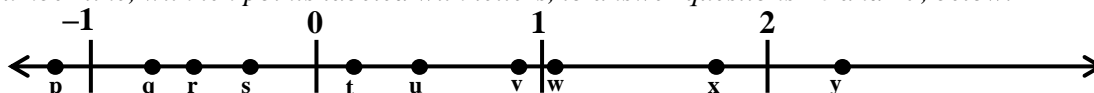


*Seventh Grade Test - Excellence in Mathematics Contest - 2009*

- The sum of two natural numbers is 100 and their positive difference is 42. What is the positive difference of the squares of these two natural numbers?  
A. 1600                      B. 2800                      C. 3600                      D. 4200                      E. 8400
- The sum of 16 consecutive integers is 2008. What is the largest of these?  
A. 132                      B. 133                      C. 134                      D. 135                      E. 141
- The 12 hours on a clock are written in Roman Numerals. How many I's are used?  
A. 15                      B. 17                      C. 18                      D. 20                      E. 23
- Gabe was born on February 29<sup>th</sup>, 1916. So his first true 'birthday' was February 29<sup>th</sup>, 1920. By today, how many 'true' birthdays has Gabe celebrated?  
A. 21                      B. 22                      C. 23                      D. 24                      E. 25
- What is the sum of all positive factors of 42?  
(Note: 1 and 42 do count as 'positive factors' of 42.)  
A. 53                      B. 79                      C. 83                      D. 96                      E. 102

Use this number line, with ten points labeled with letters, to answer questions #6 and #7, below.



- Which of these points is closest to the product  $ux$ ?  
A. t                      B. u                      C. v                      D. w                      E. y
- Which of these points is closest to the difference  $u - q$ ?  
A. p                      B. r                      C. t                      D. v                      E. w
- For all families with an income over \$30,000, a state's income tax is \$900 plus 4% of all income over \$30,000. If Beth Morin's family income is \$56,500, what amount of state income tax do they pay?  
A. \$1960                      B. \$2260                      C. \$2460                      D. \$2860                      E. \$3160
- If two standard 6-sided dice are tossed, what is the probability that the product of the two numbers rolled is even?  
A. 1/4                      B. 1/2                      C. 5/8                      D. 19/39                      E. 3/4
- From an 8x8x8 cube, a 2x2x2 cube is removed from each corner. What fraction of the 8x8x8 cube is removed?  
A. 1/4                      B. 1/8                      C. 1/2                      D. 3/32                      E. 3/8



**Seventh Grade Test - Excellence in Mathematics Contest - 2009**

19. This sheet of paper is numbered from 1 through 16, as shown. While lying on a table, this sheet of paper is folded in half four times. After the following sequence of four folds, in this order, the square with which number will be on top (even if you can't see the number)?

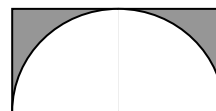
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

**“Top half over Bottom half”**  
**“Right half over Left half”**  
**“Left half over Right half”**  
**“Bottom half over Top half”**

- A. 6                      B. 10                      C. 13                      D. 14                      E. 15
20. For every  $3^{\circ}\text{C}$  rise in temperature, the volume of a certain gas increases by 4 cubic centimeters. 50 cubic centimeters of this gas at  $-8^{\circ}\text{C}$  is heated from  $-8^{\circ}\text{C}$  to  $19^{\circ}\text{C}$ . By what percent does the volume increase?

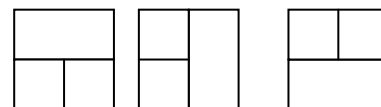
- A. 36%                      B. 42%                      C. 58%                      D. 60%                      E. 72%

21. A semi-circle with diameter 18 cm is inscribed in a rectangle. Rounded to the nearest tenth, what per cent of the rectangular region is shaded?



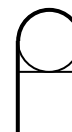
- A. 21.5%                      B. 22.8%                      C. 23.4%                      D. 24.2%                      E. 25%

22. A square magazine page, 12 cm by 12 cm, is to be filled with any mix of ads that each measure  $12 \times 6$ ,  $6 \times 12$ , or  $6 \times 6$ . How many different designs are possible? Note: Being a magazine page, these three sample designs are considered ‘distinct’.



- A. 4                      B. 6                      C. 7                      D. 8                      E. 9

23. A circle with diameter 12 cm sits on top of a square with side 12 cm. Pulled tight, a piece of tape is wrapped exactly once (without overlap) to hold the square and circle together, as shown. To the nearest tenth of a centimeter, what is the length of the piece of tape?



- A. 66.8                      B. 73.7                      C. 85.7                      D. 104.5                      E. 123                      12 cm

24. The first three numbers in a sequence are **512**;  **$1/32$** ; **16**. Each new number in the sequence is the product of the previous two numbers. If 512 is the first number in the sequence, what is the  $8^{\text{th}}$  number?

- A.  $1/64$                       B. 32                      C. 64                      D. 128                      E. 4096

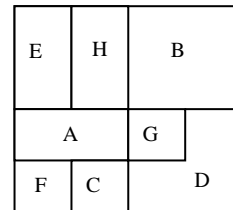
25. You have 2 dimes, 8 pennies, and 4 nickels. In how many different ways can you make \$0.26? (Note: A solution such as “4 nickels and 6 pennies” counts only once even though you would have a choice of which 6 of the 8 pennies to use.)

- A. 2                      B. 3                      C. 4                      D. 5                      E. 6

**Seventh Grade Test - Excellence in Mathematics Contest - 2009**

26. A 3-digit natural number is divisible by 5 but not by 10. The hundreds' digit is odd and the tens' digit is twice the hundreds' digit. What is the sum of all 3-digit numbers that meet all of these conditions?  
 A. 490                      B. 540                      C. 560                      D. 600                      E. 660
27. A bag contains only blue marbles, green marbles, and 24 red marbles. If the probability of drawing a blue marble is  $\frac{1}{2}$  and the probability of drawing a green marble is  $\frac{1}{8}$ , how many green marbles are in the bag?  
 A. 3                              B. 4                              C. 5                              D. 6                              E. 8
28. How many positive integers less than or equal to 200 are divisible by 3 or 5, but not by both 3 and 5?  
 A. 78                              B. 80                              C. 93                              D. 95                              E. 96
29. The 8-digit number:  $76, \underline{\quad} \underline{\quad} \underline{\quad}, \underline{\quad} \underline{\quad} 4 = N^2$  is a perfect square. What is the sum of the least possible and the largest possible values of N?  
 A. 17,486                      B. 17,487                      C. 17,490                      D. 17,492                      E. 17,494

30. Eight identical sheets of paper were placed, one at a time, overlapping as shown in the diagram. Which sheet(s) of paper could have been the fifth one placed?

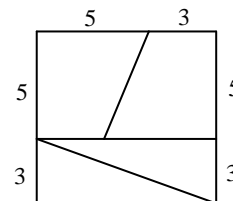


- A. Only A                      B. Only E                      C. Only G  
 D. Only A or G              E. Only D or G

31. In the board game *Careers*, when Zan is sent to the Park Bench square she rolls two standard 6-sided dice on each turn. She can leave the Park Bench square only if she rolls a sum of 7, a sum of 11, or rolls the same number on each die. What is the probability that she can leave Park Bench on her first turn there?

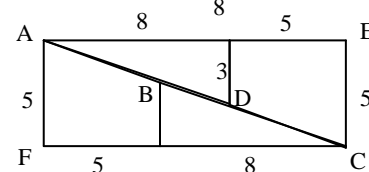
- A.  $\frac{7}{18}$                       B.  $\frac{1}{3}$                       C.  $\frac{1}{2}$                       D.  $\frac{13}{36}$                       E.  $\frac{2}{9}$

32. Two pairs of congruent shapes that form a square are shown to the right. They are rearranged (without overlap) to form the given rectangle AECF. Lengths are in centimeters.



What is the area in square centimeters of the region ABCD?

- A. 0                              B. 0.25                      C. 0.5  
 D. 1                              E. 1.5



33. The "digit-sum" of 744 is  $7+4+4 = 15$ . How many even 3-digit numbers have a digit-sum of 18?  
 A. 22                              B. 25                              C. 27                              D. 30                              E. 36

