

2009 SCSU MATH CONTEST
7th and 8th Grade Test

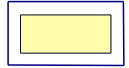
- A nickel is worth \$0.05 and is 0.075 inches thick. If a stack of nickels is as tall as Bob, whose height is $5\frac{3}{4}$ feet, what is the value of this stack?
A. \$46.00 B. \$45.00 C. \$34.50 D. \$0.26 E. none of these
- Andre is a butcher and president of a committee, which also includes a grocer, a baker, and a candlestick maker. All are sitting around a square table, one on each side of the table. Andre sits on Charmin's left, Barton sits at the grocer's right, and Duclos, who faces Charmin, is not the baker. Who sits across the table from the butcher?
A. the baker B. Duclos C. the grocer D. the candlestick maker E. Charmin
- In a chemistry course, you learn that a substance's density is found by dividing its mass by its volume. If a 300 g block of wood measures 70 mm by 50 mm by 30 mm, find the density of the wood in g/cm^3 . Round your answer to the nearest hundredth.
A. $0.03 \text{ g}/\text{cm}^3$ B. $0.29 \text{ g}/\text{cm}^3$ C. $0.35 \text{ g}/\text{cm}^3$ D. $2.86 \text{ g}/\text{cm}^3$ E. $350.00 \text{ g}/\text{cm}^3$
- A building casts a shadow 26 m long. At the same time, the shadow cast by a 63 cm tall pole is 60 cm long. Find the height of the building.
A. 145.4 m B. 27.3 m C. 25.8 m D. 24.8 m E. 23.3 m
- One interior angle of an equilateral triangle measures 60° and one interior angle of a square measures 90° . Find the measure of one interior angle of a heptagon, rounded to the nearest tenth degree.
A. 51.4° B. 102.8° C. 120.0° D. 128.6° E. none of these
- The King Center is dedicated to the mission of Dr. Martin Luther King Jr. Approximately 650,000 people visit the center each year. It is open from 9 a.m. – 5 p.m. every day of the week. On the average, how many people entered The King Center each hour in 2007?
A. 31 B. 74 C. 125 D. 223 E. 1781
- Find the number that is exactly three-fifths of the way from 14 to 69 on the number line.
A. 47 B. 36 C. 33 D. 22 E. none of these
- A box contains fewer than 50 marbles. Each marble is either red or white. The probability of randomly choosing a red marble is $\frac{2}{5}$. What is the largest number of white marbles that could be in the box?
A. 18 B. 27 C. 31 D. 45 E. 49
- The ratio of males to females at a meeting is 7:4. There are 140 females at the meeting. How many people are at the meeting?
A. 245 B. 372 C. 385 D. 770 E. none of these

10. If N is the least common multiple of 10 and 18, what is the greatest common factor of 132 and N ?
- A. 2 B. 3 C. 6 D. 11 E. 12
11. $\frac{27}{45} = \frac{A}{5} = \frac{9}{B} = \frac{C}{225} = \frac{60}{D}$. Find $C - B \div A \times D$.
- A. 13,000 B. 4000 C. 0.4 D. -365 E. -1365
12. $2^M 5^N = 128,000,000$. What does $M + N$ equal?
- A. 13 B. 15 C. 16 D. 17 E. 19
13. Grandma is sewing a shirt, and she needs to sew on three buttons of the same color. She has a tub with five black buttons, four brown buttons, and three white buttons. If she does not look in the tub, how many buttons must grandma pull out to guarantee that she will have at least three buttons of the same color?
- A. 3 B. 4 C. 5 D. 6 E. 7
14. Three people run a mile. The first person runs the mile in seven minutes. The second person takes $\frac{5}{4}$ as long as the first person. How many minutes did it take the third person to run the mile if the average for all three people is eight minutes?
- A. 8 B. 8.25 C. 8.5 D. 9 E. 11.4
15. Tammy carries an 8-oz. capacity water bottle to work with her during the day. Before she leaves for work in the morning, she fills the bottle to capacity. At lunch time, with some water remaining in the bottle, Tammy again fills the bottle to capacity. If she drank 11 ounces of water throughout the day, and there were 2 ounces remaining at the end of the day, how many ounces were in the bottle before she added water at lunch time?
- A. 6 ounces B. 5 ounces C. 4 ounces D. 3 ounces E. 2 ounces
16. The sum of two numbers is 24 more than their difference. Which of the following is the value of one of the numbers?
- A. 0 B. 6 C. 12 D. 24 E. 48
17. While running, a computer program terminates with a binary (base 2) error code: 01111010. Unfortunately, the trouble shooting manual displays all error codes in base 16, where 10, 11, 12, 13, 14, and 15 are represented by the letters A, B, C, D, E, and F respectively. Which of the following base 16 numbers has the same numeric value as the binary error code?
- A. 7A B. 6D C. 1E D. F2 E. FA
18. A toothpaste tube holds 250 cm^3 of toothpaste. The nozzle of the tube is round with a diameter of 5 mm. Assume that the toothpaste is deposited on the counter in a straight line such that the diameter is the same as that of the nozzle (0.5 cm). Approximately how long a line of toothpaste can be made with a full tube of toothpaste?
- A. 79.6 cm B. 250 cm C. 4000 cm D. 3.18 m E. 12.73 m
19. Which of the following numbers is equal to one-fourth of its own reciprocal?
- A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. 2 E. 4

20. You take a trip traveling first by taxi, then by plane, then by bicycle, and finally by walking the remaining distance to your destination. The 75-mile taxi ride from your home to the airport takes 90 minutes. The 7500-mile plane trip takes 15 hours. The 500-mile bicycle trip takes 48 hours. The 5-mile walk takes 150 minutes. Your average speed for the entire trip is approximately:

- A. 11.2 mph B. 50.0 mph C. 120.6 mph D. 125.2 mph E. 500.0 mph

21. A 15-foot by 32-foot rectangular pool is surrounded by a 3-foot wide walkway so that the pool and the walkway make a larger rectangle. How many 6-inch by 6-inch square tiles are required to pave this walkway?

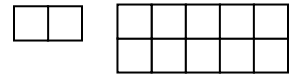


- A. 318 B. 424 C. 636 D. 1128 E. 1272

22. Evaluate $2 + \frac{1}{1 - \frac{1}{1 - \frac{2}{1 - \frac{3}{2}}}}$

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

23. In how many distinct ways can five 1 by 2 tiles be used to cover a 2 by 5 rectangle?



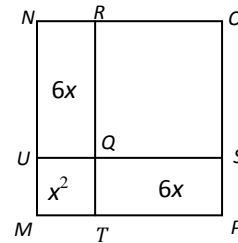
- A. 5 B. 6 C. 8 D. 9 E. 13

24. At a gathering of professionals, all but 30 were musicians; all but 40 were pediatricians; and all but 50 were journalists. Each person has exactly one profession. If only musicians, journalists, and pediatricians attend this gathering, how many journalists were present?

- A. 10 B. 20 C. 30 D. 60 E. 70

25. The figure to the right shows a square region $MNOP$ divided into four rectangular regions, three of which have areas $6x$, $6x$ and x^2 , respectively. What is the area of the square $QROS$?

- A. 4 B. 9 C. 16 D. 25 E. 36

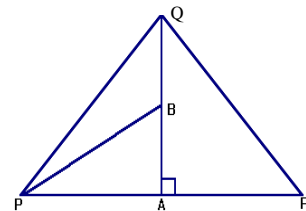


26. When Elizabeth visits her friend Andrew, she must first walk uphill, then walk on level ground, then finally walk downhill. She walks home by the same route. She always walks 2km/h when going uphill, 6km/h when going downhill and 3km/h when on level ground. If her total walking time is 6 hours, what is the roundtrip distance she walks?

- A. $3\frac{2}{3}$ km B. 4 km C. 9 km D. 18 km E. 22 km

27. Triangle PQR is equilateral. $QR = 30$ units, B is the midpoint of QA . QA is perpendicular to PR . What is the best estimate for the length of PB ?

- A. 15 B. 18.5 C. 19.84 D. 20.04 E. 22.5



28. For how many integers x is $\sqrt{81 - x^2}$ a real number?

- A. 9 B. 10 C. 17 D. 18 E. 19

29. A three digit number $2A4$ is added to 239, yielding a sum of $5C3$. Find the largest possible value of A such that $5C3$ is divisible by 3.

- A. 1 B. 3 C. 4 D. 7 E. 8

30. The mean of the following set of eight numbers is 11.25. $\{8, 18, 7, 16, 13, 4, N, N + 2\}$
Find the product of N and $N + 2$.

- A. 24 B. 140 C. 143 D. 440 E. 624

31. What is the greatest common factor of $8!$ and 4^3 ?

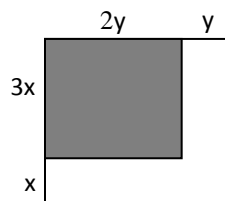
- A. 8 B. 64 C. 128 D. 630 E. 40,320

32. Two numbers have a sum of 8 and a product of 11. Find the sum of their reciprocals.

- A. $\frac{1}{8}$ B. $\frac{8}{11}$ C. $\frac{3}{7}$ D. 3 E. $4 + \sqrt{5}$

33. What fraction of this square is shaded?

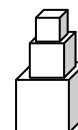
- A. $\frac{5}{12}$ B. $\frac{1}{2}$ C. $\frac{7}{12}$ D. $\frac{2}{3}$ E. $\frac{3}{4}$



34. Yesterday, 20% of the animals on a farm were rabbits. Today Farmer Joe brought home five more rabbits, increasing the percentage of rabbits to 25%. How many animals were on the farm yesterday?

- A. 60 B. 75 C. 80 D. 90 E. 95

35. You have three sizes of blocks. Each block is in the shape of a cube. Some blocks measure 13 cm per side, some measure 9 cm per side, and the rest measure 3 cm per side. You build a tower exactly 80 cm high by stacking 13-cm cubes on the bottom, then 9-cm cubes in the middle and finally 3-cm cubes on top. You use one block per level as shown in the example to the right. The number of 3-cm blocks is three times the number of 13-cm blocks. The number of 9-cm blocks is two times the number of 13-cm blocks. How many 9-cm cubes do you use in the tower?



- A. 1 B. 2 C. 3 D. 4 E. 5

36. The dimensions of a rectangular solid are 5 inches by 10 inches by 15 inches. The length of each edge of the solid is to be increased by 20%. What is the surface area, in square inches, of the new solid?

- A. 396 B. 486 C. 594 D. 684 E. 792

37. In Mr. Hoolihan's class, every student voted once for class president. Vonda received 10% of the votes, Emma received 35% of the votes, Frank received 30% of the votes, and Bobby received the remaining 10 votes.

What was the difference between the least number of votes received by a candidate and the greatest number of votes received by a candidate?

- A. 4 B. 6 C. 10 D. 12 E. 14

38. Mr. Fix-It has a container of bolts, all the same weight. He also has a container of nails, all the same weight, and a container of screws, all the same weight. On a balance scale, 3 bolts and 1 nail balance 4 screws. Also, 3 nails balance 6 screws.

Finish this sentence: On a balance scale, 6 bolts will balance 1 nail and ___ screws.

- A. 0 B. 1 C. 2 D. 3 E. 4