Contest Corner

A New Twenty-Minute Mathematics Contest

Michael Flick and Debbie Kuchey, Xavier University

Introduction

It has been a number of issues since we provided a practice mathematics contest. The 20 minute mathematics contests featured in previous issues were very popular. Therefore, another short practice contest will be featured in this issue.

2009 Contest Results

The OCTM's 2010 State Tournament of Mathematics took place on February 27, 2010. Now is the time to start assembling a team to represent your school in competition for 2011! Since the 2010 results were not available as we go to press with this article, we can revisit the 2009 contest results. You can find more information on the OCTM State Tournament of Mathematics at http://www.octmtournament.org. Overall results from the 2009 State Tournament of Mathematics are summarized in Table 1.

Table 1 2009 Overall State Tournament of Mathematics Results

Rank	School	Score
1	William Mason High School	135
2	Sycamore High School	133
3	Thomas Worthington High School	127
4	Beavercreek High School	123
5	Hawken Upper School	121
6	Lakota West High School	120
7	Dublin Scioto High School	117
	Seven Hills Upper School	117
9	Dublin Jerome High School	116
	Strongsville High School	116
11	Revere High School	113
12	Upper Arlington High School	109
13	Worthington Kilbourne High School	104
14	Western Reserve Academy School	99
15	St Xavier High School	98
16	Athens High School	97
17	Brecksville-Broadview Heights	96
18	Sylvania Southview High School	94
19	Dublin Coffman High School	93
20	Cincinnati Country Day School	90
	Walnut Hills High School	90
22	Olmsted Falls High School	89

Awards and Recognition

The OCTM also presents awards and recognition to participating schools by their size. In this way, small schools are not put in direct competition with larger schools. OCTM uses a five level system to group schools. Level 1 schools have fewer than 100 students per grade level, Level 2 schools have between 100 and 162 students per grade level, Level 3 schools have between 162 and 234 students per grade level, Level 4 schools have between 234 and 362 students per grade level and Level 5 schools have more than 362 students per grade level. In April, every school principal in Ohio is mailed a copy of the tournament score report. Be sure to ask your principal for a copy of the 2010 results.
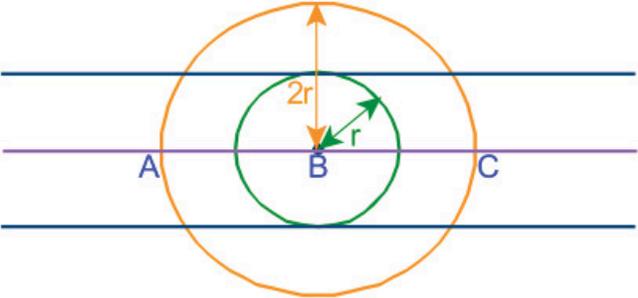
Exam Content

Most of the annual State Tournament of Mathematics questions consist of routine problems found in standard high school mathematics textbooks. All of the problems can be solved using algebra, geometry, and arithmetic and calculators are certainly allowed. Preparation for this annual contest can be accomplished in a variety of ways. However, many successful schools have mathematics clubs that regularly take short contests for preparation. The following is a 20 minute mathematics contest that can be used in the classroom or with a mathematics club. It is setup in the format of the OHIO MATHEMATIC LEAGUE (http://www.themathleague.com/) or the Atlantic Pacific Math League (http://www.atpacmath.com/). These mathematics leagues are great experiences for students that will prepare them for the State Tournament of Mathematics.

Practice Contest

PRACTICE MATHEMATICS CONTEST*

NAME_____ SCORE_____

TIME LIMIT: 20 minutes

ANSWERS

1. In a group of hunters and dogs, the number of legs is 100 more than twice the number of heads. How many dogs are in the group?

1. A father's will divides his estate of 'n' thousand dollars among his four children so that his oldest gets ½ of his estate; his second oldest gets ¼; his third oldest gets 1/5; and his fourth child gets $7000. What is the dollar value of the father's estate?

3. Given a circle with two parallel tangents to the circle. Find the number of points that are equidistant from the circle and the two parallel tangents.

3. The average of a set of 10 test scores is 80. If the highest score of 96 and the lowest score of 40 are discarded, find the average of the remaining test scores.

*For similar problems see The MAA Contest Problem Books (see Reference List for more details).

Solutions to the Practice Contest problems require only the application of some basic high school mathematics. It should be noted that there are many ways to solve each of these problems. In the following key, one possible solution to each is presented. Ω

PRACTICE MATHEMATICS CONTEST SOLUTIONS	ANSWERS
1. Let h = the number of hunters and d = the number of dogs. $2h + 4d = 100 + 2(h + d)$ and $d = 50$.	50
2. The sum of the fractions ½, ¼, and 1/5 is 19/20. Hence, 1/20 of the Estate is $7000. So the estate is 20 x $7000 = $140,000.	$140,000.00
3. Consider the figure below. Let the green circle (radius r) with two parallel tangents is the given circle. The orange circle has a radius of 2r. Thus the points 'A', 'B', and 'C' are a distance of 'r' from both the given circle and the two parallel tangents.	3
4. If the average of 10 test score is 80, the SUM (S) of the 10 scores must be S = 10 x 80 = 800. If 40 and 96 are discarded from the sum, the 8 remaining scores have a sum of Z = 800-40-96 = 664. The average A = 664/8 = 83.	83

References

Faires, J. & Wells, D. (2008). *Contest Problem Book IX*. MAA. Washington, D.C.

Think About It!

JUST THINK ABOUT DOING HOMEWORK

"The scientist's conclusion: mental imaging may be just as good as actual practice."

Tammet, D. (2009). *Embracing the wide sky: A tour across the horizons of the mind*, 17. Free Press. NY.

"To expect the unexpected shows a thoroughly modern intellect."

Oscar Wilde
from the play *An Ideal Husband* (1895)

DEBORA KUCHEY served as a Teacher Leader in the Kentucky Middle Grades Mathematics Teacher Network for several years. She is currently the College Representative for the Greater Cincinnati Council of Teachers of Mathematics. Dr. Kuchey is an Associate Professor in Early and Middle Childhood Education at Xavier University.

MICHAEL FLICK has served the Ohio Council of Teachers of Mathematics as State Contest Coordinator for nearly 25 years. He has received numerous teaching awards and honors. Dr. Flick is Professor, Director of the Xavier Center for Excellence in Education, and Chair of the Department of Secondary and Special Education at Xavier University.

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