MATHCOUNTS®

2005
■ **School Competition** ■
Sprint Round
Problems 1–30

Name _____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of 30 problems. You will have 40 minutes to complete all the problems. You are not allowed to use calculators, books or other aids during this round. Calculations may be done on scratch paper. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the right-hand column of the competition booklet. If you complete the problems before time is called, use the remaining time to check your answers.

In each written round of the competition, the required unit for the answer is included in the answer blank. The plural form of the unit is always used, even if the answer appears to require the singular form of the unit. The unit provided in the answer blank is the only form of the answer that will be accepted.

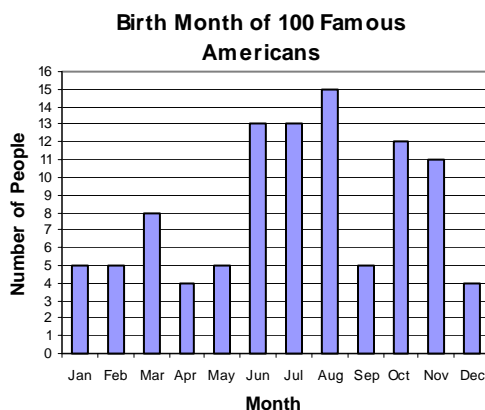| Total Correct	Scorer's Initials

1. The value of a word is determined by adding together the value of each letter. In the alphabet, letters A through H each have a value of 5 cents, letters I through R each have a value of 7 cents, and letters S through Z each have a value of 8 cents. What is the value of the word MATHCOUNTS?

1. _____ cents

2. The shape of Yellowstone National Park is nearly a rectangle 55 miles wide and 64 miles long. What is the area of a rectangle with these dimensions?

2. _____ sq miles

3. The graph shows the birth month of 100 famous Americans. What percent of these people have March as their birth month?

3. _____ percent

Birth Month of 100 Famous Americans

4. How many positive two-digit integers are there in which each of the two digits is prime?

4. _____ integers

5. The coldest night temperature on the moon can reach -280°F. The daytime temperature can reach 160°F. What is the positive difference between these two temperatures?

5. _____ °F

6. Jane's quiz scores were 98, 97, 92, 85 and 93. What was her mean score?

6. _____

7. How many letters of the alphabet shown below have a vertical line of symmetry?

7. _____ letters

ABCDEFGHIJKLMNOPQRSTUVWXYZ

8. If two standard six-sided dice are tossed, what is the probability that a 5 is rolled on at least one of the two dice? Express your answer as a common fraction.
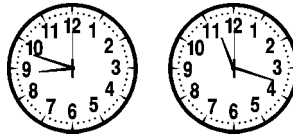
8. _____

9. What is the positive difference between the median and the mode of the data given in the stem and leaf plot below? In this plot, 5|8 represents 58.

Tens	Units
1	2 3 4 5 5
2	2 2 2
3	1 1 8 9
4	0 1 2 3
5	2 8 9

9. _____

10. From 8:48 a.m. to 11:18 a.m. on a Thursday morning, how many seconds elapse?

10. _____ seconds

11. Jeremy buys several items from a catalog. The shaded regions in the order form indicate information Jeremy must supply. Including shipping and handling (S&H), what is the total cost of his order?

11. $ _____

Item #	Item Description	Price per unit	Quantity	Subtotals
V55-005	Gumball Refill	$4.95	2	
V69-064	Gumball Machine	$19.95	1	

Merchandise Total	S&H Costs
$0.01 – $10.00	add $4.95 S&H
$10.01 – $25.00	add $5.95 S&H
$25.01 and above	add $6.95 S&H

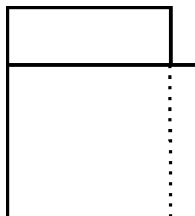| Merchandise Total:	
S&H:	
Order Total:	

12. The marble statue of Abraham Lincoln in the Lincoln Memorial has a height of 60 feet. A scale model of the statue has a height of 4 inches. How many feet of the statue does one inch of the model represent?

12. _____ feet

13. Harold had a bag of marbles. He gave 40% of the marbles to his best friend Steve. He gave his sister a fourth of the remaining marbles. There were then 18 marbles left in the bag. How many marbles did Harold have originally?

13. _____ marbles

14. A sheet of 8-inch by 10-inch paper is placed on top of a sheet of $8\frac{1}{2}$ -inch by 11-inch paper, as shown. What is the area of the region of overlap?

14. _____ sq inches

15. It costs 2.5¢ to copy a page. How many pages can you copy for $20?
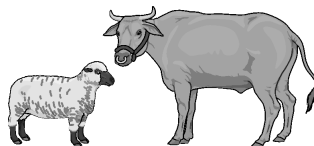
15. _____ pages

16. It takes exactly 74 colored beads on a string to make a necklace. The beads are strung in the following order: one red, one orange, two yellow, one green, and one blue. Then the pattern repeats starting again with one red bead. If the first bead of the necklace is red, what is the color of the last bead used to make the necklace?

16. _____

17. In how many different ways can 40 be written as a sum of two positive prime numbers? The sums $a + b$ and $b + a$ are considered to be the same.

17. _____ ways

18. Together two farmers rented a pasture for $140. The first farmer placed his four oxen in the pasture, and the second farmer placed his 30 sheep in the pasture. How much should the first farmer pay if one ox eats as much as ten sheep, and the rent is based on the portion of the pasture that is eaten by each farmer's animals?

18. $ _____

19. In parallelogram ABCD, AB = 38 cm, BC = $3y^3$ cm, CD = $2x + 4$ cm, and AD = 24 cm. What is the product of x and y?

19. _____

20. Sophia has 16 plants and one window. Only five plants can be placed in the window at any given time. If each of the 16 plants spends the same amount of time in the window during an eight-hour period of sunlight, what is the greatest number of minutes in the sun that is possible per plant?

20. _____ minutes

21. Mikhail currently has a balance of $5400 in his bank account. This is 60% of the balance he had when he opened the account. How much money will be in his account when the balance is down to 35% of the balance he had when he opened the account?

21. $ _____

22. Find the mean of the whole numbers from 1 to 250. Express your answer as a decimal to the nearest tenth.

22. _____

23. A street has 20 houses on each side, for a total of 40 houses. The addresses on the south side of the street form an arithmetic sequence, as do the addresses on the north side of the street. On the south side, the addresses are 4, 10, 16, etc., and on the north side they are 3, 9, 15, etc. A sign painter paints house numbers on a house for $1 per digit. If he paints the appropriate house number once on each of these 40 houses, how much does he earn?

23. $ _____

24. Koalas absorb only 25% of the fiber they eat. A koala absorbed 10.5 ounces of fiber in one day. How many ounces of fiber did he eat that day?

24. _____ ounces

25. For what value of k does the line represented by the equation $1 - kx = -3y$ contain the point (4, -3)?
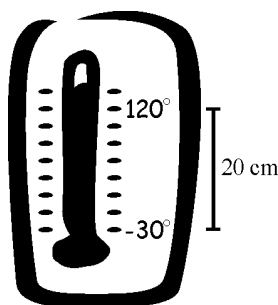
25. _____

26. The data in the table below shows the percent of bus riders in a survey of Central H.S. students; 300 males and 300 females in each grade were surveyed. For which grade is the number of its male bus riders closest to 135% of the number of its female bus riders?

26. _____ grade

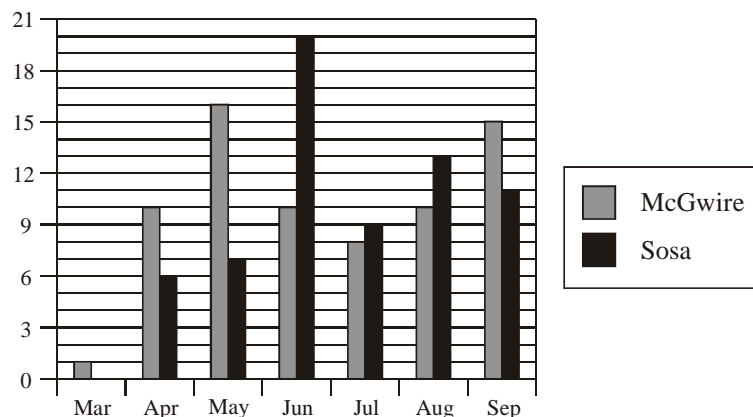| Grade	Males	Females
9th grade	41.1%	39.4%
10th grade	34.4%	33.1%
11th grade	20.6%	13.8%
12th grade	11.6%	8.6%

27. On a mercury thermometer with equally spaced temperatures from -30º to 120º, the distance between the marks for -30º and 120º is 20 cm. When the temperature rises from -8º to 22º , what is the distance that the mercury rises?

27. _____ centimeters

120°

20 cm

-30°

28. The double-bar graph shows the number of home runs hit by McGwire and Sosa during each month of the 1998 baseball season. At the end of which month were McGwire and Sosa tied in total number of home runs?

28. _____

29. Two different integers are randomly chosen from the set {-5, -8, 7, 4, -2}. What is the probability that their product is negative? Express your answer as a common fraction.

29. _____

30. What is $7\frac{5}{7}\%$ of the expression $17.7 - 2\frac{1}{9} + 2.3$? Express your answer as a decimal to the nearest hundredth.

30. _____