Secondary Mathematics Informational Meeting

August 18th, 2014

Mathematics Graduation Requirements

- Class of 2014 and Beyond
  - Four high school credits of mathematics
    - Must include Algebra 2
- Class of 2018 and Beyond
  - Passing score on 7 End of Course Exams **OR**
  - ACT remediation-free score **OR**
  - Approved Industry-recognized credential

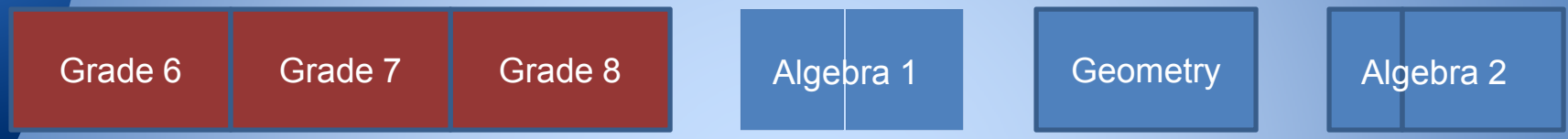
Preparing students to be college and career ready

- Research-based instructional strategies
- Opportunities to enrich or intervene
- Incorporation of mathematical practices

A Rigorous Mathematics Curriculum

- **Rigor**: balance of conceptual understanding, skill fluency, problem solving
- **Coherence**: connections and progressions
- **Focus**: fewer problems, less distraction
- **Standards for Mathematical Practice:** The 'habits of mind' needed to be a successful mathematician.
- **21st Century Skills:** Emphasis on reasoning and communication

Content Changes



Mathematical Practices

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.

Mathematical Practices

- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Typical Day in a Mathematics Classroom

- Role of the Student
  - Students will learn mathematics through problem solving
  - Students will collaborate, discuss, and communicate mathematical ideas
  - Students will explore and grapple with mathematical relationships
  - Students will be actively involved in the learning process

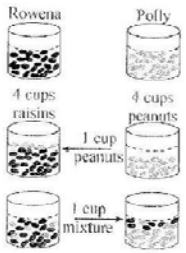
1.1.5 How can I make sense of it?

Making Sense of a Logic Problem

An important skill that you will develop throughout this course is making sense of a problem or situation. You will be asked to think and talk through challenging problems until they make sense to you. You will know that an idea makes sense when you understand it so well that you can explain it to others and answer their questions about it. In this lesson, you will make sense of a challenging logic problem and work with your team to explain your ideas.

1-33. TRAIL MIX

Rowena and Polly were making trail mix. Rowena had 4 cups of raisins, and Polly had 4 cups of peanuts. Polly poured exactly one cup of her peanuts into Rowena's raisins and stirred them up, as shown in the diagram at right. Then Rowena poured exactly one cup of her new peanut-and-raisin mix back into Polly's peanuts.



Did Rowena get more of Polly's peanuts, or did Polly get more of Rowena's raisins?

Your Task:

- First, decide by yourself what you think the answer to this question is. Then share your ideas with your team.
- Together make a guess (also called a **conjecture**) about which girl got more of the other's snack item.
- Explain your conjecture with words, numbers and symbols, diagrams, models, or anything else you think will convince another student.

1-34. Rowena and Polly still cannot agree about who has more of the other's item. Rowena is still sure that Polly got more of her raisins. Polly is sure that Rowena got more of her peanuts. To make sense of what happened, they decided to try a simpler experiment.

Rowena got a cup of 10 red beans, and Polly got a cup of 10 white beans. Polly gave 3 white beans to Rowena, and Rowena stirred them into her red ones. Then she closed her eyes and chose 3 beans from her mixture at random to give back to Polly. The girls then examined each cup.

a. Try their experiment a few times with a partner. What happens each time? Work with your team to find a way to explain why your results make sense.

b. Would you have gotten similar results if you had exchanged 5 beans? 6 beans? 20 beans? Be ready to explain your thinking.

c. With your team, consider whether your ideas about Rowena's raisins and Polly's peanuts have changed. If so, write and explain your new conjecture. If not, explain why you still agree with your original conjecture. Be sure to include anything you think will be convincing as you write down your ideas. Be prepared to share your ideas with the class.

Typical Day in a Mathematics Classroom

- Role of the Teacher
  - A variety of instructional practices including:
    - Actively guiding, supporting, summarizing, and addressing questions
    - Whole class or small group direct instruction

How to support your child

- Encourage your child to be a self-advocate
- Purposeful questioning
- Keep lines of communication open with teacher
- Review previous classwork, homework, & tests
- Stay positive

Resources to support your child

- Online homework help
  - http://homework.cpm.org/cpm-homework
- Checkpoint Problems
- Parent Guides
  - http://www.cpm.org/parents/resources.htm

CC2 1-38

1-38. At the farmers' market, two pounds of peaches cost $4.20. How much will five pounds cost? Show all of your work or explain your reasoning.

Hint: How much does one pound of peaches cost?

Step 1: Because we know the cost of two pounds of peaches, we can divide this value ($4.20) by two and find the cost of one pound of peaches.

$4.20 divided by 2 = $2.10

Hint: Think about what you did in Step 1. Can this help you find how much 5 pounds cost?

Step 2: By multiplying the cost of one pound by five, we will find the cost of five pounds.

($2.10)(5) = $10.50

Answer: The cost of five pounds of peaches will be $10.50.

Checkpoint 5
Problem 5-148
Order of Operations

Answers to problem 5-148: a: 20, b: –4

In general, simplify an expression by using the **order of operations:**

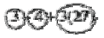
- Evaluate each exponential (for example, $5^2 = 5 \cdot 5 = 25$).
- Multiply and divide each term from left to right.
- Combine like terms by adding and subtracting from left to right.

But simplify *the expressions in parentheses* or any other expressions of grouped numbers first. Numbers above or below a "fraction bar" are considered grouped. A good way to remember is to circle the terms like in the following example. Remember that terms are separated by + and − signs.

Example 1: Simplify $12 \div 2^2 - 4 + 3(1 + 2)^3$

Simplify within the circled terms: Be sure to perform the exponent operations before dividing. $12 \div 2^2 = 12 \div 2 \cdot 2 = 3$

Then perform the exponent operation: $3^3 = 3 \cdot 3 \cdot 3 = 27$



Next, multiply and divide left to right: $3(27) = 81$

Finally, add and subtract left to right: $3 - 4 + 81$

80

Example 2: Simplify $-3^2 - \frac{2+7}{3} + 8 \div \left(\frac{1}{2}\right)$

Simplify within the circled terms: $-3^2 = -3 \cdot 3 = -9$

$\frac{2+7}{3} = \frac{9}{3} = 3 \quad 8 \div \frac{1}{2} = 8 \cdot \frac{2}{1} = 16$

$-9 - 3 + 16$

Then add and subtract, left to right.

$-12 + 16$

4

Now we can go back and solve the original problem.

a. $16 - 2^3 \div 8 + 5$

$16 - 2 \cdot 2 \cdot 2 \div 8 + 5$

$16 - 4 \cdot 2 \div 8 + 5$

$16 - 8 \div 8 + 5$

$16 - 1 - 5$

$15 + 5$

20

b. $(-2+6)^2 - \left(\frac{3}{2}\right) \cdot 14 + 1$

$(4)^2 - \frac{42}{2} + 1$

$16 - 21 + 1$

$-5 + 1$

-4

Here are some more to try.

1. $10 \square \frac{1}{2} \square (\square 6)(\square 8)$
2. $\frac{\square(\square 26) \square \frac{1}{2} \square}{\square 8}$
3. $(6 \square 8)(5 \square 1 \square 0) \square (4 \square 2)(6 \square 3)$
4. $\frac{\square 24}{16 \square 2(\square 5)}$
5. $\frac{1}{2} \square 6 \square 12 \square \sqrt{\square} \square 4 \square 6$
6. $3 \left[\frac{1}{2} \square \square 5 \square 18 \square 3^2 \square \right]$
7. $\square 8 \square 12 \square \square 4 \square 6$
8. $\square 6^2 \square 4 \square 8$
9. $18 \square \square 3^3$
10. $10 \square 5^2 \square 25$
11. $28 \square (3^2 \square 9) \square 2$
12. $100 \square (2^3 \square 6^2) \square 2$
13. $85 \square (4 \square 2)^2 \square 8$
14. $22 \square (3 \square 2)^2 \square 2$
15. $16 \square 11 (\square 2)^2 \square 25 \left[\frac{\square}{\square} \square \right]$
16. $54 \square 3^2 \square \left[\frac{\square}{\square} + \frac{\square}{\square} \right] \square 11^2$
17. $2 \left[5 \square 11 \sqrt{\square} \square 8 \right.$
18. $(7^2 \square 11) \square 4 \square 1$
19. $\square 3 \square 2 \square (\square 2 \square 4)$
20. $\square 3 \square 2 \square \square 2 \square 4$
21. $12 \square 3 \left[\frac{\square \square}{2 \square 9} \square \right] \square 72 \left[\frac{\square 9 \square}{9 \square 8 \square 3} \square \right]$
22. $15 \square 4 \left[\frac{1 \square 2}{9 \square 6} \square \right] \square 72 \left[\frac{1 \square 2 \square 4}{8 \square 1 \square 8} \square \right]$
23. $32 \square 16 \square 8 \square 2 \left[\frac{1}{2} \square \sqrt{\square} \right.$
24. $36 \square 16 \left[\frac{\square}{\square} \square (5 \square 2 \square 3)^2 \right.$

Answers:

1. 23
2. 3
3. –52
4. $\square \frac{7}{\square}$
5. –4
6. 33
7. –1
8. –4
9. 2
10. 10
11. 14
12. 99
13. 18
14. 40
15. 50
16. 23
17. 2
18. 14
19. 1
20. –1
21. 14
22. 25
23. –48
24. 36

PERCENT PROBLEMS USING DIAGRAMS 5.1.1 and 5.1.2

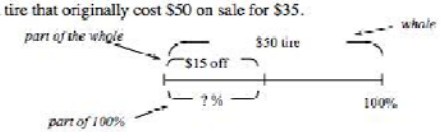
A variety of percent problems described in words involve the relationship between "the percent," "the part" and "the whole." When this is represented using a number line, solutions may be found using logical reasoning or equivalent fractions (proportions). These linear models might look like the diagram at right.

For additional information, see the Math Notes box in Lesson 5.1.2 of the *Core Connections, Course 2* text.

Example 1

Sam's Discount Tires advertises a tire that originally cost $50 on sale for $35. What is the percent discount?

A possible diagram for this situation is shown at right:

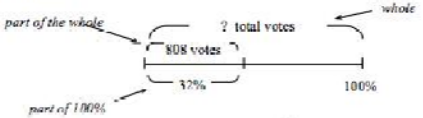


In this situation it is easy to reason that since the percent number total (100%) is twice the cost number total ($50), the percent number saved is twice the cost number saved and is therefore a 30% discount. The problem could also be solved using a proportion $\frac{15}{50} = \frac{?}{100}$.

Example 2

Martin received 808 votes for mayor of Smallville. If this was 32% of the total votes cast, how many people voted for mayor of Smallville?

A possible diagram for this situation is shown at right:



In this case it is better to write a pair of equivalent fractions as a proportion: $\frac{808}{32} = \frac{x}{100}$.
If using the Giant One, the multiplier is $\frac{100}{32} = 3.125$ so $\frac{808}{32} \cdot \frac{3.125}{3.125} = \frac{2525}{100}$.
A total of 2525 people voted for mayor of Smallville.

Note that the proportion in this problem could also be solved using cross-multiplication.

Frequently Asked Questions

- Why are students “teaching each other” instead of the teacher teaching directly?
- How does the teacher provide instruction in the classroom?

Frequently Asked Questions

- Why do you do group work?
- How do teachers promote individual accountability when students are working in groups?
- What are team tests and why do we have to do them?

Frequently Asked Questions

- How can I help my child study/prepare/complete homework?
- Why doesn't the homework look like what we did in class today?
- What happens if my student falls behind/has an extended absence?

Questions?

- At this time, we will be answering questions from the index cards provided.

Links to Research

Adding it Up; National Research Council

College Preparatory Mathematics (CPM) Research Base

Links to Resources

PARCC Sample Assessments

7 Skills Students Must Have for the Future

NCTM Principles to Actions

Next Steps

- Please complete the survey using the link below:

- http://tinyurl.com/westervillemath