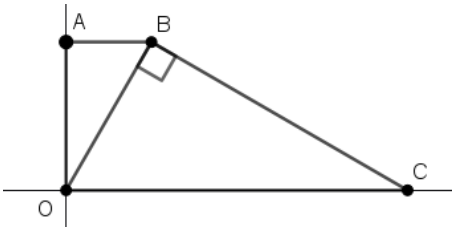

Figure for #23

	Positive result	Negative result
Accurate result	46	8,159
Inaccurate result	1,791	4

Chart for #24

24. A medical company is researching a new diagnostic exam to screen for a disease and they know that 50 of the 10,000 people participating in the research project have that disease. They also know that, sometimes, the diagnostic exam can be inaccurate. Above (right) is a chart with the results of the research (for example, 46 participants had the disease AND tested positive for it). If an individual receives a positive test result, rounded to the nearest tenth of a percent, what is the probability they actually have the disease?

A. 0.5% B. 2.5% C. 80.4% D. 92% E. Not enough information

25. Working alone, it would take Moe 10 hours, Larry 12 hours, and Curly 14 hours to paint a particular room. They plan on working together, though, with Moe and Larry working together for the first three hours and then Curly taking over for Larry to finish the job with Moe. Rounded to the nearest minute, how long would it take for them to paint the room?

A. 2 hrs, 38 min B. 2 hrs, 45 mins C. 4 hrs D. 5 hrs, 38 mins E. 5 hrs, 45 mins

26. An analog clock is manufactured incorrectly such that its minute hand rotates at half of the normal speed (in other words, it takes two hours for the minute hand to complete a full revolution) but the hour hand completes a revolution in the standard twelve hours. Both hands move independently of each other and clockwise. Assume the clock starts at 12:00 with the hour and minute hands aligned and consider the next point at which they will be aligned. What is the sum of the hour shown on the clock by the hour hand and the minutes shown on the clock by the minute hand at that next point of alignment?

A. 12 B. 13 C. 14 D. 25 E. 26

27. Consider the equation $\sqrt{3x+k} - \sqrt{2x-4} = 2$. If the sum of the solutions is 24, find k.

A. -3 B. -2 C. 2 D. 4 E. 6

28. All variables below represent positive integers greater than 1 (not necessarily distinct) that satisfy the three equations to the right:

$$k \cdot m = 1{,}001$$
$$j + k + l = 12$$
$$\frac{k \cdot l \cdot m}{39} = r$$

What is the value of j?

A. 1 B. 2 C. 3 D. 4 E. Not enough information

29. A point is located in the interior of a rectangle so that its distances from two opposite corners are 5 and 14, while its distance from a third corner is 10. What is the point's distance to the fourth corner?

A. 8 B. 9 C. 10 D. 11 E. 12

30. The polynomial $x^3 - x^2 - (m^2+m)x + 4m + 2$ is divisible by $(x-4)$. Find the value(s) of m.

A. $\pm\frac{5\sqrt{2}}{2}$ B. $\pm\sqrt{2}$ C. ± 2 D. $\pm\sqrt{5}$ E. None of these

31. In a geometric sequence of real numbers, the sum of the first two terms is 7, and the sum of the first six terms is 91. What is the sum of the first four terms?

A. 28 B. 32 C. 35 D. 49 E. 84

32. In a 10×10 square $ABCD$, let E be the midpoint of $\overline{AB}$ and F be the midpoint of $\overline{BC}$ (see diagram below, left). Let G be the intersection of $\overline{AF}$ and $\overline{ED}$. The area of quadrilateral $BFGE$ is …

A. 20 B. $9\sqrt{5}$ C. 22 D. $7\sqrt{10}$ E. None of these

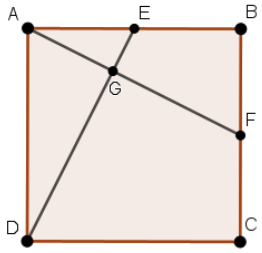

Figure for #32

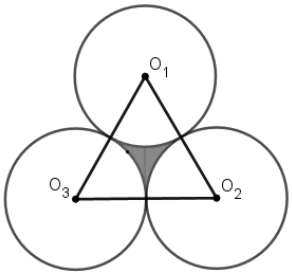

Figure for #33

33. In the figure above, right, circles centered at points O_1, O_2, and O_3 have radius 1 and are tangent to one another. Approximate, to the nearest hundredth, the area of the shaded region in the middle of the figure.

A. 0.12 B. 0.15 C. 0.16 D. 0.43 E. None of these

34. The amount 2.5 is split into two non-negative real numbers at random, for instance, into 1.503 & 0.997 or $\sqrt{2}$ & $2.5 - \sqrt{2}$. Then each number is rounded to its nearest integer, for instance, 2 & 1 in the first case and 1 & 1 in the second. What is the probability that the two integers sum to 3?

A. $\frac{1}{4}$ B. $\frac{2}{5}$ C. $\frac{1}{2}$ D. $\frac{3}{5}$ E. $\frac{3}{4}$

35. In honor of the 2026 SCSU Math Contest, a mathematical experiment is devised. 2026 light switches in a row have been numbered #1, #2, #3, …, #2026 and all begin in the OFF position. 2025 students form a line, and the first student walks forward and flips every other switch starting with #2 as they walk by. The second student walks forward and flips every third switch starting with #3, the third student flips every fourth switch starting with #4, and so forth. After all the students are finished, how many switches are in the ON position?

A. 1013 B. 1176 C. 1608 D. 1968 E. 1981