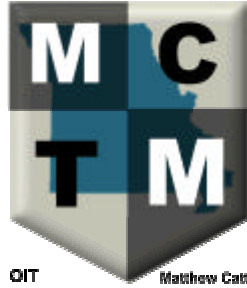


# 2001 MCTM Elementary Mathematics Contest – Sample Test

Grades 4-6

Sponsored by the  
Missouri Council of Teachers of Mathematics



## 2001 Sample Test Questions and Solutions

**Concepts Test:** This test will attempt to assess knowledge of and about mathematics. Recall of facts and understanding of relationships will be essential. Items involving Number and Number Sense, Geometry (including visualization, transformations and Logo), Measurement, Data Analysis, and Probability and Statistics will be included in this section of the test.

**Problem Solving Test:** This test will assess higher order thinking skills. These items should require an application of mathematics utilizing both concepts and/or computation. A wide variety of problems can be expected, all of which can be solved utilizing problem solving strategies found in current literature. Expect to spend more time on some items of this test than on items on the Concepts Test.

**Labels on Solutions:** Solutions will require labels when they involve money (\$ or ¢), time (a.m. or p.m.), or measurement (cm, in,  $\text{cm}^2$ , ft & in, hours & minutes, weeks & days...).

**Student Tools:** Each student needs to bring sharpened pencils, an in/cm ruler, and a calculator (optional). Fifth grade students should also bring a protractor; and sixth grade students should also bring a protractor and a compass.

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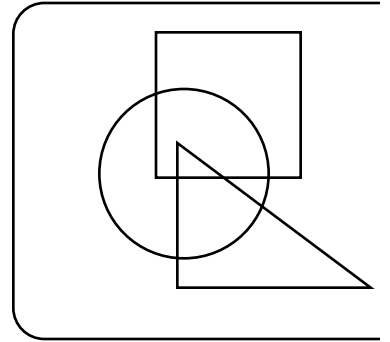
2001 MCTM Elementary Mathematics Contest – Sample Test

4<sup>th</sup> Grade Concepts

1. A 2 liter soda bottle holds approximately ? .
- A. 2 cups                      B. 1 gallon                      C. 2 quarts                      D. 3 pints

2. What is the ratio of the circumference of a circle to its diameter?

3. The product  $1.8 \times 3.3$  is in both the circle and the triangle, but not in the square. Place an X within the appropriate region in the figure where this product would fall.



4. How many  $\frac{1}{2}$  cup servings are there in a gallon of ice cream?
5. Three hundred one is the quotient in the division of 79,765 by what divisor?
6. Paul bought a school notebook at a 30% discount. He paid \$1.19. What was the original price of the notebook before the discount?
7. You purchased two tops, one for \$18.59 and the other for \$22.79. If you give the clerk a \$50 bill, how much change will you get back?
8. The teacher asked the children to open their books to the facing pages whose page numbers add up to 85. To which pages should the class turn?
9. Find the mean of the following set of data.  
26, 32, 67, 87, 90, 18
10. The average monthly rainfall for 6 months was 28.5 inches. If it had rained 1 inch more each month, what would the average have been?

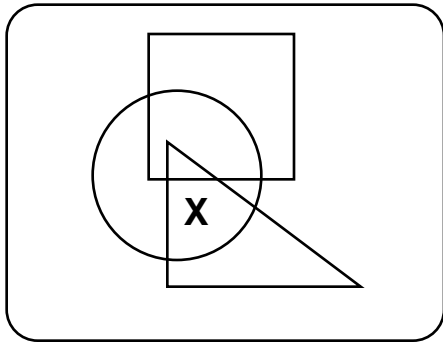
2001 MCTM Elementary Mathematics Contest – Sample Test

# KEY

Name 4th Grade Concepts

- C
1. \_\_\_\_\_  
or pi or 3.14 or 22/7
2. \_\_\_\_\_

7. \$8.62
8. 42 and 43
9. 53 1/3 or 53.33
10. 29.5



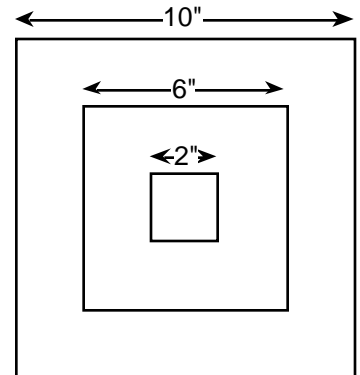
3. \_\_\_\_\_  
32
4. \_\_\_\_\_  
265
5. \_\_\_\_\_  
\$1.70
6. \_\_\_\_\_

## 2001 MCTM Elementary Mathematics Contest – Sample Test

### 4<sup>th</sup> Grade Problem Solving

1. Fill in each blank with a single whole number from 0 to 9, to make the largest possible five-digit decimal number with no digits repeated.  
 $0.\underline{\quad}\underline{\quad}3\underline{\quad}\underline{\quad}8\underline{\quad}$
2. Two small pizzas and one large pizza cost the same as five small pizzas. If a small pizza costs \$4, then what does a large pizza cost?
3. Find the perimeter of a regular pentagon whose sides each measure 9.23 in.
4. Find the number of minutes in the month of March.
5. Use the four digits 3, 4, 5, 6 exactly once each to form a division problem which has a quotient of 0.08. Write the appropriate division problem.
6. A rectangle is formed by placing two identical squares side by side. The perimeter of the rectangle is 60 cm. What is the area of the rectangle in square centimeters?
7. Connie is the youngest of three siblings. Jim is four years older than Connie. Bob is 8 years older than Connie. If the sum of their ages is 165. How old is Bob?

8. What is the probability that a randomly thrown dart would hit the small center square on the dartboard shown at the right?



9. A number is greater than 275. It is less than 325. If you count by 5's you say its name. It can be divided exactly by 3 and 9. What is the number?
10. At the Halloween party, Fancy is throwing darts at jack-o-lanterns and witches. She gets 5 points for every jack-o-lantern she hits and 8 points for every witch. She has hit 13 jack-o-lanterns and witches altogether and has 80 points. How many jack-o-lanterns and how many witches has she hit?

2001 MCTM Elementary Mathematics Contest – Sample Test

# KEY

Name 4<sup>th</sup> Grade Problem Solving

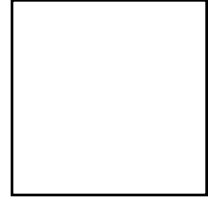
- |    |                     |     |  |
|----|---------------------|-----|--|
| 1. | <u>0.93786</u>      | 8.  | <u>4/100 or 1/25 or 0.04 or 4%</u>     |
| 2. | <u>\$12</u>         | 9.  | <u>315</u>                             |
| 3. | <u>46.15 inches</u> | 10. | <u>8 jack-o-lanterns and 5 witches</u> |
| 4. | <u>44,640</u>       |     |  |
| 5. | <u>3.6/45</u>       |     |  |
| 6. | <u>200</u>          |     |  |
| 7. | <u>59</u>           |     |  |

## 2001 MCTM Elementary Mathematics Contest – Sample Test

### 5<sup>th</sup> Grade Concepts

1. If Filbert is older than Greta, Greta is older than Hal. Hal is younger than Filbert and Ivy is older than Filbert. List the people from oldest to youngest.

2. Draw all the lines of symmetry in this square.

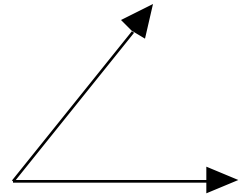


3. How could you rewrite  $12 \times 5 + 12 \times 8$ , using the distributive property?

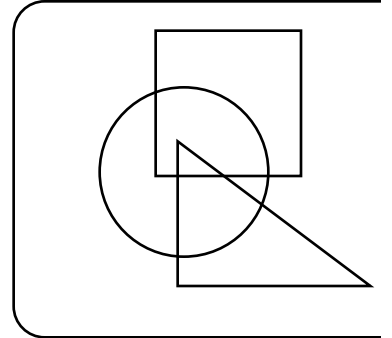
4. If  $x$  is an odd number, how would you represent the odd number following it?

5. The measure of the angle to the right is approximately ...

- A. less than  $30^\circ$
- B. between  $30^\circ$  and  $45^\circ$
- C. between  $45^\circ$  and  $60^\circ$
- D. between  $60^\circ$  and  $75^\circ$
- E. between  $75^\circ$  and  $90^\circ$



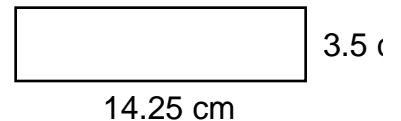
6. The product  $1.8 \times 3.3$  is in both the circle and the triangle, but not in the square. Place an X within the appropriate region in the figure where this product would fall.



7. Find the value of P to make the number sentence true:  $\frac{3}{P} + \frac{2}{9} = \frac{1}{3}$ .

8. List all the prime factors of 56?

9. Find the area of this box.



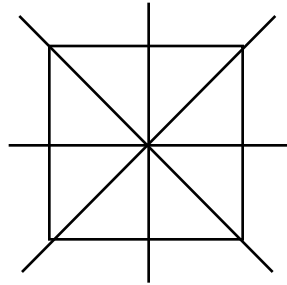
10. You purchased two tops for \$18.59 and \$22.79. If you give the clerk a \$50 bill, how much change will you get back?

2001 MCTM Elementary Mathematics Contest – Sample Test

# KEY

Name 5th Grade Concepts

1. Ivy, Filbert, Greta, Hal



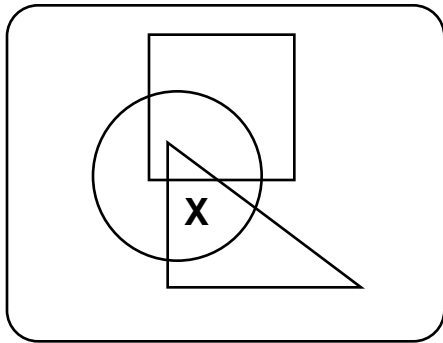
2. 12 ( 5 + 8 ) or 12 ( 13 )

3. \_\_\_\_\_

4. x + 2

5. C

5. \_\_\_\_\_



6. \_\_\_\_\_

7. 27

8. 2 and 7

9. 49.875 cm<sup>2</sup>

10. \_\_\_\_\_

10. \$8.62

10. \_\_\_\_\_

## 2001 MCTM Elementary Mathematics Contest – Sample Test

### 5<sup>th</sup> Grade Problem Solving

1. If a fathom is equivalent to 6 feet, how many fathoms are there in a mile?
2. Baby Dewey is 25 days old and Baby Ellen is 5 days old. How old will Dewey be when he is 3 times as old as Ellen?
3. Find the distance between the points (3, 5) and (6, 4).
4. An elephant ride at the zoo costs \$3.00 for the first 10 minutes and 25¢ for each additional 5 minutes. Liam paid \$4.00 for his elephant ride. How long did he ride?
5. A rectangle is formed by placing two identical squares side by side. The perimeter of the rectangle is 60 cm. What is the area of the rectangle in square centimeters?
6. In 1969, the price of 5 lbs. of flour was \$0.75. In 1970, the price increased by 15%. In 1971, the new price decreased by 5%. What was the price of 5 lbs. of flour in 1971?
7. Jeannie passed around a box of chocolates to the girls at her party. Before the party she ate 5 chocolates and gave a friend 3. Eight girls arrived at the party. The first girl took a chocolate, the second girl took 3 chocolates, the third girl took 5 chocolates and so on. After the last girl took her chocolates, the box was empty. How many chocolates were in the box at the beginning?
8. Ferguson's Department Store bought gloves, six pairs for \$10, and sold them 4 pairs for \$10. Their profit was \$60. How many pairs of gloves did they sell?
9. At the Halloween party, Fancy is throwing darts at jack-o-lanterns and witches. She gets 5 points for every jack-o-lantern she hits and 8 points for every witch. She has hit 13 jack-o-lanterns and witches altogether and has 80 points. How many jack-o-lanterns and how many witches has she hit?
10. Linda is buying a used car for \$5,800. The dealer offered her the option of paying in cash or paying \$1,000 down and 24 monthly installments of \$230. How much more will she pay for the car on the installment plan?

2001 MCTM Elementary Mathematics Contest – Sample Test

# KEY

Name: 5<sup>th</sup> Grade Problem Solving

1. 880

2. 30 days

3. 10 or 3.16

4. 30 minutes

5. 200

6. 82 cents or \$0.82

7. 72

8. 72

9. 8 jack-o-lanterns and 5 witches

10. \$720

## 2001 MCTM Elementary Mathematics Contest – Sample Test

### 6<sup>th</sup> Grade Concepts

1. Which of these numbers is the smallest?

a.  $\frac{1}{3}$       b.  $\frac{3}{10}$       c.  $\frac{333}{1000}$       d.  $\frac{7}{20}$       e. 0.33

2. How many  $\frac{1}{2}$  cup servings are there in a gallon of ice cream?

3. What weight should be placed on the scales at B to balance the scales?



4. The best free-throw shooter on the girls' basketball team made 12 out of 20 free throws. The best free-throw shooter on the boys' team made 14 out of 25 shots. Which team has the better shooter, and what is that person's percent of successful free-throw shots?

5. The lengths of the legs of a right triangle are 5 and 12. What is the length of the hypotenuse?

6. What temperature in Fahrenheit is equivalent to  $30^{\circ}$  C?

7. What would a figure with a square base, 8 edges, 5 vertices, and 5 faces be called?

8. If a fathom is equivalent to 6 feet, how many fathoms are there in a mile?

9. At which of these times is the angle between the two hands of a clock face exactly  $170^{\circ}$  ?

a. 3:50      b. 5:00      c. 6:30      d. 8:10      e. 10:20

10. Evaluate  $x^3 - 3y^2$  when  $x = 22$  and  $y = 7$ .

2001 MCTM Elementary Mathematics Contest – Sample Test

**KEY**

Name 6<sup>th</sup> Grade Concepts

1. **b**  
\_\_\_\_\_

2. **32**  
\_\_\_\_\_

3. **22 1/2**  
\_\_\_\_\_

4. **Girls and 60%**  
\_\_\_\_\_

5. **13**  
\_\_\_\_\_

6. **86°**  
\_\_\_\_\_

7. **square pyramid**  
\_\_\_\_\_

8. **880**  
\_\_\_\_\_

9. **e**  
\_\_\_\_\_

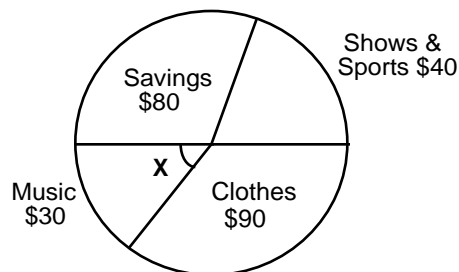
10. **10,501**  
\_\_\_\_\_

## 2001 MCTM Elementary Mathematics Contest – Sample Test

### 6<sup>th</sup> Grade Problem Solving

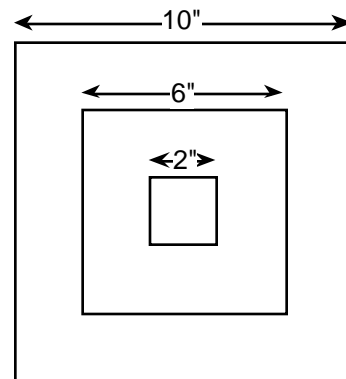
1. Find the distance between the points (3, 5) and (6, 4).
2. The minute hand of a clock is 7 cm long. To the nearest tenth of a centimeter, how far does the tip of the minute hand move in 25 minutes?
3. My father is four times as old as I am. In 20 years, he will only be twice as old as I am then. How old are we right now?

4. Robert made the following circle graph of his weekly earnings from his new job. To make each sector proportional to the amount shown, what is the measure of angle  $x$  in degrees?

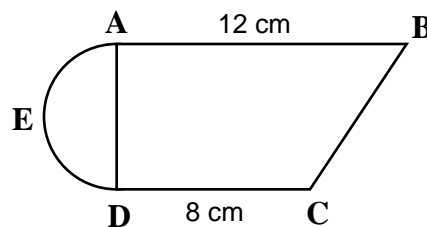


5. I am an astronomer and my telescope lens is 1.372 m in diameter. My friend, the spy, has a camera with a lens only 2.9 cm across. About how many of his lenses would fit across the lens of my telescope?
6. On snow days, Mr. Kleghorn has to call 3 people. Each of them must call 3 people, and each of them calls 3. How many people in total will be aware of the snow day, including Mr. Kleghorn, if this calling chain continues for two more rounds?
7. An aquarium is filled by pouring in one cup of water the first hour, two cups the second hour, four cups the third hour, 8 cups the fourth hour, and so on. It took 6 hours to fill the aquarium. What fraction of the aquarium was filled after 5 hours?
8. The record for the most consecutive sit-ups is 17,000. At 40 sit-ups per minute, how many hours and minutes would it take to tie the record?

9. What is the probability that a randomly thrown dart would hit the small center square on the dartboard shown at the right?



10. Line segment AB is parallel to line segment CD. The semicircle AED has a diameter of 6 cm. To the nearest thousandth, what is the area of the trapezoid ABCD plus the semicircle AED?



2001 MCTM Elementary Mathematics Contest – Sample Test

# KEY

Name 6<sup>th</sup> Grade Problem Solving

1. 10 or 3.16

2. 18.3

3. I am 10 and Father is 40

4. 45

5. 47

6. 364

7. 31/63

8. 7 hrs and 5 min

9. 4/100 or 1/25 or 0.04 or 4%

10. 74.137 cm<sup>3</sup>