

Eighth Grade Test - Excellence in Mathematics Contest - 2008

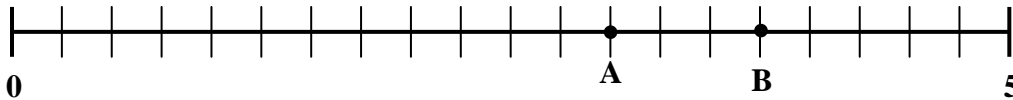
1. Even the cast members of the musical *Rent* know that the number of minutes in the year 2006 is:
 A. 525,600 B. 527,000 C. 824,200 D. 3,153,600 E. 31,536,000

2. 247 is the product of two prime numbers. What is the positive difference between these two prime numbers?
 A. 2 B. 4 C. 6 D. 8 E. 10

3. Which one of these five numbers is the greatest?
 A. $\frac{1}{15} \div \frac{1}{18}$ B. $\frac{1}{18} \div \frac{1}{15}$ C. $\frac{1}{18} * \frac{1}{15}$ D. $\frac{1}{18} + \frac{1}{15}$ E. $\frac{1}{15} - \frac{1}{18}$

4. A 2 m deep 20 m by 12 m rectangular pool is filled with water. When all of this water is transferred into a 16 m by 16 m pool, how deep is the water?
 A. 1.6 m B. 1.75 m C. 1.875 m D. 2 m E. 2.25 m

5. A number line from 0 to 5 is divided into 20 equal parts. What is the sum of the numbers located at points A and B?



- A. 6 B. 6.25 C. 6.5 D. 6.75 E. 7

6. Determine the positive difference between π and each of these five estimates of π .

$\frac{22}{7}$ $\sqrt[3]{31}$ $\sqrt{10}$ 3.14159 $\frac{355}{113}$

List your five answers from least to greatest. The middle number in your list came from which of these five estimates?

- A. $\frac{22}{7}$ B. $\sqrt[3]{31}$ C. $\sqrt{10}$ D. 3.14159 E. $\frac{355}{113}$

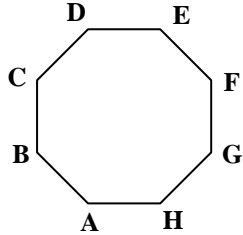
7. A rectangle and an equilateral triangle have the same perimeter. The length of the rectangle is twice its width. If the length of each side of the triangle is 30 cm, what is the area of the rectangle?

- A. 225 cm² B. 450 cm² C. 506.25 cm² D. 525 cm² E. 900 cm²

8. 37 divided by N leaves a remainder of 7. For how many different whole numbers N is this true?
 A. 0 B. 1 C. 2 D. 3 E. 6

9. 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

Eighth Grade Test - Excellence in Mathematics Contest - 2008

10. $\frac{27}{45} = \frac{A}{5} = \frac{9}{B} = \frac{C}{225} = \frac{60}{D}$ What does $A + B + C + D$ equal?
 A. 118 B. 163 C. 238 D. 250 E. 253
11. Cheryl ran a 10 kilometer race in exactly 51 minutes. To the nearest tenth, what was her average speed in miles per hour? (Use: 1 mile = 1.61 km)
 A. 7.3 mph B. 7.6 mph C. 8.1 mph D. 8.4 mph E. 19.0 mph
12. In this sequence of seven numbers, the difference between consecutive numbers doubles each time.
 $A ; \quad \underline{\hspace{1cm}} ; \quad 12 ; \quad 18 ; \quad 30 ; \quad \underline{\hspace{1cm}} ; \quad B$
 Compute $B \div A$.
 A. 7.2 B. 9 C. 10.4 D. 13.6 E. 17
13. For the team she coaches, Brenda buys sodas at \$0.75 each and hamburgers at \$1.20 each. If she spends \$21.60 on sodas and hamburgers, buys more hamburgers than sodas, and buys at least one soda, what is the total number of hamburgers and sodas she buys?
 A. 21 B. 22 C. 23 D. 24 E. 25
14. On this regular octagon, a snail starts at A and crawls clockwise along the edges. Where is the snail when it has completed $\frac{2}{3}$ of the distance around the octagon?
 A. Between E and F B. Point F C. Between F and G
 D. Point G E. None of these
- 
15. Two standard 6-sided dice are rolled. What is the probability that the sum is 10, 11, or 12?
 A. $\frac{1}{6}$ B. $\frac{3}{11}$ C. $\frac{1}{4}$ D. $\frac{1}{12}$ E. $\frac{3}{8}$
16. $2^M 5^N = 128,000,000$ What does $M + N$ equal?
 A. 13 B. 15 C. 16 D. 17 E. 19
17. Rutherford B. Hayes was elected President of the United States in a leap year in the 19th Century. The sum of the digits in that year is 22. What is the tens' digit of that year?
 A. 5 B. 6 C. 7 D. 8 E. 9
18. If N is not equal to 0, 8, or -8, how many of these four numbers are equal to $\frac{5}{8}$?
 $\frac{5 + N}{8 + N}$ $\frac{5 - N}{8 - N}$ $\frac{5N}{8N}$ $\frac{5/N}{8/N}$
 A. 0 B. 1 C. 2 D. 3 E. 4

Eighth Grade Test - Excellence in Mathematics Contest - 2008

19. For how many integers x is $\sqrt{81-x^2}$ a real number?
 A. 9 B. 10 C. 17 D. 18 E. 19
20. In February 2006, the total United States public deficit was estimated to be 8.3 trillion dollars. Suppose that a Presidential candidate promised to decrease this deficit at the rate of one million dollars per hour. If she is elected twice and keeps her promise for eight years, what percent of the deficit would be paid off?
 A. 0.0084% B. 0.84% C. 8.4% D. 84 % E. 100%

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



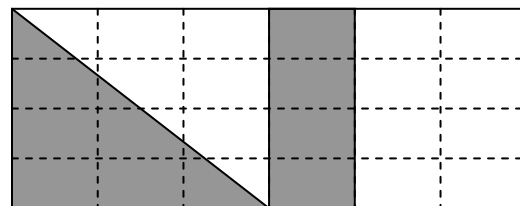
- A. 318 B. 424 C. 636 D. 1128 E. 1272
22. In December 2005, the Taum Sauk Reservoir in Missouri released one billion gallons of water. If this water had spread evenly over one square mile of land, what depth would be the water be? (1 cubic foot is approximately 7.5 gallons of water. 1 mile = 5280 feet) Round to the nearest tenth of a foot.
 A. 0.6 feet B. 1.3 feet C. 2.5 feet D. 3.5 feet E. 4.8 feet

23. Evaluate:

$$2 + \frac{1}{1 - \frac{1}{1 - \frac{2}{3}}}$$

- A. -1/2 B. -1/3 C. 3/2 D. 2/3 E. 4/3
24. A “triple prime” is a set of three consecutive odd numbers, all of which are prime. How many sets of “triple primes” are there between 0 and 200?
 A. 0 B. 1 C. 2 D. 3 E. 5
25. From a 4-meter wooden rod, Shanna cut: one 1.2 meter piece; two 0.82 meter pieces; one 36 cm piece; and five 7.4 cm pieces. How many centimeters of the rod have not been used?
 A. 2.9 cm B. 43 cm C. 48.4 cm D. 105 cm E. 190.6 cm

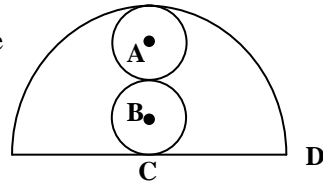
26. What fraction of this rectangle is shaded?



- A. 1/5 B. 3/8 C. 5/12
 D. 5/6 E. 7/12

Eighth Grade Test - Excellence in Mathematics Contest - 2008

34. In this semi-circle, the two congruent circles with centers A and B are tangent to each other and to the semi-circle. Points A and B lie on a radius perpendicular to the radius CD. What is the ratio of the area of the semi-circle to the area of one of the smaller circles?



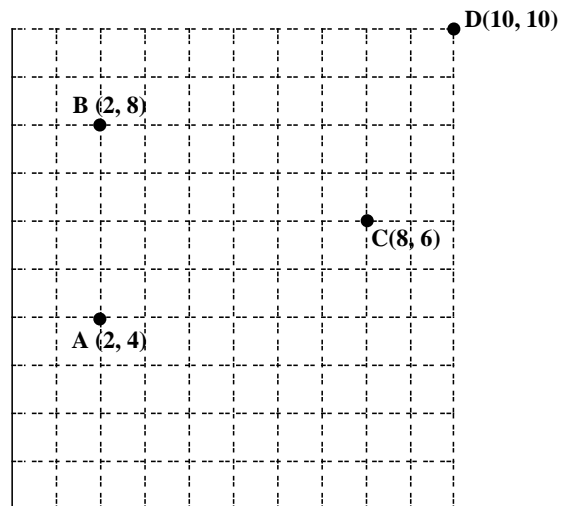
- A. 4 B. 6 C. 8 D. 12 E. 16

35. An endurance runner leaves Dodge at noon. His running pattern is to run for 2 hours at a constant 8 mph pace, rest 15 minutes, and then repeat this pattern. A horseman leaves Dodge at 2:30 pm and takes the same route as the runner. His pattern is to ride for 3 hours at a constant 12 mph pace, rest 30 minutes, and then repeat the pattern. At what time does the horseman overtake the runner?

- A. 7:15 pm B. 7:30 pm C. 7:45 pm D. 8:00 pm E. Never

- 36.

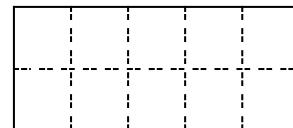
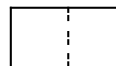
On this Cartesian grid, Sam randomly selects two of the four points A, B, C, and D. He draws the midpoint P of those two points. Then Irene selects the other two points and draws their midpoint Q. What is the sum of the coordinates of the midpoint of PQ?



- A. 11 B. 11.5 C. 12
D. 12.5 E. It depends on Sam's choice

37. 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



Eighth Grade Test - Excellence in Mathematics Contest - 2008

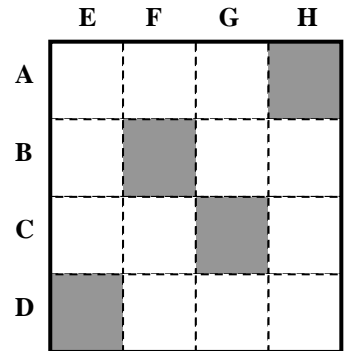
38. Each of the twelve blank cells will be filled with one digit, 0 through 9.
 The letters A, B, C, and D each represent a 2-digit or 3-digit number from the corresponding row.
 For example, A is the horizontal 3-digit number beginning in cell AE and B is the 2-digit horizontal number beginning in cell BG. Similarly, E, F, G, and H each represent a 2-digit or 3-digit number from the corresponding column.

None of these eight 2-digit or 3-digit numbers begin with the digit "0".

CLUES: E = 5F D = 8H
E = A + 91 A = 4B

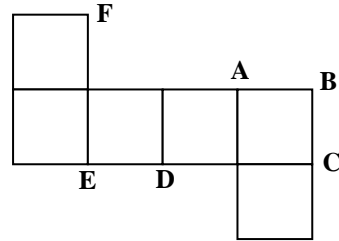
What is the sum of all twelve digits that you use?

- A. 48 B. 49 C. 50
 D. 51 E. 52



39. When you fold this pattern into a cube, which vertex does NOT share a face with vertex F?

- A. A B. B C. C
 D. D E. E



40. On this grid of streets, each block is square and bicyclists must stay on the streets. Therefore, the distance (the length of a shortest path) between points P and Q is $8+4 = 12$ blocks, not the length of the segment PQ:

$\sqrt{64+16} = \sqrt{80}$ blocks.

Pauline at P and Quincy at Q agree to meet at any intersection T such that the shortest distance from P to T is 6 blocks and the shortest distance from Q to T is also 6 blocks. How many different intersections are possible meeting points?

- A. 0 B. 2 C. 4
 D. 5 E. More than 5

