GRADE 5
MONTHLY PROBLEMS

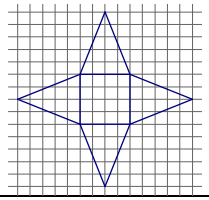
The math standards referenced in the Solutions are for the State of Minnesota. A Common Core alignment will be available soon, but the problems will work in any fifth grade classroom. Because the problems are designed to meet the needs of talented math students, they are also appropriate for older students.

Notes and Suggestions:

- The standards addressed by a problem may vary depending on the strategies that students choose.
- Some cells do not have standards listed. These problems may address more advanced standards. Problems from the "General" column may not be focused on specific standards.
- The problems vary substantially in difficulty. In general, they are quite challenging and will require time and persistence. Most students are unlikely to complete every problem within the month.
- When students solve a problem incorrectly, stress the importance of persistence!
- Some problems have many solutions. Others have no solution.
- Students should usually be able to work without direct instruction, but they may often get stuck. Encourage collaboration! Ask them to look up unfamiliar vocabulary.
- For most problems, students may decide whether to use a calculator. However, they should be able to justify their decision. Sometimes, they can learn a lot from solving them with and without!
- Some problems address content that students will not study until later in the school year. They may still attempt the problems using strategies that are based on what they already know.
- Avoid teaching rules and procedures before you discuss topics in class. If students don't know the rules, so much the better! Creating their own strategies will help them think more deeply.
- Many of these problems provide opportunities for mathematical communication, (even when the problem does not call for explanations). Consider having students write and submit their solution processes from time to time. Be sure to read their ideas carefully and offer one or two brief but thoughtful comments in response. This is very motivating!

Classroom teachers may freely copy and distribute these problems in their classroom. I ask only that you include my name and contact information as they appear at the bottom of each page. Please inform me of any typographical or mathematical errors by contacting me through 5280math.com. I would love to hear about how you are using the problems in your classroom, and I welcome your feedback and suggestions.

GRADE 5
JANUARY PROBLEMS

	Number and Operation (NO)	Algebra (A)	Geometry and Measurement (GM)	Data and Probability; Ratios and Rates (DR)	General (G)
1	If you divide *m* by 7, the remainder is 3. If you divide *n* by 7 the remainder is 5. What happens when you divide *m* + *n* by 7? Explain.	Find at least 8 solutions to the equation: 5 – G = H – 2. Write each solution as an ordered pair in the form (G, H). What do you notice about all of your solutions?	The volume of a square prism is 80 cubic cm. Its length, width, and height are whole numbers. What is the largest possible surface area of the prism?	Javier's mean test score in math was 76 points. He receives 96 points on the next test and increases his mean to 80 points. How many tests has Javier now taken?	One of the interior angles in a parallelogram has a measure of 68°. What are the measures of the other interior angles?
2	Surabhi is watching the women's World Cup live on television in Denver. The game is being played in London with a local start time of 16:30. Surabhi watches for 1.6 hours before she has to leave for work. What time does her clock read when she leaves?	*Y* cars are in a line touching each other bumper to bumper. Write an algebraic expression that represents the number of bumpers that are touching another bumper.	This is a net for a three-dimensional figure whose base has an area of 100 square meters. Name the figure, and find its surface area. 	Towns A, B, C, and D lie in order on a straight road. AD (the distance from A to D) = 76 miles. Also, AB : BC = BC : CD AB : CD = 4 : 9 How far is town B from town D?	Jenny's can of soda holds 25% more soda than Dawn's. Dawn's can holds 20% less soda than Jenny's. How many ounces does each person's can hold?
3	Fill in the blanks in at least three different ways: 76.1 equals _____ tenths and _____ hundredths.	B 2 5 8 10 17 C 14 15.5 17 18 21.5 Write a rule that turns B into C. Then write a rule that turns C into B.	A prism has 14 vertices. How many faces and edges does it have?	Five friends have a mean number of 4 pets. One person has 10 pets. Which is greater, the mean or the median number of pets?	If every person in the United States could stand side by side at the equator, would they encircle the Earth?

GRADE 5
JANUARY SOLUTIONS

	Number and Operation (NO)	Algebra (A)	Geometry and Measurement (GM)	Data and Probability; Ratios and Rates (DR)	General (G)
1	The remainder will be 1. The two remainders combine to form 3 + 5, but this creates another group of 7, with 1 remaining. 5.1.1.1 5.1.1.2	Sample solutions: (0, 7) (1, 6) (2, 5) (3, 4) (4, 3) (5, 2) (6, 1) (7, 0). Any pair for which G and H have a sum of 7 works! This includes solutions in which G and H are fractions, decimals, or negative numbers. 5.2.3.1 5.2.3.3	322 square cm. The greatest surface area comes from a tall prism with a small base: in this case, 1 cm by 1 cm by 80 cm. Each base has an area of 1 square cm. Each of the other four faces has an area of 80 square cm. 5.3.2.2 5.3.2.3	Javier has now taken 5 tests. His total test score for the first four tests was 76 • 4 = 304 points. The 96 points from the fifth test raised his total to 400 points, giving a mean of 400 ÷ 5 = 80 points. 5.4.1.2	68°, 112°, and 112° One of the angles has the same measure as the given angle. What is a quick way to find the measure of the other angle? Why does this make sense?
2	11:06 am Mountain Daylight time is 7 hours earlier than London time. 16:30 is 4:30 pm, so the game begins at 9:30 am in Denver. 1.6 hours is 1 hour and 36 minutes. 5.1.1.4 5.1.2.4	$(Y - 1) \bullet 2$ or $Y \bullet 2 - 2$ Encourage students to explain why their expressions make sense! 5.2.1.1 5.2.3.2	The figure is a square pyramid. Its surface area is 350 square meters. 5.3.1.2 5.3.2.1 5.3.2.2	Answer: BD = 60 miles Details: AB = 16 miles BC = 24 miles CD = 36 miles	It is not possible to say how many ounces are in each can! If Jenny's can holds 25% more than Dawn's, then Dawn's will *always* hold 20% less than Jenny's! Can you draw a picture to show why?
3	A few possible solutions: 761 tenths and 0 hundredths 0 tenths and 7610 hundredths 760 tenths and 10 hundredths 61 tenths and 7000 hundredths, etc. Some students may get creative! 5.1.2.1	Turning B into C: C = B ÷ 2 + 13 or C = (B + 26) ÷ 2 Turning C into B: B = (C – 13) • 2 or B = C • 2 – 26 Some students may use words instead of symbols to describe their rules. 5.2.1.1	The prism has 9 faces and 21 edges. (It is a heptagonal prism.) 5.3.1.1	The mean is greater. Because the mean number of pets is 4, the friends have a total of 4 • 5 = 20 pets. The other four friends have 20 – 10 = 10 pets. If the median were 4, the sum of the two middle numbers would have to be 8, which would leave only 2 pets for the remaining two people. 5.4.1.2	Yes; they would encircle the Earth over 3 and one half times! This answer assumes that each person takes up an average width of 1.5 feet. (The current U.S. population is about 322,000,000 people. The circumference of the Earth is approximately 24,900 miles.)