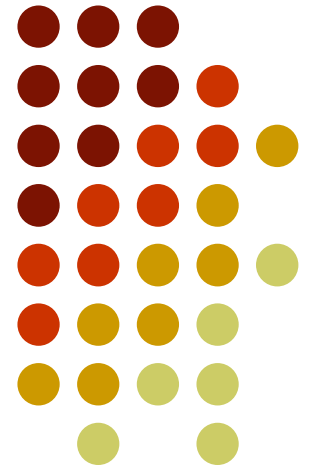


Division



Representation



- How can you represent the following problems:
 - There are 20 children going on a school trip. The school got 4 minivans for the trip. If we wanted equal number of children in each vehicle how many should we put in each?
 - There are 20 kids going on a school trip. How many vehicles does the school need to get if we want to put 4 kids in each?
- What is similar about these two problems and what is different?



Two views

- Partitive
 - How many in a group?
 - We know how many groups there are.

- Measurement
 - How many groups?
 - We know how many there are in each group.



Exercises

- Use either base ten blocks or place value table to find
 - $34 \div 2$
 - $550 \div 2$
 - $96 \div 3$
 - $55 \div 12$
 - $48 \div 8$
 - $54 \div 6$



Division algorithm

- If a and b are any two whole numbers with $b \neq 0$ then there exists unique whole numbers q and r such that

$$a = qb + r, \quad \text{where } 0 \leq r < b.$$

- How can you convince yourself that this is true?

Problems



- In each of the problem decide which approach to division is illustrated by the example and use any method to solve the problem. Think about whether there is a “best” method to do each of the problems.
 1. Ashley made 205 muffins. She put them into boxes of 4 each. How many boxes were there?
 2. 5 packets of coffee weight 750g. How much does each packet weigh?
 3. David has 74 wheels. If he uses 4 wheels to make a toy car, how many toy cars can he make?
 4. Justin has 429 yd of wire. He cuts it into pieces. Each piece is 3 yds long. How many pieces can he get?



Explanation #1

- Your student is working on the problem $0 \div 7$ and she says:

“The answer is 0, because if I have 0 apples and I want to divide them between 7 friends each of us will get 0 apples”

How do you respond to your student?

Explanation #2



- Your student is working on the problem $6 \div 0$ and says

“It is 6 because if I have 6 apples then if I divided into 0 groups I haven’t divided it at all, so I still have 6 apples.”

How would you respond to this student?

Missing factor approach



- If a and b are any two whole numbers with $b \neq 0$, then $a \div b = c$ if and only if $a = b \cdot c$, for some whole number c .

Base 5 multiplication table



x	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	11	13
3	0	3	11	14	22
4	0	4	13	22	24

Using missing factor approach find each of the following:

$$11_5 \div 3_5$$

$$22_5 \div 3_5$$

$$13_5 \div 4_5$$

$$21_5 \div 3_5$$



Explanation #3

- A student says: “If I want to divide 21 by 6, I just keep subtracting 6 until I get a number less than 6 and that’s my answer.” How would you respond to this student?
- How many possible remainders are there if you are dividing by
 - a) 2
 - b) 12
 - c) 62
 - d) 23?

Analogies



- If addition is repeated addition, shouldn't division be repeated subtraction?
- Can you find $20 \div 3$ using repeated subtraction?

Explanation #4

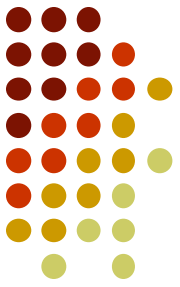


- Model $573 \div 4$ using base 10 blocks, and record your work using numbers.

Explanation #5: $7328 \div 8$



Explanation #6: $7328 \div 8$

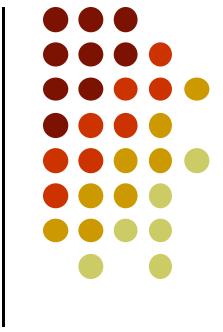


Explanation #6: What is happening here?



Explanation #7: what is happening here?





More



Fred's paper



- What can you say about his understanding of multiplication:

A Place for 0

