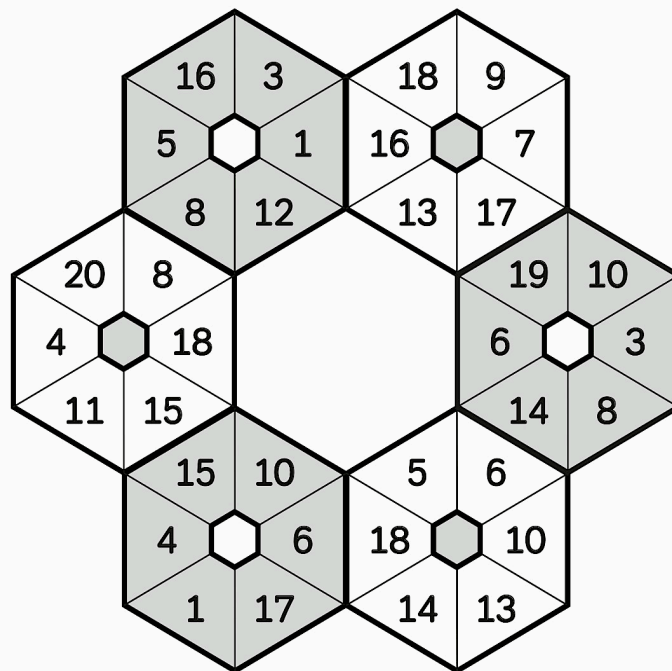


Wisconsin Annual Conference
Green Lake, WI
May 6, 2016

Greg Tang's



A Model Approach to Word Problems



K–2 Word Problems

- **K.OA.2.** Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- **1.OA.1.** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- **1.OA.2.** Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- **2.OA.1.** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

1.OA.8. Addition & Subtraction Equations

Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = _ - 3$, $6 + 6 = _$.

Addition

- | | | |
|------------------|------------------|---|
| a. $8 + 6 = _$ | d. $_ = 8 + 6$ | Result Unknown (Missing Sum) |
| b. $8 + _ = 14$ | e. $14 = 8 + _$ | Change Unknown (Missing 2 nd Addend) |
| c. $_ + 6 = 14$ | f. $14 = _ + 6$ | Start Unknown (Missing 1 st Addend) |

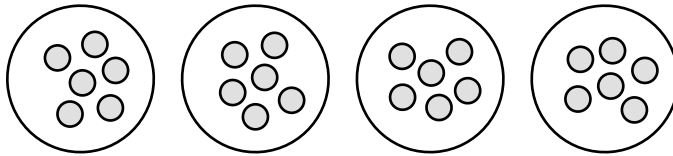
Subtraction

- | | | |
|------------------|------------------|-------------------------------------|
| a. $14 - 6 = _$ | d. $_ = 14 - 6$ | Result Unknown (Missing Difference) |
| b. $14 - _ = 8$ | e. $8 = 14 - _$ | Change Unknown (Missing Subtrahend) |
| c. $_ - 6 = 8$ | f. $8 = _ - 6$ | Start Unknown (Missing Minuend) |

Represent and solve problems involving multiplication and division.

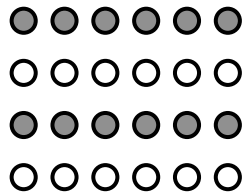
Example: $4 \times 6 = ?$

a.



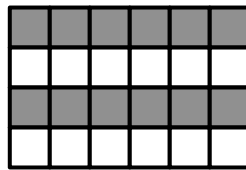
Groups

b.



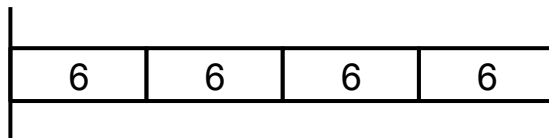
Array

c.



Area

d.



Bar Model

Q: Which shows the commutative property best? Distributive?

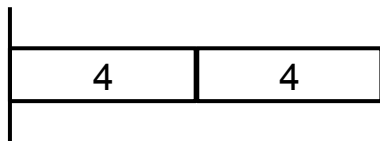
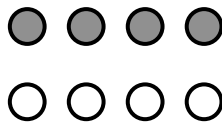
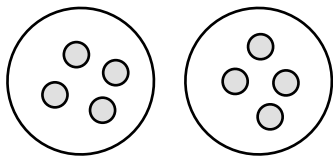
Represent and solve problems involving multiplication and division.

Partitive or Sharing: Divisor is **number** of groups.

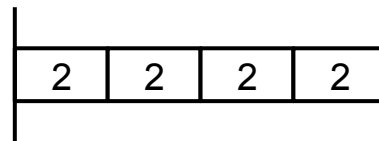
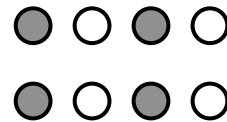
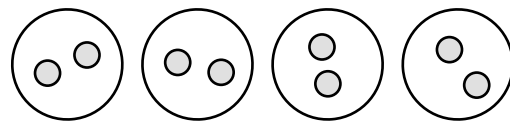
Quotative, Grouping or Measurement: Divisor is **size** of each group.

Example: $8 \div 2 = ?$

8 divided into 2 groups



8 divided into groups of 2



Word Problems: Addition & Subtraction

1. There were some cans on a grocery store shelf. A customer bought twenty-five cans and now there are nineteen cans left. How many cans were originally on the shelf?

2. Erin found fifteen fewer shells than Katie. If Erin found seventeen shells, how many shells did Katie find?

Word Problems: Fractions

5. Katie spent $3\frac{3}{4}$ hours at the library and finished $\frac{3}{4}$ of her homework. How long will it take her to do her homework, altogether?

6. A group of students watched basketball practice. When the bell rang, $\frac{3}{4}$ of them went back to class. The other 12 stayed to watch. How many students were there in all?

Word Problems: Fractions

7. 30 second graders had a choice of 3 instruments. Half chose the drums and of the remaining kids, two-thirds chose the guitar and the rest chose the recorder. How many students chose the recorder?
8. In a recent survey, $\frac{1}{6}$ of the respondents said they did not like their job. Of those who said they liked their job, $\frac{3}{4}$ or 15 people said they also liked their spouse. How many people took part in the survey?

Word Problems

9. Pinocchio told a lie and his nose grew 75%. His nose is now 95% shorter than Rapunzel's hair. If Pinocchio's nose was originally 24 inches long, how long is Rapunzel's hair measured in feet?

10. Blake has 14 more songs on his phone than Adam. If they have 242 songs altogether, how many songs does Blake have?

Word Problems

11. Feodor Vassilyev was said to have fathered 87 children. If his first wife gave birth to 51 more children than his second wife, how many children did his second wife have?
12. Tina, Mark, and Sue spent a rainy afternoon reading. Together, Mark and Sue read a total of 82 pages. Mark and Tina read 94 pages, and Sue and Tina read 72 pages. How many pages did each student read?

Percent Problems

13. 16 is 25% of what number?

14. 18 is 24% of what number?

15. 51 is 60% of what number?

16. 63 is 210% of what number?