



MONTANA MATHEMATICS

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Understanding the Montana Mathematics Criterion-Reference Test Carl Anderberg

The CRT is a test developed by Measured Progress for the State of Montana to address the federal requirements of “No Child Left behind”. The test consists of items from two sources, an off-the-shelf test developed by Measured Progress and items developed by Montana educators. The CRT items are linked to the Montana content standards.

The test will be given in the spring of 2006 to grades 3-8 and 10. In the past the test has been given to grades 4, 8 and 11. There are 16 different forms of the test per grade. The CRT consists of common items and field test items. The common items are questions that all the students answer and these are the items that are used for scoring. The field test items are questions that are being tested to become common items on future tests.

Every year a development team meets to develop new items.

The types of items on the CRT are multiple choice, short answer and constructed response. The multiple choice and short answer items are worth zero or one point and the constructed response items are graded using a rubric that assigns point values of zero, one two, three or four. The 2005 test for 4th and 8th grades had 55 multiple choice, three short answer and two constructed response items. The 10th grade test had 60 multiple choice, three short answer and two constructed response items. The total possible raw score for the 4th and 8th grade tests were

66 and the 10th grade was 71.

The student’s raw score is converted to a scaled score between 200 and 300. A scaled score is used for consistency between grade levels and subjects (reading and math). The table at the lower left of the page shows the range of values for the perfor-

The raw scores are converted to scaled scores. Scaled scores for nearing proficiency and proficient are found using a linear transformation. The novice and advanced raw scores are forced to fit the scaled scores.

March 9 to March 29 is the four week testing window for this years CRT. Teachers and administration need to realize that this is an untimed test even though it comes with time guidelines. Using the length of the testing window, the unlimited time for the students to take the exam, a small number of students per test administrator and a comfortable testing environment will help to promote student achievement.

At this web address, www.opi.mt.gov/Assessment/index.html you will find more information on the CRT, including the 2004 and the 2005 released test items. It is important that time is spent going over questions from the test to familiarize students with the test and allow them to practice answering the different types of testing items. Answering multiple choice questions, short answer or constructed response all require different test taking skills.

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	Raw Score	Scaled Score

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President's Message

After teaching for 36 years, you think you have seen it all. Not so. I have been teaching math in Lewistown for the last 29 years and up until this year we have had one snow day. This year in December alone we had two. To quote a classmate of mine many years ago, "The wind she blew and the snow she flew and you couldn't see for a minute or two". The minute or two actually lasted a day or two. I have to confess, I really enjoyed the days off. It was like a free day, no prep for the next day, just watch a mindless video or two. We will have to make up some hours for those days, but it was relaxing.

During the break I had a little time to reflect on my year so far. We started the school year with an all staff assembly at the high school here in Lewistown. We watched a video made by National Geographic photographer Dewitt Jones. The title of the video is "Celebrate What's Right with the World." A point that Dewitt made was that you don't have to be "the best *in* the world, but rather you need to be the best *for* the world". I wondered what I had done in the past year to become "the best for the world". I considered some questions as I continued my reflections.

Have I grown in my profession? Have I attended workshops? Have I taken education or math courses to improve my skills? You do not have to look very far in Montana to find some excellent opportunities to grow. If you are frequent visitor to the MCTM website, updated regularly by my friend Tony Riehl, you will find all kinds of information about classes, workshops and to learn new ideas and methods. The website is www.montanamath.org. Also, a great place to find the happening things in Montana is to visit www.MontanaLearning.org, the website for the Montana Learning Center under the direction of Jean Howard.

Am I as caring now as I was in the early fall? Our patience and tolerance for students' excuses and actions start to weigh thin during the cold winter months. I know I have said this before, but you never know how much what you say and the way you say it will mean to a student. A couple of years ago I was asked to be a reader at a funeral for the mom of a former student. He told me that if wasn't for me, he never would have graduated from high school. Honestly, I can't remember what I said. So keep in mind they remember all of us, our attitudes, and how we treat every one of them.

Am I part of a team? Working with colleagues can be a huge stress reliever. I find that my problems are not unique and that others have the same thoughts running through their heads, too. Sharing your successes as well as your failures is a great way to eliminate some self-inflicted tension. As I look back at some of the things that kept me awake at night, after talking with another teacher (friend) the trials were not near as great as I had originally thought. Do share victories too. As teachers, we have a tendency to keep things to ourselves and not shout out when we have our memorable moments.

Am I challenging my students? The rating scales of the new MontCAS classifies students as "novice", "nearing proficient", "proficient", and "advanced". I always hope that I am pushing students towards the advanced stage? I hope there are problems that I pose to students everyday in my teaching that make them think. Questions that do not have the immediate, obvious solutions. Ones that answer the "what" and the "why" and not just the "how". Think back, are you asking questions that push students to think beyond the lesson in the book? A former teacher from Bozeman, Lance Johnson, asked me once, "Did you ever wonder?" I love that phrase and use it a lot in my teaching.

Am I trying to be the best *for* the world? I wonder if my attitude, preparation and general disposition makes me the teacher I really want to be. Do I recognize the opportunities before me each day to affect the positive? I hope that I can create an atmosphere where students can unleash their creativity and harness their positive energy. I know that each teacher faces some enormous challenges during the year, but to be effective, we must see that every situation is an opportunity to accentuate the good, not emphasize the negative.

Here is hoping that during this new year, you are "the best *for* the world". -Jim Hamling

SIMMS Announcement

The excitement is building for MCTM's new arrival! Join us in Billings in October 2006 for the celebration! See how it can positively impact your classroom and your students' outlook toward mathematics.

Lesson Plans

Complete lesson plans are available at www.montanamath.org

K-6

Grade Level: 4th - 6th Grade

Title: Cluster Problems
k12.mt.us

Submitted by: Angel Greenley greenleya@billings.k12.mt.us

Abstract: Cluster problems are sets of 3 or more problems that use known facts from the first problems to find an answer to a more difficult problem. You want to encourage students to look for patterns and connections between the problems. **The main focus of cluster problems is to help build number sense and fluency with numbers.**

See www.montanamath.org for several examples and 5 worksheets to use in conjunction with this lesson.

Middle School

Around or All Over

Submitted by Linda Horst (horstl@billings.k12.mt.us)

8th Math – Will James Middle School, Billings

“Area – do you multiply or add?” “Perimeter what does it mean?” Perhaps your middle school students have asked these questions when presented with the topics of area and perimeter. If so, access MCTM’s website, www.montanamath.org, for a two-day hands-on lesson. The posted lesson plan is detailed enough for a novice and guaranteed to remind the seasoned teacher of what college methods courses required for lesson plans. This activity is an excellent way to help students conceptualize the difference between area and perimeter. Students will need tiles to complete the activity and a copy of the two-page worksheet. Try it, your students will enjoy it and you will be excited with the results.

MCTM History Tidbits

Many consider numbers to be the vocabulary of mathematicians, but we know letters are just useful. The patterns of letters below are not variables however, but have appeared in connection with various activities of MCTM. Some are current projects, others no longer exist but helped shape mathematics as we do it in Montana. How many can you identify? (see the answers elsewhere in this newsletter)

BITL
IMPACT
MMASS
SMART
STEP

COMET
MEIM
PAESMT
STARs
TOTOM

EMME
MLC
SIMMS
STEM

-Answers on page 5

ASK BARNEY



1. **Barney, you know you are just a dog, why do people keep writing to you for information?**

Actually, you can learn a lot from a dog. Like: a) Leave room in your schedule for a good nap; b) If you stare at something long enough, you will eventually get what you want and c) Always give people a friendly greeting. There is nothing more effective than a cold nose on a warm part of the body.

2. **Last time you mentioned about crossing a pointer and a malamute to get a moot point. Are there any other cross-breeds that I should know about?**

You know there are. A Pointer + a Setter makes a Poinsetter, a traditional Christmas pet. A Terrier + a Bulldog makes a Terribull, a dog that makes awful mistakes. A Pekingese + a Lhasa Apso makes a Peekasso, an abstract dog. And finally, a Deerhound + a Terrier makes a Derrier, a dog that is true to the end.

3. **I just heard of a math program in Montana called BITL. I know what a BLT is, but what is a "BITL"?**

BITL stands for "Before It's Too Late!" a series of three workshops funded by The Office of the Commissioner of Higher Education. The workshops being held in Poplar, Havre, Butte, Lodge Grass and Helena are designed to prepare teachers to help their students understand the necessity of mathematics at all ages for post-secondary education. Promoting the message "**when** you attend post-secondary education" not "**if** you attend post-secondary education" provides the incentive to teach all students algebra, geometry, and statistics. The workshops are also designed to prepare teachers to understand and help their students demonstrate their knowledge on various

Deadline for March Newsletter is

March 10, 2006

e-mail articles to

kathje_dalton@gfps.k12.mt.us

assessments including MontCAS, NAEP, PISA, ACT or SAT. Find more information at www.MontanaLearning.org Teacher programs. Also check out the BITL forum for valuable discussions.

4. **I have been thinking a lot about my teaching and I was wondering, what is "math proficiency"? We are hearing that our students are supposed to be proficient, what about me as a teacher?**

That is a great question. I went to the master of research, my good friend Dick Seitz. His explanation is very good. (Would you have thought anything else about Dick?) He sees this broken down into to five components: 1) **Conceptual Understanding** – comprehension of math concepts, operations and relations, 2) **Procedural Fluency** – skill in carrying out procedures flexibly, accurately, efficiently and appropriately, 3) **Strategic Competence** – the ability to formulate, represent and solve mathematical problems, 4) **Adaptive Reasoning** – capacity for logical thought, reflection, explanation, and justification, and 5) **Productive Disposition** – habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy.

5. **What?**

He goes on (and on, and on, ...). This definition of mathematics proficiency allows us to reflect on what might be missing from our instruction that is essential to building success in learning mathematics. If a teacher's view of mathematics teaching and learning just concentrates on procedural or computational fluency in students' performances they may need to find activities, problems and lessons that use other components of teaching.

*-Feature Article
Continued from page 1*

The Montana Standards are a demanding set of standards. Since the CRT is constructed around these standards we can use this as an ally to expect more from our students.

Please feel free to contact me with questions or comments at canderberg@helena.k12.mt.us

References:

Criterion-Referenced Test 2005 Technical Manual, Montana Office of Public Instruction
Judy Snow, Statewide Student Assessment, Montana Office of Public Instruction
Measured Progress, Dover, New Hampshire

Vocabulary Corner
 Submitted by Angel Greenley
greenleya@billings.k12.mt.us

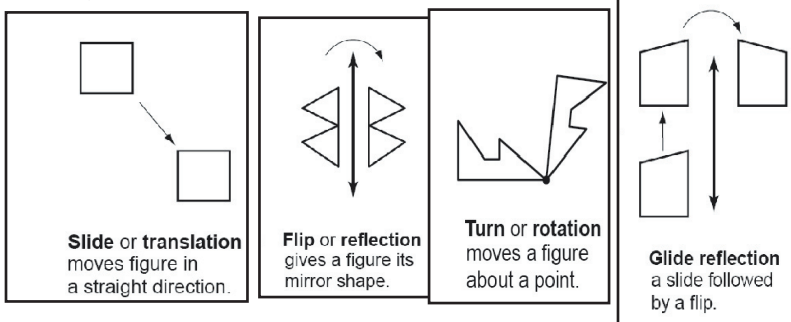
The words for this edition's vocabulary corner come from the following publication put out by OPI.

MATH VOCABULARY LISTS* FOR SPRING 2006 CRITERION-REFERENCED TEST

FOR GRADES 3, 8, 10

The words listed below were chosen because they were found on MOST of the grade level lists. If you would like a more comprehensive list, please visit <http://www.opi.state.mt.us/>

Transformations: Used to move a figure to a new position without changing its size or shape. Examples of transformations include:



Other words associated with transformations include:

- Clockwise
- Counterclockwise
- 90° ($\frac{1}{4}$ turn)
- 180° ($\frac{1}{2}$ turn)
- 270° ($\frac{3}{4}$ turn)
- 360° (full turn).

MCTM History Tidbits - Answers

Answers to the MCTM History Tidbits

- BITL: Before It's Too Late
- COMET: Creating Opportunity in Mathematics for Exemplary Teaching
- EMME: Excellence for Montana Mathematics Education
- IMPACT: Integrating Math Programs and Computer Technology
- MEIM: Mathematics Education Inservice for Montana
- MLC: Montana Learning Center
- MMASS: Montana Mathematics and Science Society
- PAESMT: Presidential Awards for Excellence in Science and Mathematics Teaching

SIMMS: Systemic Initiative for Montana Mathematics and Science

SMART: Science and Math Academies for Rural Teachers

STARs: Student/Teacher Assessment Resources

STEM: Six Through Eight Mathematics

STEP: Systemic Teacher Education Project

TOTOM: Teachers of Teachers of Math conferences

MCTM Membership Form

New Member Renewal
 Elementary MS HS
 College Other
 Name _____
 Address _____

 Phone Number: _____
 Email: _____

Annual Dues (September- August)	
_____ Regular (1 yr)	\$15
_____ Regular (2 yrs)	\$25
_____ Regular (10 yrs)	\$100
_____ Life Time	\$150
_____ Student	\$8
_____ Retired Educator	FREE
_____ MCTM & MSTA	\$30
_____ Contribution to Scholarship Fund \$5 to \$ 8	

Send Form with correct amount to:
 Lisa Wood, MCTM Membership Chair
 1911 Belvedere Drive
 Billings, MT 59102
woodl@billings.k12.mt.us

Jokes & Quotes by charlie

A man walks into a bar with a slab of asphalt under his arm and says,
"A beer please, and one for the road."

What is pink and fuzzy?
Pink fuzz.

How can you tell if a mathematician is flirting with you?
S/he is looking at your shoes.

"Zero hit the USS Yorktown like a torpedo. On September 21, 1997, while cruising off the coast of Virginia, the billion-dollar missile cruiser shuddered to a halt. Yorktown was dead in the water. ... When the Yorktown's computer system tried to divide by zero, 80,000 horsepower instantly became worthless."

Zero, The Biography of a Dangerous Idea. Charles Siefe, pg1

SIMMS trivia

Terry Souhrada

1. Did you know that in 1992 MCTM began a writing project to produce of an integrated mathematics curriculum for grades 9-12 designed to change the way teachers taught mathematics? (Its name–The Systemic Initiative for Montana Mathematics (SIMM))
2. Did you know that the National Science Foundation required that SIMM show connections to science and thus became the SIMMS project? (The last "S" is for "and Science.")
3. Did you know that the materials were all written by high school teachers? (There were 24 original writers the first summer with many others to follow during the life of the original grant.)
4. Did you know that the SIMMS project made it possible for schools to purchase calculator and computer technology for their classrooms at a highly discounted rate? (Schools received up to 50% support for funding of computer stations and hand-held calculators for student use with the SIMMS mathematics curriculum.)
5. Did you know that mathematics educators outside the state of Montana thought so highly of the SIMMS materials that they suggested that it be produced as a nationwide curriculum? (The National Science Foundation agreed and extended the funding of the SIMMS project for two additional years to make the SIMMS Integrated Mathematics curriculum a nationally marketed integrated mathematics program.)
6. Did you know that the SIMMS curriculum is currently marketed through Kendall-Hunt Publishing under the name SIMMS Integrated Mathematics: An Modeling Approach Using Technology? (The second edition is currently for sale. The release of the third edition is scheduled for the spring of 2006.)

Summer PDA's

**** The K-6 PDA is on Number Sense, it will be in Billings, June 12-15.

**** The 7-12 PDA is on T-N-T: Technology and Teach-

**MCTM Scholarship Article
by Joan Gates from Kalispell**

During my 25+ years of teaching middle school math, I hear occasional mention of a parent attending our local community college. More than once, I have heard, "We are working on the same stuff my mom (or dad) is doing in a college math class!" Some of those parents even call me after hours for help with a vexing homework problem.

This situation, especially in the last 10 years, has led me to question where students might need bolstering in math instruction; more pointedly, how do students succeed in high school math if they are not fully comprehending the concepts and processes of middle school math? Even though I am only armed with a degree in elementary education, I continually search for ways to give my students useful math instruction for retention into high school and (hopefully!) beyond. The MEA /MFT conferences I have attended over the years provide a wealth of sections in math, sponsored largely by the Montana Council of Teachers of Mathematics, and it is usually easy to find something devoted to the breakdown or closer inspection of math skill, theory, process or concept, and of course, we all look for those hand-

outs!

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Greetings from MLC, The Montana Learning Center

Please take time to check out our website www.MontanaLearning.org. We have been diligently working to get all the programs listed with registrations as well as descriptions.

Don't miss the upcoming event –“**Learning Technology at the Lake**” **T³ Regional Conference 23-24 March**: Building the Power of Algebra with Technology provides active learning for teachers to integrate technology into classroom instruction. What a wonderful time to come and learn how to use technology in your classroom. Splendid speakers, marvelous meals, and powerful professional development await you, register today.

Along with planning your summer learning experiences, you can help students to plan theirs. There is a camp for three age groups; Camp Discovery, Young Naturalists, and Innovations in Math and Science. It only takes a moment to download the information and pass it on. I can also send you the information if you prefer. In fact, please nominate a male and female student for a scholarship to the Young Naturalist and the Innovations in Math and Science programs. Send your nominations to Jean Howard jkhoward@montanalearning.org.

Montana Learning Center Student Programs

Camp Discovery:

August 7th - August 10th 2006 Students participate in hands-on science, crafts, and story telling programs. (Students entering grades 1-3 Fall 2006)

Young Naturalists' Program:

July 24th - July 27th 2006 Students will explore the many fields of Earth Science. Through Geology, students will learn to identify various rocks, fossils, geologic structures, and learn how the earth works. Through Meteorology, students will come to understand principles of weather and properties of water. Through Astronomy, students will observe the night sky; learn summer constellations, planets, and features of the universe. Other activities include: floating a portion of the Missouri River, observing wildlife, swimming, and building shelters. (Students entering grades 4-6, Fall 2006). **Scholarships Available!!**

Innovations in Math and Science:

July 10th - July 14th 2006 OR July 31st - August 4th This one is really fun! It is a residential (stay in dorms) program for students grades 7-9 in mathematical and scientific thinking at the Montana Learning Center at Canyon Ferry Lake, presented by award-winning mathematics and science instructors from Helena, Kalispell, and Great Falls. Come make some new lifetime friendships. (Students entering grades 7-9 Fall 2006)

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During this past MEA /MFT conference in Missoula, I found a very crowded session called Method to Your Mathness, presented by two adult educators from Billings, Rose Steiner and Kathie Daviau. The detailed handout and accompanying CD were filled with specific ideas for presentation or re-teaching of crucial concept or foundational skills. Long division, for example, is almost always a struggle to master for the middle school student. Now consider how many adults also wrestle with the complexities of that particular skill; most probably just reach for the calculator. The presenters in this workshop gave many pointers and hints to demystify the process of show-your-work, long division. Upon returning to my classroom and questioning a group of 7th graders, I was amazed to find not one student had ever witnessed the “subtraction” display (in vertical form, $277 \div 45 = 277 - 45$ repeatedly, how many times with what remaining?) This explains why long division is actually a shortcut; the students loved to watch their teacher labor through the process, begging me to use bigger numbers!

Even a process as simple as efficient borrowing when subtracting was clarified by the “Madness” presenters. Too many zeroes can puzzle even the wisest 8th grader. Steiner and Daviau presented a different approach to borrowing, another “forgotten” skill my 7th grade testers claimed NEVER to have seen! Students are directed to follow the zeroes until reaching a nonzero digit, then to reduce the entire larger number by one in order to borrow. This skill works well for older students who understand place value, but have trouble with those pesky zeroes!

Skills for the older or adult basic learner can provide great instructional methodologies for the young, beginning or emerging learner. As teachers, we must learn how to break down our instruction into small enough segments so retention of learning is foremost. Learning how to find and impart all the those small pieces of instruction can often be time consuming and difficult, and as a teacher, I always welcome and appreciate support in instruction. Providing timely and relevant professional development is and should be a major emphasis of professional organizations, such as MCTM and MEA /MFT.

Montana Mathematics Opportunities

Check out the MCTM web site at www.montanamath.org

*Math Contests.	Bozeman:	March 2	4:30 pm (Register online!)
	Havre:	March 4	9:00 am
	Billings:	Feb 28	4 pm (NEW DATE!)
	Miles City:	March 14	2:30 pm
	Sidney:	March 14	4:00 pm
	Grass Range:	March 13	12:00 pm
	Glasgow:	March 14	4:15 pm
	Butte:	March 15	9:30 am
	Great Falls:	March 18	9 am (Register online!)
	Kalispell:	To Be Announced	
	Missoula:	To Be Announced	

Contact the State Director for more information: satinee_lightbourne@gfps.k12.mt.us

***Dean Preble Award.** Nominations are accepted year round! Nominate any MCTM member (board members excluded) who teaches K-college. Nomination procedure found on the MCTM web site. Click on Awards.

***MCTM Teacher Scholarships.** Self-nomination form can be found on the MCTM web site. Click on Awards. These scholarships are offered year-round. Teachers can receive \$250 for help with any out of state conference or \$100 for any in state conference.

***Presidential Awards.** Nominations for K - 6 teachers are currently being accepted. A teacher must be nominated in order to receive the application. Application deadline is May 1, 2006. Go the Awards page of the MCTM website or directly to www.ehr.nsf.gov/pa/.

***Membership.** Do you know someone in your school who is not a member of MCTM? Please encourage them to join!

MCTM Membership Form

<input type="checkbox"/> New Member	<input type="checkbox"/> Renewal	Annual Dues (September- August)	
<input type="checkbox"/> Elementary	<input type="checkbox"/> MS	<input type="checkbox"/> Regular (1 yr)	\$15
<input type="checkbox"/> College	<input type="checkbox"/> Other	<input type="checkbox"/> Regular (2 yrs)	\$25
Name _____	<input type="checkbox"/> Life Time	<input type="checkbox"/> Regular (10 yrs)	\$100
Address _____	<input type="checkbox"/> Student	<input type="checkbox"/> Retired Educator	\$150
_____	<input type="checkbox"/> MCTM & MSTA	<input type="checkbox"/> Contribution to Scholarship	\$8
Phone Number: _____	<input type="checkbox"/> Fund \$5 to \$ 8		FREE
Email: _____			\$30

Send Form with correct amount to:

Lisa Wood, MCTM Membership Chair
 1911 Belvedere Drive
 Billings, MT 59102
woodl@billings.k12.mt.us

Nominations Sought for the 2006 Dean Preble Memorial Award for Outstanding Teachers of Mathematics

The Dean Preble Memorial Award for Outstanding Teachers of Mathematics is an annual recognition of teachers of mathematics at all levels in mathematics education. MCTM wishes to recognize an elementary (grades K-8), a secondary (grades 5-12), and a collegiate teacher of mathematics who have made significant contributions to the teaching and learning of mathematics.

The Award

This award is given in memory of our colleague Dean Preble, who passed away from cancer in the fall of 1998. Dean was recognized for his unfailing support for mathematics education in the state of Montana. His dedication to the mathematics teaching profession, his love of his students, his involvement in state and national mathematics organizations, and his devotion to the improvement of mathematics education in Montana were unparalleled.

One of Dean's wishes was to establish an annual award to recognize outstanding teachers of mathematics in Montana. In keeping with his wish, MCTM created the Dean Preble Memorial Award for Outstanding Teachers of Mathematics. The award consists of an inscribed plaque and a \$100 stipend for the recognized teachers, to be awarded at the MCTM annual meeting in October.

Award Criteria

- Any member of MCTM may submit a nomination. Current members of the MCTM Board may not be nominated for this award.
- The nominee must be a current MCTM member.
- The nominee must have taught mathematics in Montana.
- The nominee must have a record of significant and consistent contributions to the teaching and learning of mathematics.
- The nominee must demonstrate a concern for her/his fellow teachers of mathematics.
- The nominee must demonstrate a willingness to continue to grow and improve as a teacher of mathematics.
- The nominee must demonstrate an extraordinary ability to engage students in the learning of mathematics.
- The nominee must have a substantial record of participation in professional activities involving mathematics.

Nomination Procedure

Nominations should consist of a maximum of two, double-spaced, typewritten pages and should directly address the criteria outlined above. The name, address, telephone number, and present position of both the nominee and the nominator must be included.

Deadline for submissions for the 2006 Dean Preble Memorial Award is June 15, 2006. Nominations may be sent or e-mailed to:

Cliff Bara
Box 610
Troy - MT - 59935
cliffbara@hotmail.com

MCTM NEWSLETTER
Great Falls Public Schools
 Great Falls High School
 1900 2nd Ave. S
 Great Falls, Montana 59401

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Montana Mathematics is a newsletter published for all members of the Montana Council of Teachers of Mathematics. The publication comes out 5 times/ year and is free to all members of the MCTM. Any information pertaining to MCTM can be sent to Kathje Dalton at Great Falls High School, 1900 2nd Ave S, Great Falls, Montana 59401. All entries will be reviewed.