2026 SCSU MATH CONTEST
7^{th} and 8^{th} GRADE

DIRECTIONS: Select the <u>BEST</u> 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! What will be the 2026^{th} letter in the pattern

   MATHCONTESTMATHCONTESTMATHCONTEST... ?

   (a) M (b) A (c) T (d) H (e) C

2. The SCSU Math Contest began in the year 1968. The prime factorization of 1968 is $2^a \times 3^b \times 41^c$. What is the value of $a + b + c$?

   (a) 6 (b) 7 (c) 8 (d) 9 (e) 10

3. The digits of 1968 are written on separate cards: $\{1, 9, 6, 8\}$. Two cards are drawn at random without replacement. What is the probability that the sum of the numbers drawn is odd?

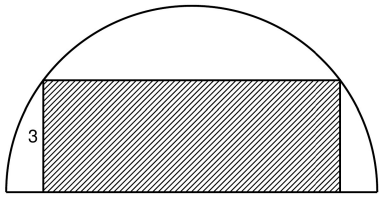
   (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$ (e) $\frac{5}{6}$

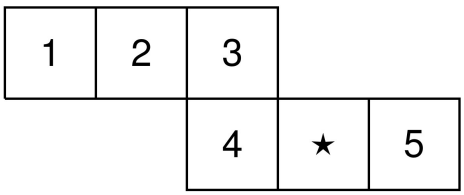
4. The seventh- and eighth-grade classes from Lake Wobegon middle school participated in the 2026 SCSU Math Contest. The 16 seventh-graders earned a mean score of 20. The 8 eighth-graders earned a mean score of 26. What was the mean score of the 24 students from Lake Wobegon middle school?

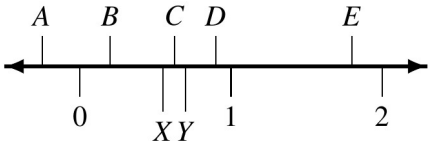
   (a) 21 (b) 22 (c) 23 (d) 24 (e) 25

5. A rectangle of height 3 inches is inscribed in a semicircle of diameter 10 inches (below, left). What is the area of the rectangle?

   (a) 12 in^2 (b) 18 in^2 (c) 21 in^2 (d) 24 in^2 (e) 30 in^2







6. The shape shown (above, center) is folded to make a cube. Which number is opposite the ⋆?

   (a) 1 (b) 2 (c) 3 (d) 4 (e) 5

7. If the fractions represented at locations X and Y (above, right) are multiplied, what location on the number line best represents their product?

   (a) A (b) B (c) C (d) D (e) E

8. The sum of three consecutive counting numbers is one-eighth of their product. What is the product of these three numbers?

   (a) 80 (b) 96 (c) 104 (d) 120 (e) 136

9. Two numbers are selected at random without replacement from the set $\left\{-2, -\frac{4}{3}, -\frac{1}{2}, 0, \frac{1}{2}, -\frac{3}{4}\right\}$. What is the probability that the selected numbers will be the slopes of two perpendicular lines?

   (a) $\frac{1}{15}$ (b) $\frac{2}{15}$ (c) $\frac{1}{6}$ (d) $\frac{1}{3}$ (e) $\frac{2}{3}$

10. A streaming service has a library of movies and TV shows. All titles are either HD or 4K. Thirty percent of the titles are TV shows. Fifty percent of the movies are HD. What percentage of all titles are 4K movies?

(a) 15% (b) 30% (c) 35% (d) 50% (e) 70%

11. The distance between Saint Cloud and Minneapolis is 75 miles. A car leaves Saint Cloud at 8:15 AM and travels towards Minneapolis at an average speed of 50 miles per hour. At what time will the car arrive in Minneapolis?

(a) 9:30 AM (b) 9:40 AM (c) 9:45 AM (d) 9:50 AM (e) 10:00 AM

12. Estee agreed to work for her neighbor for 30 days, for which she was to get paid $858 and a skateboard. Estee quit after 20 days and her neighbor paid her $538 and the skateboard. Assuming this pay was in accordance with the original agreement, what is the value of the skateboard?

(a) $42 (b) $62 (c) $82 (d) $102 (e) $112

13. Ann, Ben, Cory, Don, and Ella each ride exactly one of these buses: 4, 15, 18, 27, and 30. They all forgot their bus number, but each did remember something about their bus.

- Ann knows her bus number has a 1 in it.
- Ben knows his bus number is divisible by 3 but not by 6.
- Cory knows his bus number is divisible by 9 and is larger than Ben's.
- Don knows his bus is yellow.
- Ella knows her bus number is larger than Ann's.

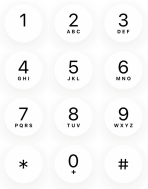
Which one of the statements below is true?

(a) Ann rides bus 4. (b) Ben rides bus 15. (c) Cory rides bus 18. (d) Don rides bus 30. (e) Ella rides bus 27.

14. The points $(6, 12)$ and $(0, -6)$ are connected by a straight line. Which of these points is also on that line?

(a) $(-1, -4)$ (b) $(2, 1)$ (c) $(7, -16)$ (d) $(4, 6)$ (e) $(-3, -8)$

15. I "let my fingers do the walking" on the keypad of my cell phone shown on the right. If the distance from 1 to 2 or from 1 to 4 is one unit, then how many units do my fingers "walk" when I dial Jenny's number, 867-5309?



(a) $4\sqrt{2} + \sqrt{5} + \sqrt{10}$ (b) $3\sqrt{2} + \sqrt{3} + 2$ (c) $4\sqrt{2} + \sqrt{3} + 2$ (d) $3\sqrt{2} + \sqrt{10}$ (e) 6

16. Jake signed a contract to build 35 birdhouses in February. He received $20 for each birdhouse he built, but was fined $6 for each one he failed to build. At the end of February he received a payment of $388. How many birdhouses did Jake build that February?

(a) 19 (b) 20 (c) 21 (d) 22 (e) 23

17. How many positive integers less than 2026 are divisible by both 20 and 26?

(a) 3 (b) 5 (c) 8 (d) 260 (e) None of these

18. What is the result if the integers from 0 to 2026 are combined as follows?

$$0 - 1 + 2 - 3 + 4 - 5 + \ldots + 2022 - 2023 + 2024 - 2025 + 2026$$

(a) -2026 (b) -1013 (c) 0 (d) 6 (e) 1013

19. If x is 150% of y and y is 80% of z, then z is what percent of $x + y$?

(a) $16\frac{2}{3}\%$ (b) 20% (c) 50% (d) $83\frac{1}{3}\%$ (e) 120%

20. What fraction is $\frac{3}{4}$ of the way between $\frac{1}{4}$ and $\frac{2}{3}$ on the number line?

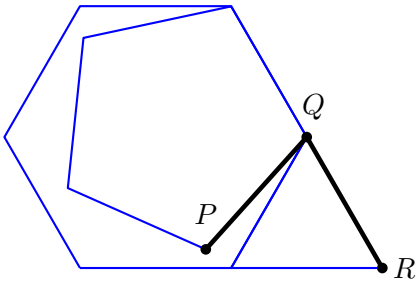
(a) $\frac{17}{48}$ (b) $\frac{7}{16}$ (c) $\frac{11}{24}$ (d) $\frac{9}{16}$ (e) $\frac{11}{16}$

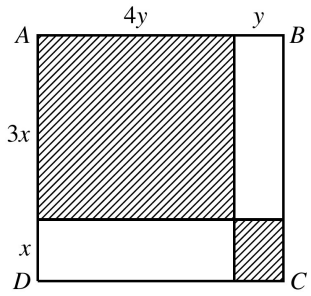
21. A triangle with sides of length 5, 5, and 6 units has area t. A triangle with sides of length 5, 5, and 8 units has area s. A rectangle with sides of length 3, 4, 3, and 4 units has area r. Which one of the following statements is true?

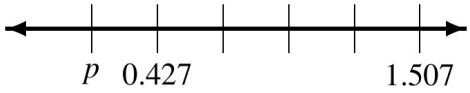
(a) $t < s < r$ (b) $t = r$ and $s < r$ (c) $r < t < s$ (d) $r = t$ and $t < s$ (e) $t = s = r$

22. A regular hexagon, a regular pentagon, and an equilateral triangle are joined as shown (below, left). What is the measure of $\angle PQR$?

(a) 50° (b) 60° (c) 72° (d) 80° (e) 90°







23. $ABCD$ is a square (above, center) and the shaded figures are rectangles. What percentage of the square $ABCD$ is shaded?

(a) 55% (b) 60% (c) 65% (d) 70% (e) 75%

24. A portion of the number line is divided into five equal parts as shown (above, right). What is the value of p?

(a) -0.653 (b) 0.157 (c) 0.211 (d) 0.216 (e) 0.270

25. Donald earns \$18.50 per hour. He earns double this rate for each hour he works over 40. After 20% tax was taken from his gross pay, he earned a net income last week of \$888. How many hours did Donald work last week?

(a) 42 (b) 45 (c) 48 (d) 50 (e) 60

26. Google Maps predicts your trip will take 36 minutes for a 24-mile route. The trip consists of two segments of 12 miles each. The speed limit on the first segment is 40 miles per hour (mph). The speed limit on the second segment is 60 mph. If you drive exactly at the speed limits, what is your actual travel time for the trip?

(a) 28.8 minutes (b) 30 minutes (c) 32 minutes (d) 36 minutes (e) 40 minutes

27. An electric vehicle (EV) has a battery capacity of 75 kWh and consumes energy at a rate of 18 kWh per 100 miles when driving at a steady speed. The EV starts a road trip with a full battery. On the route there are three charging stations at distances of 120 miles, 180 miles, and 240 miles from the start. Each station can charge the EV from total discharge up to 80% of its battery capacity in 40 minutes. To reach a destination 360 miles away as quickly as possible, what is the minimum charging time required?

(a) 0 minutes (b) 40 minutes (c) 60 minutes (d) 80 minutes (e) 120 minutes

28. How many two-digit whole numbers (10 through 99) are increased by exactly 18 when the digits are reversed?

(a) 3 (b) 4 (c) 5 (d) 6 (e) 7

29. There are nine different 4-digit numbers (greater than 1000) that can be formed using digits from 2026. These 4-digit numbers are listed from smallest to largest. What is the fourth number in the list?

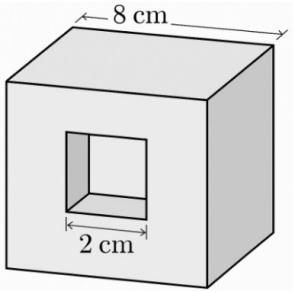
(a) 2260 (b) 2602 (c) 2620 (d) 6022 (e) 6202

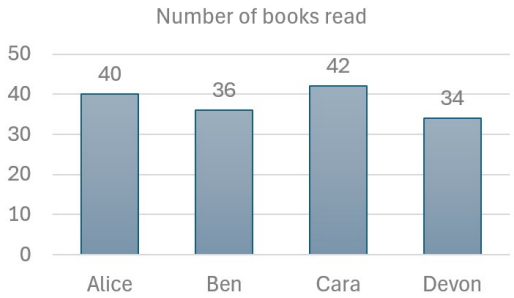
30. A bag contains 20 balls: 6 red balls, 4 blue balls, and 10 green balls. Two balls are drawn from the bag at random without replacement. What is the probability that both balls are red?

(a) $\frac{1}{400}$ (b) $\frac{1}{19}$ (c) $\frac{2}{19}$ (d) $\frac{3}{40}$ (e) $\frac{3}{38}$

31. A cube has side length 8 cm. A smaller cube with side length 2 cm is cut out from the center of one face of the larger cube (below, left). What is the total surface area of the resulting solid?

(a) 384 cm^2 (b) 396 cm^2 (c) 400 cm^2 (d) 404 cm^2 (e) 504 cm^2





$$\begin{array}{cccc} & A & A & B \\ & A & A & C \\ + & A & B & C \\ \hline & 2 & 0 & 2 & 6 \end{array}$$

32. The chart (above, center) shows the total number of books read by four students during the first four months of the year. If each student continues reading books at the same pace, how many more books will Cara have read than Ben by the end of the year?

(a) 18 (b) 24 (c) 36 (d) 60 (e) 72

33. In the sum shown (above, right), A, B, and C represent single-digit numbers. Find the value of $A + B - C$.

(a) 5 (b) 6 (c) 7 (d) 8 (e) 9

34. If $\frac{a-b}{a+b} = \frac{2}{3}$, what is the value of $\frac{a}{b}$?

(a) 2 (b) 3 (c) 4 (d) 5 (e) 6

35. The scores of 10 students are: 4,7,6,6,7,9,4,5,4,8. Compute (Mean + Median + Mode) – Range.

(a) 10 (b) 11 (c) 12 (d) 13 (e) 14

36. Alex and Jordan are painting a fence. Alex can paint the entire fence in 6 hours. Jordan paints at half this speed. Alex starts painting the fence at 9:00 AM and Jordan joins him at 10:00 AM. At what time will they finish painting the fence if they work together after Jordan joins?

(a) 11:20 AM (b) 12:30 PM (c) 1:20 PM (d) 1:50 PM (e) 2:15 PM