Chapter 3
Estimation and Computation

Section 3.1
Strategies and Procedures for Mental Computation

What is Mental Computation?

- Mental computation is the process of finding an _________ answer to a computation mentally, _________ pencil, paper, calculator, or any other computational aid.

Mental Computation Techniques

- Count On and Count Back

  Use this technique if one of the numbers to be added or subtracted is 1, 2, or 3; 10, 20, or 30; 100, 200, or 300; etc.

  How to Use
  1) Say the _________ number first.
  2) Count on to add or count back to subtract for each _________ _________.

Example

- Use the Count On and Count Back techniques to find the following.
  1) 260 + 130
  2) 1875 - 320

Mental Computation Techniques

- Choose Compatible Numbers

  Use this technique if one or more pairs of numbers can be easily added, subtracted, multiplied, or divided, OR
  Use this technique if numbers can be combined to produce multiplies of 10, 100, or other numbers that make calculations easy.

  How to use
  1) Look for _________ of numbers that are easy to calculate and do these calculations first.
  2) Look for other number combinations that are _________ to calculate.

Example

- Look for compatible numbers to find the exact value for the following computations.
  1) 2 + 7 + 5 + 3 + 8 =
  2) 5 x 9 x 2 x 7 =
Mental Computation Techniques

• **Break Apart Numbers**
  Use this technique if simple calculations involving basic number facts result when the numbers are broken apart according to the place value of the digits.
  **How to use**
  1) Think about each ________ in regard to its place value.
  2) Do ________ within place values or combinations of these values.
  3) Recombine the parts to get the final answer.

Example

• Find the exact value for each expression by using the break apart technique. Explain the process you used.
  1) $1347 + 3621 =$
  2) $946 - 325 =$

Mental Computation Techniques

• **Use compensation**
  Use this technique when a calculation can be chosen that is close to the original one and that is easy to do mentally.
  **How to use**
  1) Change original calculation to one that is easy to do mentally. Changing ________ number usually makes the adjustment at the end easier.
  2) Keep track of how you adjusted the problem.
  3) Find the answer to the original calculation by ________ the answer to the adjusted calculation.

Example

• Find the exact value for each expression by using compensation. Explain the process you used.
  1) $7.98 x 5$
  2) $24 + 82$

Mental Computation Techniques

• **Equal Additions**
  Use this technique when one of the numbers in a subtraction calculation (usually the number being subtracted) can be changed so that it results in a computation that is easy to do ________. This is based on the idea that the difference doesn’t change if the same number is added to each value.
  **How to use**
  1) Identify a number that can be added to one of the numbers in the ________ calculation to give a new computation that’s easy to do mentally.
  2) ________ this number to both numbers in the original calculation. Compute.

Example

• Find the exact answer to each difference using the equal additions technique. Explain the process you used.
  1) $487 - 42$
  2) $578 - 87$