

Directions: You can use a calculator if you have one but show all work (no cell phones, please). Show all of your work to earn full credit! Good luck!

(5)

1. An alien with 8 fingers (total) sees 150 chocolate chip cookies about to be served at a party. The alien counts the cookies and then reports the number back to Alien Census Headquarters. What number is reported back to headquarters?

Think in terms of
15, 85, 645, ...

$$\left. \begin{array}{l} 150 = 128 + 16 + 6 \\ = (2 \times 64) + (2 \times 8) + (6 \times 1) \\ = 226_{\text{eight}} \end{array} \right\}$$

226

2. Using the CGI Table, identify the problem type for each of the following problems. You might want to start by identifying the action (joining or separating) or situation (part-part-whole or compare) and then decide what is unknown.

(5)

(a) John has 6 blue pens and 4 black pens in his book bag. How many pens does John have in his book bag?

Part - Part - Whole (Whole Unknown)

(5)

(b) Karen had 7 dollars. Her mother gave her some money for mowing the lawn and now she has 13 dollars. How much money did Karen's mother give her for mowing the lawn?

Join (Change unknown)

(5)

(c) Bob had a full box of chocolates. He ate 4 chocolates and now he has 8 chocolates. How many chocolates were in the full box that Bob had to start with?

Separate (Start Unknown)

(6)

(d) Rank the problems (a), (b), and (c) above in terms of difficulty. Explain your choices.

(A) - easy (can be directly modeled)

(B) - still easy but child needs to keep track of what is added to get to 13

(C) - difficult (start value is not provided; difficult to model)

3. Consider the problem:

$$\begin{array}{r} 27 \\ \times 38 \\ \hline \end{array}$$

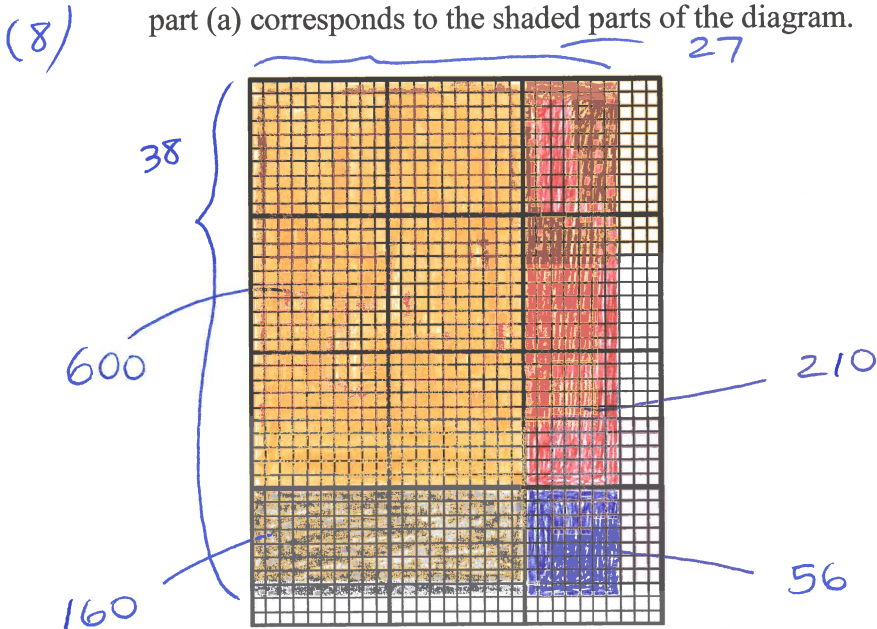
(a) Write out the solution using the expanded algorithm (Partial Products).

(8)

$$\begin{array}{r} 27 \\ \times 38 \\ \hline 56 \\ 160 \\ 210 \\ 600 \\ \hline 1026 \end{array}$$

ANSWER: 1,026

(b) Shade the solution on the multiplication grid and clearly show how each partial product from part (a) corresponds to the shaded parts of the diagram.



4. Which of the following problems would be more challenging for your students? Why?

- (8)
- Martha had 14 jellybeans. She ate 8 of them. How many jelly beans does Martha have left?
 - Martha has 13 jellybeans. 7 are red and the rest are yellow. How many yellow jellybeans does Martha have?

(B) would be more challenging. Problem (A) is a separate problem (result unknown). In general, "result unknown" are fairly easy for children & "separate" indicates an action so it can be easily modeled. (B) is part-part-whole w/ part unknown, which, in general, would be more challenging.

5. Demonstrate each of the following methods on the problem $338 + 457$.

The Standard Addition Algorithm

(5)

$$\begin{array}{r} 338 \\ + 457 \\ \hline 795 \end{array}$$

Lattice Addition

(5)

$$\begin{array}{r} 338 \\ + 457 \\ \hline \begin{array}{|c|c|c|} \hline 0 & 0 & 1 \\ \hline 7 & 8 & 5 \\ \hline \end{array} \\ \swarrow \swarrow \swarrow \\ 795 \end{array}$$

Column Addition Method

(5)

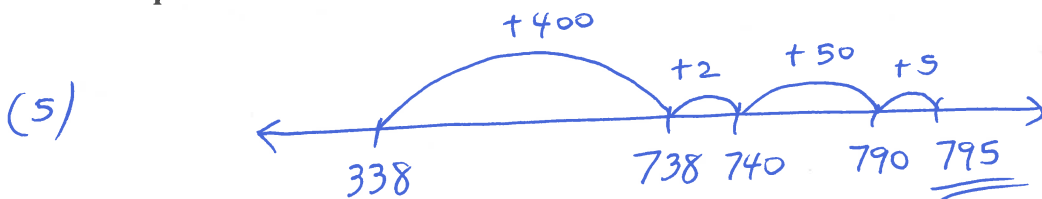
$$\begin{array}{r} 338 \\ + 457 \\ \hline 7815 \\ 795 \end{array}$$

Partial Sums Method

(5)

$$\begin{array}{r} 338 \\ + 457 \\ \hline 15 \\ 80 \\ 700 \\ \hline 795 \end{array}$$

Open Number Line



6. Jamison brought 16 crackers for a snack. He ate 9 of them. How many does he have now?

(a) Explain how a child might solve this problem using direct modeling with manipulatives (e.g., snap cubes).

(5) Gather 16 cubes, remove 9.
Count the cubes remaining.

(b) Explain how a child might solve this using a counting strategy.

(5) Counting Down
EX: 16 15 14 13 12 11 10 9 8 (7)

(c) Explain how a child might solve this using derived number facts.

(5) $16 - 10 = 6$
 $6 + 1 = 7$ (Using 10)

7. Consider the problem $13 - 8$.

(a) Use a Ten Frame to solve this problem. Explain where to find the answer.

(5) $8 + \underline{\quad} = 13$

$2 + 3 = 5$

$13 - 8 = 5$

(b) Use an open number line to solve this problem. Explain where to find the answer.

(5)

ANSWER:
 $2 + 3 = 5$