All cell phones must be turned off. Show work to receive full credit.

1. [12 pts - 3 each] For each word problem below, write the number sentence it requires and give the name of the model it illustrates for that operation.

(a) Dana had $20 before she went to the fair; now she has only $8. How much did she spend?

\[ 20 - 8 = 12 \text{ missing addend} \]

(b) Eldon made party snacks out of 4 different types of cheese on 5 types of crackers. How many different combinations could he make?

\[ 4 \times 5 = 20 \text{ Cartesian product} \]

(c) Louisa’s mom made 12 cupcakes for her and her 3 friends to munch during a slumber party. How many cupcakes did each girl get?

\[ 12 \div 4 = 3 \text{ partition/sharing} \]

(d) Tom’s read 12 pages of his history assignment, but it’s 19 pages long altogether. How many does he have to go?

\[ 19 - 12 = 7 \text{ missing addend} \]

2. [9 pts - 3 each] Make up a word problem requiring each number sentence, model, and choice of objects or measurements specified below.

(a) 6 - 4 = 2, missing addend, measurements

I ran 4 laps already, but the gym teacher expects 6. How many do I have to go?

(b) 15 ÷ 3 = 5, repeated subtraction, objects

I put 15 Russian cypresses into bags of 3. How many bags did I make?

(c) 3 × 6 = 18, area/array, objects

My classroom has 6 rows of 3 desks. How many desks are there?

3. [5 pts - 1 each] Fill in each blank with the correct term. Spelling counts.

(a) In the number sentence 2 + 3 = 5, the numbers 2 and 3 are called the \underline{addends} while the answer, 5, is called the \underline{sum}.

(b) In the number sentence 4 × 7 = 28, the numbers 4 and 7 are called the \underline{factors}.

(c) In the number sentence 60 ÷ 6 = 10, the number 60 is called the \underline{dividend} while the answer, 10, is called the \underline{quotient}.

4. [4 pts] Precisely state the set-based definition of the operation \(c - d\).

Create a set \(C\) having \(c\) many elements. Remove a \underline{subset} \(D\) having \(d\) many elements:

\[ c - d = n(C - D), \text{ the number of elements left} \]