

2018 SCSU MATH CONTEST
7th and 8th Grade Test

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

1. Jenny enters her apartment building on the first floor and runs up to the third floor in 32 seconds. At this rate, how many seconds would it take for her to run from the first floor up to the sixth floor?
 A. 64 B. 80 C. 96 D. 192 E. None of these

2. A $2 \times 2 \times 2$ cube is removed from each corner of an $8 \times 8 \times 8$ cube. What fraction of the $8 \times 8 \times 8$ cube is removed?
 A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{1}{16}$ E. $\frac{1}{32}$

3. 3 teaspoons = 1 tablespoon and 4 tablespoons = $\frac{1}{4}$ cup. How many teaspoons equal $1\frac{1}{3}$ cups?
 A. 24 B. 36 C. 48 D. 64 E. None of these

4. Lucy has only nickels, dimes, and quarters in her piggy bank. She has twice as many dimes as nickels, and two more quarters than nickels. These coins have a value of \$3.00. How many coins are in Lucy's piggy bank?
 A. 17 B. 21 C. 22 D. 25 E. 31

5. Suppose that you are on a merry-go-round that is turning very slowly: 2 degrees every 90 seconds. If you get on the merry-go-round at 10:45 pm, what time will the clock read after the merry-go-round has gone through 360 degrees with you on it?
 A. 1:00 am B. 3:15 am C. 7:45 am D. 10:45 pm E. None of these

6. A bucket filled with water weighs 25 pounds. When one-half of the water is poured out, the bucket and remaining water weigh 13.5 pounds. How many pounds would the empty bucket weigh?
 A. 1 B. 2 C. 5.75 D. 11.5 E. 23

7. A large piece of construction paper is 0.01 mm thick. It is cut in half and one piece is placed exactly on top of the other to form a stack. This stack is cut in half and one half is placed exactly on the other. This process continues, where the stack is cut in half and one half is placed on top of the other. What is the height of the stack, in cm, after the pieces have been cut and stacked for the tenth time?
 A. 1.024 cm B. 5.12 cm C. 10.24 cm D. 51.2 cm E. 102.4 cm

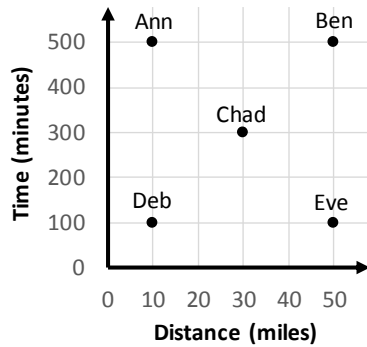
8. Simplify: $\frac{\frac{2}{3} + \frac{3}{8} \times 2}{\frac{2}{3} - \frac{3}{8} \div 2}$
 A. $2\frac{22}{23}$ B. $6\frac{2}{3}$ C. $7\frac{1}{5}$ D. $10\frac{3}{8}$ E. $14\frac{1}{7}$

9. The arithmetic sequence 606, 612, 618, 624, 630, 636, ... is continued. Which number below would you eventually see in this sequence?
 A. 4862 B. 10,367 C. 75,284 D. 99,482 E. 102,624

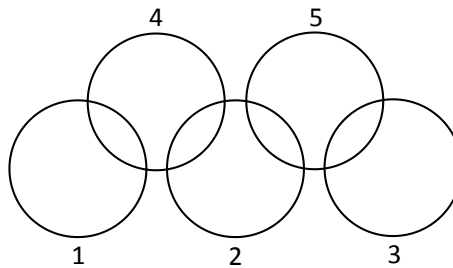
10. Mr. Smith recorded the test scores for 25 students. He used the scores recorded and calculated the mean to be 70. However, Sandra's score of 86 was incorrectly marked as 36. What is the correct mean for the 25 students? Assume that the other 24 test scores were recorded correctly.
 A. 72 B. 74 C. 76 D. 78 E. 80

11. If Q quarts of motor oil cost a total of C cents, how many gallons of this oil can you buy for D dollars?
- A. $\frac{DQ}{25C}$ B. $\frac{4DQ}{C}$ C. $\frac{DQ}{400C}$ D. $\frac{DQ}{4C}$ E. $\frac{25DQ}{C}$
12. A mixed number is to be formed by placing three different digits from the set $\{1, 2, 3, 4, 5\}$ in the spaces of $\square \frac{\square}{\square}$. The fractional part of the mixed number must be less than 1. What is the difference between the largest and smallest possible mixed numbers that can be formed?
- A. $4\frac{4}{15}$ B. $4\frac{3}{10}$ C. $4\frac{7}{20}$ D. $4\frac{9}{20}$ E. $4\frac{3}{5}$
13. A store owner purchased some widgets at 2 widgets for \$3 and purchased the same number of widgets at 2 widgets for \$5. The store owner sold all of the widgets at 3 widgets for \$7. How much did the store owner gain for each dozen widgets she sold?
- A. \$2 B. \$3 C. \$4 D. \$6 E. \$8

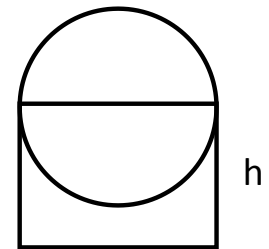
Use the three figures below to answer questions 14, 15, and 16.



Question 14



Question 15

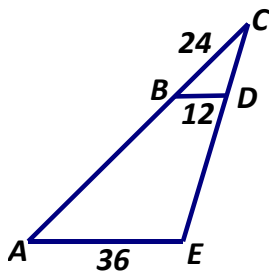


Question 16

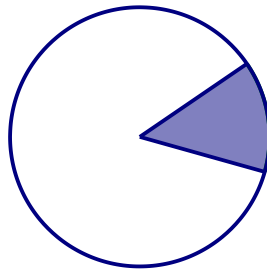
14. The time taken to travel various distances is shown in the graph above. Which person travelled the fastest on average?
- A. Ann B. Ben C. Chad D. Deb E. Eve
15. The five numbered rings shown in the diagram above represent five different colors. The colors are Red, Green, Blue, Yellow and Orange, but not necessarily in that order. It is known that:
- The Blue ring does not intersect the Green ring
 - The Yellow ring intersects only the Blue ring
 - The Red ring is to the right of the Green ring and on the same level as the Green ring
- Which ring number is colored Orange?
- A. 1 B. 2 C. 3 D. 4 E. 5
16. In the diagram shown above, the circle and rectangle have the same area. One side of the rectangle is a diameter of the circle. What is the ratio of the radius of the circle to the height of the rectangle?
- A. $\frac{\pi}{3}$ B. $\frac{\pi}{2}$ C. 1 D. $\frac{3}{\pi}$ E. $\frac{2}{\pi}$

17. What is the longest piece of straight dry spaghetti that will fit (without bending or breaking) in a cylindrical can that has a radius of 3 inches and a height of 10 inches?
- A. $\sqrt{13}$ in B. 90π in C. $\sqrt{109}$ in D. $2\sqrt{34}$ in E. 30π in
18. If the sum of two whole numbers is 24 more than their difference, what must one of the numbers be?
- A. 0 B. 6 C. 12 D. 48 E. 64
19. An evil witch casts a spell to put a princess to sleep for 10,000 hours. If the spell makes the princess fall asleep at 6:00 pm, at what time will she wake up from the spell?
- A. 8:00 am B. 10:00 am C. 12:00 pm D. 4:00 pm E. 8:00 pm
20. Mable catches two Pokemon in 30% of the parks she visits. She catches none in the other 70%. At this rate, how many Pokemon will Mable catch if she visits 40 parks?
- A. 12 B. 15 C. 24 D. 96 E. 267
21. Of 65 middle school students, 25 are in band and 47 are in choir. 13 of these students are in both band and choir. How many of the 65 students are in neither band nor choir?
- A. 2 B. 6 C. 15 D. 19 E. 22
22. The sum of five consecutive even integers is 130. What is the sum of the digits of the greatest of the five integers?
- A. 3 B. 4 C. 8 D. 31 E. 52
23. How many of the positive divisors of 220 (including 220) are even numbers?
- A. 4 B. 5 C. 6 D. 7 E. 8

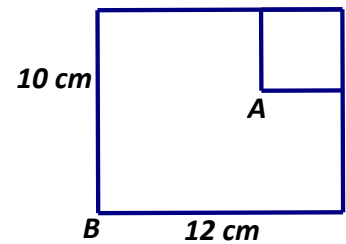
Use the three figures below to answer questions 24, 25, and 26.



Question 24



Question 25



Question 26

24. In the figure shown above, \overline{BD} is parallel to \overline{AE} , $BD=12$, $AE=36$, and $CB=24$. The perimeter of triangle ACE is 162. Find the length of \overline{CD} .
- A. 13.5 B. 18 C. 21 D. 22.5 E. 27
25. A sector of a circle of radius 8.4 cm has a central angle of 50° , as shown above. Find the perimeter of this sector, rounded to the nearest tenth of a centimeter.
- A. 7.3 B. 15.7 C. 16.8 D. 21.9 E. 24.1
26. In the figure shown above, Point A is the vertex of a square that measures 4 cm on each side. What is the length in centimeters of segment AB?
- A. 6 B. 8 C. 10 D. 14 E. 24

27. The average of a and b is 10. The average of b and 10 is $\frac{c}{2}$. What is the average of a and c ?
- A. 15 B. $\frac{a-b}{2}$ C. 20 D. $\frac{b-a}{2}$ E. 30
28. Two fair six-sided dice, one red and one green, are tossed. What is the probability that the number showing on the red die is higher than the number showing on the green die?
- A. $\frac{7}{12}$ B. $\frac{1}{2}$ C. $\frac{1}{6}$ D. $\frac{2}{3}$ E. $\frac{5}{12}$
29. You have 70 ounces of light blue paint that is in a ratio of 3 parts blue to 7 parts white. You mix it with 70 ounces of darker blue paint that is 5 parts blue to 2 parts white. What is the ratio of blue to white in the mixture?
- A. 71 to 69 B. 140 to 71 C. 20 to 50 D. 71 to 70 E. 8 to 9
30. If $n = 3^x + 3^x + 3^x$, then $n^2 =$
- A. 9^{3x} B. 27^{2x} C. 9^{x+1} D. 27^{6x} E. 27^{3x}
31. Find the 2018th digit to the right of the decimal in the expansion of $\frac{1}{13}$.
- A. 2 B. 3 C. 6 D. 7 E. 9
32. Alice, Ben and Carol found some money. They agreed that Alice should receive \$2 less than one-third of the money, Ben should receive \$8 more than one-fourth of the money, and Carol should receive the remaining \$19. How much money should Alice receive?
- A. \$15 B. \$18 C. \$25 D. \$30 E. \$35
33. A right triangle on the coordinate system has vertices at $A(2,1)$, $B(2,5)$, and $C(6,1)$. The triangle is rotated 90° clockwise about point C . What are the coordinates of the image of B ?
- A. (10,5) B. (6,5) C. (1,5) D. (2,-3) E. None of these
34. $\frac{T}{R} = \frac{2}{3}$ and $\frac{S}{T} = 6$. Find $\frac{R+S}{T}$.
- A. $1\frac{2}{3}$ B. $6\frac{2}{3}$ C. $7\frac{1}{5}$ D. $7\frac{1}{2}$ E. 12
35. Line l passes through the points (0,4) and (5,2). What is the y -intercept of a line perpendicular to l that passes through the point (2,1)?
- A. (0,-0.5) B. (0,-2.5) C. (0,-4) D. (0,-5.5) E. (0,-6)