

The 37th Contest

*Mathematics Educators of Greater St. Louis
and St. Louis Community College
at Florissant Valley present*

Excellence In Mathematics

**Sixth Grade Test
Thirty-Seventh Annual Mathematics Contest
March 21, 2015**

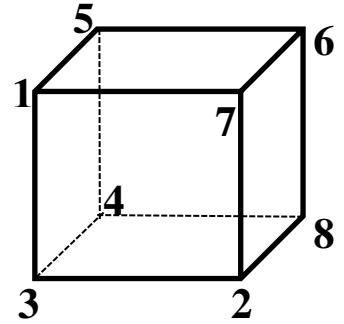
- I. **Do not open the test booklet or begin work until instructed to do so by your proctor.**
- II. **You have 75 minutes to take this test.**
- III. Listen carefully as the proctor explains where to write your name, the name of your school, your grade level, and how to mark your answers.
- IV. You may use a calculator. You only need a four-function calculator, but you may use any calculator approved for the SAT test, which includes most graphing calculators except the TI-92 and TI-Voyager. If you are unsure whether your calculator is allowed, check with your proctor.
- V. Your score will be the number of questions you answer correctly. In the event of ties, Problem #40 will be used as a tie-breaker. If ties still remain, Problem #39 will be used as a tie-breaker and so on until all ties are broken.

Sixth Grade Test - Excellence in Mathematics Contest – 2015

- The value of 15 quarters and 23 nickels is equal to the value of how many dimes?
A. 38 B. 42 C. 43 D. 46 E. 49
- In circus class in San Francisco, Zan drops 20 feet from a trapeze bar onto a bouncy net and bounces several times. The first time she rebounds 15 feet; then she rebounds 10 feet; then she rebounds 5 feet; and then she stops on the net. Including up and down, what is the total distance that Zan traveled from the time she left the trapeze bar until the time she stopped bouncing?
A. 50 feet B. 65 feet C. 80 feet D. 90 feet E. 100 feet
- Geologists state that the Mesozoic Era lasted from about 65 to 245 million years ago. 40% of the Mesozoic Era is called the Jurassic Period. To the nearest 10 million, how many years long was the Jurassic Period?
A. 70 million B. 80 million C. 100 million D. 110 million E. 120 million
- Write these three numbers in increasing order; that is, from least to greatest: $\frac{15}{4}$; **3.6** ; $3\frac{2}{3}$
A. **3.6** ; $3\frac{2}{3}$; $\frac{15}{4}$ B. **3.6** ; $\frac{15}{4}$; $3\frac{2}{3}$ C. $\frac{15}{4}$; $3\frac{2}{3}$; **3.6**
D. $3\frac{2}{3}$; **3.6** ; $\frac{15}{4}$ E. $3\frac{2}{3}$; $\frac{15}{4}$; **3.6**
- Emily lives 1.2 km west of school and Samantha lives 1.5 km east of school. After school each day Monday through Friday, Samantha walks from school to Emily's house and then walks to her own house. In one week, how many kilometers does Samantha walk?
A. 13.5 km B. 15 km C. 18 km D. 19.5 km E. 27 km
- The square of *100 thousand* equals
A. 100 million B. 1 trillion C. 10 million D. 10 billion E. 10 trillion
- 48** · $\left(\frac{7}{4} \cdot \frac{6}{5} \cdot \frac{5}{6} \cdot \frac{4}{7} \cdot \frac{3}{8}\right)$ equals
A. 8 B. 12 C. 16 D. 18 E. 48
- Two rectangles each have perimeter 64 cm. In area, how much larger is the rectangle with length 18 cm than the rectangle with length 20 cm?
A. 0 cm² B. 4 cm² C. 8 cm² D. 12 cm² E. 16 cm²
- In the number **132,978** , switch the thousands' digit with the tens' digit. How much larger is the new number than the original number?
A. 6300 B. 4950 C. 15,050 D. 15,950 E. 39,960

Sixth Grade Test - Excellence in Mathematics Contest – 2015

10. The vertices of this cube are labeled 1 through 8. For each edge, add the two numbers at the end-points of that edge. For the 12 edges, you should have 11 different sums. Which sum is repeated?



- A. 7 B. 8 C. 9
D. 10 E. 11
11. Referring to the cover of this test, *Big Bang Theory's* Sheldon Cooper often wears a T-shirt with the number 73 on it. 73 is his favorite number because 73 is the 21st prime number and 37 is the Nth prime number. What is N?
A. 10 B. 11 C. 12 D. 13 E. 14
12. On November 11, 1911, Springfield Missouri set BOTH its record daily high temperature for November 11 and its record low temperature for November 11. The temperature dropped from 80°F at 3:45 PM to 13°F at midnight. In degrees per hour, what was the average rate of decrease of the temperature?
Round to the nearest tenth of a degree per hour.
A. 6.9°F/hr B. 7.2°F/hr C. 7.3°F/hr D. 8.1°F/hr E. 8.2°F/hr
13. The number F is 6 less than -8 . The number U is 8 more than -3 . The number N is 18 less than 7.
What is the sum $F+U+N$?
A. 30 B. -2 C. -8 D. -20 E. -36
14. In 18 football games in the 2014 season, Marshawn Lynch of the Seattle Seahawks rushed for an average of 84.6 yards per game. In his best 4 games, he ran for 157 yards, 140 yards, 124 yards, and 110 yards.
How many yards per game did he average in the other 14 games?
Round to the nearest tenth of a yard.
A. 55.1 B. 70.8 C. 76.2 D. 79.5 E. 80.3
15. An empty 12-gallon water jug is filled at a rate of 1 quart every 12 seconds. In how long will the tank be full?
A. 2 minutes 24 seconds B. 3 minutes 48 seconds C. 4 minutes 48 seconds
D. 9 minutes 6 seconds E. 9 minutes 36 seconds
16. The numbers 2013 and 2015 each have exactly three prime factors.
What is the sum of those six prime numbers?
A. 124 B. 144 C. 486 D. 724 E. 1084
17. The three digits 1, 6, and 9 can be used to form three different 3-digit square numbers. What is the sum of these three square numbers? Note: Each of these 3-digit numbers contains one 1, one 6, and one 9.
A. 984 B. 1056 C. 1281 D. 1326 E. 1749

Sixth Grade Test - Excellence in Mathematics Contest – 2015

18. You order an extra-large pizza, immediately eat $\frac{1}{4}$ of it, and put the rest in the refrigerator. After 2 hours, you eat $\frac{1}{3}$ of the remaining pizza and put the rest in the refrigerator. One hour later, you eat $\frac{1}{2}$ of the remaining pizza. What fraction of the pizza have you eaten?

- A. $\frac{3}{4}$ B. $\frac{5}{6}$ C. $\frac{23}{24}$ D. $\frac{11}{12}$ E. $\frac{13}{12}$

19. One marble is drawn randomly from a bag containing 6 red, 9 blue, and 5 green marbles. What is the probability that the marble that is drawn is not green? Round to the nearest per cent.

- A. 20% B. 25% C. 67% D. 75% E. 80%

20. In meters, what is the perimeter of a square of area 490,000 square meters?

- A. 1400 B. 2800 C. 14,000 D. 28,000 E. 140,000

21. Starting on January 1, what month will it be when exactly $\frac{5}{7}$ of the year has passed?

- A. July B. August C. September D. October E. November

22. $6 + 6 \div 2 \times 3$

By placing exactly one pair of parentheses into four different locations of this expression, four different values of the expression are possible. What is the sum of those four values?

- A. 49 B. 51 C. 55 D. 63 E. 67

23. Ridi is $\frac{2}{3}$ as tall as his mother. If Ridi's height is 3 feet 6 inches, how tall is his mother?

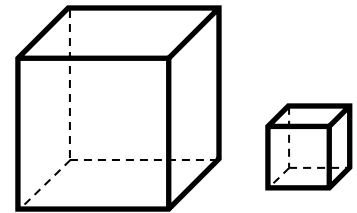
- A. 2 feet 4 inches B. 4 feet 6 inches C. 4 feet 8 inches
D. 5 feet 3 inches E. 5 feet 9 inches

24. A cube 1 foot on each side is cut into cubes 4 inches on each side.

All of the smaller cubes are stacked into one tall stack.

How tall is that stack?

- A. 2 feet 8 inches B. 3 feet C. 4 feet 6 inches
D. 6 feet E. 9 feet



25. On this 40-item Excellence in Mathematics Contest, the 5-student Green Rock Park Middle School's goal as a team is to get 80% of the questions correct. If four students get 67.5%, 77.5%, 82.5%, and 85% correct, how many questions must their fifth student get correct to earn a team average of exactly 80%?

- A. 32 B. 33 C. 34 D. 35 E. 36

Sixth Grade Test - Excellence in Mathematics Contest – 2015

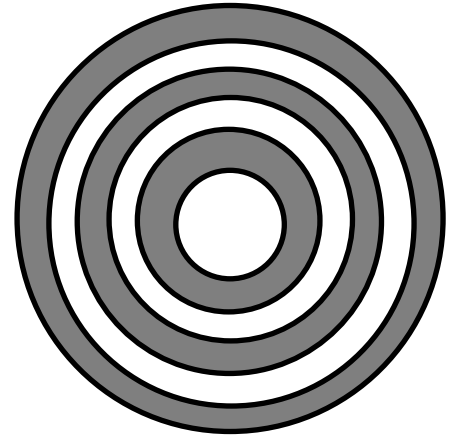
32. How many of the following five statements are TRUE?

1. One mile is longer than one kilometer.
2. One quart of water has greater volume than one liter of water.
3. One pound of beef weighs more than one kilogram of beef.
4. One inch is longer than one centimeter.
5. A temperature of 0°C is warmer than a temperature of 0°F .

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

33. A target has six rings formed by concentric circles of radii 1, 2, 3, 4, 5, and 6 feet. If the 2nd, 4th, and 6th rings are gray, what fraction of the target is gray?

A. $1/2$ B. $2/3$ C. $3/4$
D. $5/9$ E. $7/12$



34. The first three verses of the song *Twelve Days of Christmas* are:

On the first day of Christmas my true love sent to me:

A Partridge in a Pear Tree

On the second day of Christmas my true love sent to me:

2 Turtle Doves; and a Partridge in a Pear Tree

On the third day of Christmas my true love sent to me:

3 French Hens; 2 Turtle Doves; and a Partridge in a Pear Tree

This pattern continues until the 12th and final verse:

On the twelfth day of Christmas my true love sent to me:

*12 Drummers Drumming; 11 Pipers Piping; 10 Lords a Leaping
9 Ladies Dancing; 8 Maids a Milking; 7 Swans a Swimming
6 Geese a Laying; 5 Golden Rings; 4 Calling Birds
3 French Hens; 2 Turtle Doves; and a Partridge in a Pear Tree*

What is the sum of the number of drummers, pipers, lords, ladies, maids, swans, geese, golden rings, calling birds, French hens, turtle doves, and partridges mentioned in the standard 12 verses of the song?

A. 362 B. 363 C. 364 D. 365 E. 366

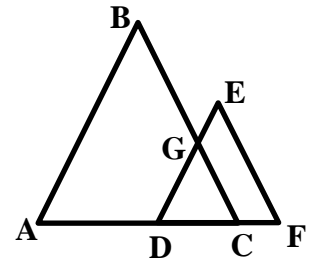
35. In a rectangle ABCD, M is the midpoint of AB and N is the midpoint of BC.

What is the ratio of the area of triangle BND to the area of triangle CMD?

A. $1/4$ B. $1/3$ C. $1/2$ D. 1 E. 2

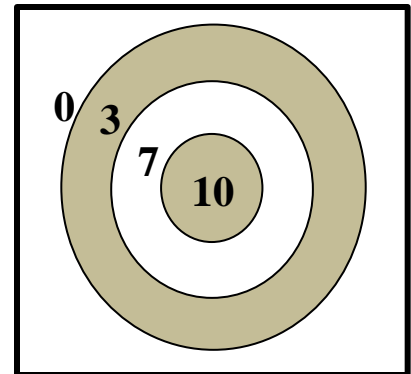
Sixth Grade Test - Excellence in Mathematics Contest – 2015

36. ABC and DEF are equilateral triangles. $AD = 2DC$ and $DC = 2CF$
 If the perimeter of ABC is 54 cm, what is the perimeter of the trapezoid EFCG?
 A. 18 cm B. 21 cm C. 24 cm
 D. 27 cm E. 36 cm



37. There are exactly 24 different 3-digit whole numbers with three different digits from this set: 4, 5, 6, 7. How many of those twenty-four 3-digit numbers are divisible by 6?
 A. 4 B. 6 C. 8 D. 9 E. 12

38. Each dart which hits this square dartboard scores 0, 3, 7, or 10 points.
 After Sasha throws three darts which all hit the dartboard, she adds her three scores.



- Including 0, how many different scores are possible?
 A. 14 B. 15 C. 16
 D. 17 E. 18

39. On a street with 32 houses: 7 have fewer than 6 rooms; 12 have more than 7 rooms; and 4 have more than 8 rooms. How many of these houses have 6, 7, or 8 rooms?
 A. 19 B. 20 C. 21
 D. 25 E. Cannot be determined with this information



The goal of this puzzle is to switch the positions of the 2 unshaded discs with the positions of the 2 shaded discs.
 In this puzzle, only these two types of moves are allowed:

1. Slide one disc to an empty square next to it.
2. Jump over exactly one disc to an empty square (the jumped disc is not removed).

Note: Any move may be to the left or to the right.

What is the minimum number of *moves* needed to switch the positions of the two shaded discs with the two unshaded discs?

- A. 7 B. 8 C. 9 D. 11
 E. Using only these *moves*, it is not possible to switch the positions of these discs.