1.1

List five relevant quantities that are involved with this problem situation. For each quantity, if the value is given, write it next to the quantity. If the value is not given, write the unit you would use to measure it. One example is provided.

Josh and Erin started out at the same time riding their bikes from campus to Brookston. Josh rode at a rate of 8 mph and Erin rode twice as fast. If the distance to Brookston is 25 miles, how far behind will Josh be when Erin reaches their destination?

Quantity	Value
Distance from campus to Brookston	*25 miles*

1.2

A sink can hold 18 gallons of water, but is currently empty. If the faucet is turned on adding 4 gallons of water per minute and simultaneously the drain is opened allowing 2.5 gallons of water per minute to drain out, how long will it take for the sink to fill?

    A. 12 minutes

    B. 24 minutes

    C. 10 minutes

    D. 27 minutes

    E. None of the above

1.3

If a bottle can hold 250 ml of liquid, how many liters can it hold? _____

If a piece of board measures 87 cm, how many millimeters long is it? _____

If a box weights 3.42 kg, how many grams does it weight? _____

1.4

Use a strip diagram to solve this problem. Do not use algebra. Show all steps of your work.
Label everything. ☺

Katie had four times as many stickers as Jordan did and twice as many as Megan. Megan had 38 stickers. How many stickers did each girl have and how many did they have altogether?

Number of stickers for:

Katie: _____   Jordan: _____   All three girls: _____

2.1

In the base sixty Babylonian numeration system, ▼ represents 1 and ◄ represents 10.
Determine the value in our number system for the Babylonian number:

▼   ◄◄▼   ◄▼▼▼

A. 323

B. 4873

C. 35

D. 1873

E. 3823

2.2

Fill in the blanks. In base ten, 2914 is exactly _____ *ones*, is exactly _____ *tens*, is

exactly _____ *hundreds*, is exactly _____ *thousands*;

it is also exactly _____ *tenths*, or exactly _____ *hundredths*.

2.3

Express 10.21_{three} in base ten.

       A. $3\frac{1}{3}$

       B. $1\frac{2}{3}$

       C. $3\frac{7}{9}$

       D. $1\frac{7}{9}$

       E. None of the above

If a space alien has three fingers on each hand, what number might he record when seeing:

☆   ☆   ☆   ☆   ☆
  ☆   ☆   ☆   ☆
☆   ☆   ☆   ☆   ☆   Number: _____   Base: _____

Briefly explain your reasoning.

2.4

Use base pieces to illustrate the given addition problem. Show any regrouping that is necessary.

Sketch the base pieces for your sum. Write the base five sum.

$$234_{five}$$
$$+142_{five}$$

Base pieces for sum:

Answer: _____

3.1

The school cafeteria is ready to serve two kinds of sandwiches, roast beef (RB) and peanut

butter (PB); and two kinds of pizza, cheese (CP) and vegetarian (VP). There are 61 servings

of pizza prepared. There are 8 fewer roast beef sandwiches prepared than there are servings

of cheese pizza. There are 6 more peanut butter sandwiches prepared than there are servings

of vegetarian pizza. All together, how many servings of sandwiches are prepared?

Begin by listing relevant quantities. Four are provided. List 4 more.

Quantity	Value
# of RB sandwiches	unknown
# of PB sandwiches	unknown
# of CP	unknown
# of VP	unknown

Make a neat diagram with labels to show the relevant sums and differences in this problem.

Solve the problem without using algebra.

3.2

Determine the type of subtraction problem suggested by the following:

Jason is practicing his basketball free-throws and has made 27 baskets. His goal is to keep practicing until he makes 75 baskets. How many more baskets does he need to make?

Subtraction concept: _____

Write a new word problem using the same numbers as above. Use a different subtraction concept, but do not use the take away concept.

Word problem:

Subtraction concept: _____

3.3

Use the empty number lines provided to show two different approaches to the problem $423 - 58$.

_____

_____

3.4

Mitchell decides to get his car painted and to buy new hubcaps. There are 5 colors to choose

from and 3 styles of hubcaps. He wants the roof color to be different from the body color.

How many choices does he have for getting this work done? Show and label your work.