1. Give teacher’s solutions to the following problems. [Sec. 2.3]

a. [6 pts] At a party, people ate 18 slices of pizza. They ate 4 slices more in the second half of the party than they did in the first half. How many slices of pizza were eaten in the first half of the party?

\[
\begin{align*}
\text{First} & \quad \text{Second} \\
? & \quad 4 \\
2 \times \text{First} + 4 &= 18 \\
2 \times \text{First} &= 14 \\
\text{First} &= 7 \\
\end{align*}
\]

\[
18 - 4 = 2 \times \text{First} \\
14 = 2 \times \text{First} \\
7 = \text{First}
\]

7 slices of pizza were eaten in the first half of the party.

b. [6 pts] Stephanie, Carry and Dennis saved $430 this month. Stephanie saved $30 more than Dennis and Carrie saved three times as much as Dennis. How much did Dennis save by himself?

\[
\begin{align*}
\text{Dennis} & \quad \text{Steph} \quad \text{Carry} \\
? & \quad ? \quad ? \\
5 \times \text{Dennis} + 30 &= 430 \\
5 \times \text{Dennis} &= 400 \\
\text{Dennis} &= 80
\end{align*}
\]

Dennis saved $80 by himself.
2. Illustrate the quotient-remainder theorem using the model stated in each part. Then write the equation that results from the theorem. [Sec. 1.6]

a. [4 pts] A number line picture for 50 ÷ 15

\[50 = 3 \times 15 + 5\]

b. [4 pts] A set model for 10 ÷ 2

\[10 = 5 \times 2 + 0\]

No remainder!

c. [4 pts] A bar diagram, using measurement division, for 35 ÷ 8

\[35 = 4 \times 8 + 3\]

d. [4 pts] A rectangular array for 28 ÷ 6

\[28 = 4 \times 6 + 4\]

3. Identify the following problems as measurement or partitive division. You do NOT need to solve them. [Sec. 1.6]

a. [3 pts] Sally has 204 stickers. She gives 6 to each friend. How many friends did she give stickers? \textit{Measurement}

b. [3 pts] 6 chocolate bars weigh 660 grams total. How much does each chocolate bar weigh? \textit{Partitive}

c. [3 pts] Mary has 24 eggs. She uses 3 eggs to make a cake. How many cakes can she make? \textit{Measurement}
4. Perform the indicated computations. Show your mental math. [Sec. 2.1]
   a. [3 pts] $631 \times (10 + 1) = 6310 + 631 = 6941$
   b. [3 pts] $99 + 116 = 100 + 115 = 215$
   c. [3 pts] $848 \div 4 = \left(848 \div 2\right) \div 2 = 424 \div 2 = 212$

5. [2 pts] Find $365 - 125$ by subtracting from left to right. Illustrate your thinking with three hops on the number line. [Sec. 1.4]

   $365 - 125 = 240$

6. Identify the type of subtraction presented in each word problem and then solve each problem by using a diagram in the measurement model or set model. [Sec. 1.4]

      \[ \text{AM} \quad \boxed{173} \]
      \[ \text{PM} \quad \boxed{202} \]

      \[ 202 - 173 = 29 \]

   b. [4 pts] There were 1588 people at a concert. 1350 of them were adults. How many children were there?

      \[ \boxed{1588} \]
      \[ \boxed{1350} \]

      \[ 1588 - 1350 = 238 \]
c. [4 pts] There were 21 students in a class but 5 of them left. How many students are still in class?

\[ 21 - 5 = 16 \]

\[ \text{Take Away} \]

d. [4 pts] Jamie picked 11 flowers. 3 of them are roses. How many flowers are not roses?

\[ 11 - 3 = 8 \]

\[ \text{Part - Whole} \]

7. [8 pts] State the name of the arithmetic property used. [Ch. 1]

a. \[ 48 + 0 = 48 \] Additive Identity

b. \[ 94 + (39 + 6) = 94 + (6 + 39) \] Commutative (or Any-Order)

\[ = (94 + 6) + 39 \] Associative (or Any-Order)

c. \[ 7 \times (2 + 3) = 14 + 21 \] Distributive

8. Using only this set of digits -- 8, 0, 3, 4, 1 -- do the following: [Sec. 1.2]

a. [1 pt] Write down the smallest five digit number.

\[ 10348 \]

b. [1 pt] Write down the biggest five digit number.

\[ 84310 \]
9. [4 pts] Show 3604 by using (a) chip model and (b) expanded form. [Sec. 1.2]

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

\[ 3000 + 600 + 0 + 4 \]

10. [4 pts] Convert (a) 82 and (b) 159 from decimal into base-five. [Sec. 1.2]

\[ 82 = 25 + 25 + 25 + 5 + 2 = (312)_5 \]
\[ 159 = 125 + 25 + 5 + 4 = (1114)_5 \]

11. [8 pts] Convert these numbers to decimals, then order from smallest to largest: Roman numerals, base-10, base-5.

\[ \text{MCMXIII, MCC, (1420)}_5 \]
\[ 1113, 1200, \rightarrow (1 \times 125) + (4 \times 25) + (2 \times 5) + 0 = 235 \]
\[ 235, 1020, 1113, 1200 \quad (\text{or } (1420)_5, \text{ANN, MCXIII, MCC}) \]

12. Write the given numbers in standard decimal form. [Sec. 1.2]

a. [2 pts] 4 billion 17 million 24 thousand 68:
\[ 4,017,024,068 \]

b. [2 pts] 620 hundreds 45 tens 17 ones:
\[ 62000 + 450 + 17 \]
\[ 62417 \]

13. [6 pts] List two features of a well-written word problem and one feature of a well-presented word problem. [Sec. 2.3]

Well-Written
- Short and Clear
- Interesting
- Realistic
- Self-Contained
- Well-Defined answer

Well-Presented
- Varied
- Integrated
- Coherent