Estimating Whole Number Answers

I. **Estimation**

You will use calculators in all of your math courses. Whether or not you use a calculator, you must be able to tell if your answer is reasonable.

To estimate answers you simply round to a convenient place and use the rounded values to find an approximate answer.

EXAMPLES: Estimate the answers without using a calculator.

1. $3846 + 2943 + 16,100$
   Rounding to the nearest thousand, the addends are
   $4,000 + 3,000 + 16,000$
   The answer should be approximately 23,000
   The actual sum is 22,889 which seems reasonable.

2. $547 - 89$
   Rounding to the nearest ten the problem is
   $550 - 90 = 460$
   Rounding to the nearest hundred the problem is
   $500 - 100 = 400$
   The exact answer is 458 which seems reasonable.
   NOTICE that rounding to the nearest ten gives a closer approximation than rounding to the nearest hundred (but using hundreds was easier)!

3. 534×29
   This time we'll round 534 to 500 and 29 to 30.
   500×30 is 15,000 (5 × 3 followed by all the zeros in the factors.) The actual answer is 15,486 which seems reasonable.

4. $4884 \div 715$

   This is approximately $4900 \div 700$ which is 7
   (Isn't 700 × 7 = 4900?)

   The exact answer is 6 with a remainder of 594. If my answer had been in the 60 range, my estimation would let me know that 60 was not reasonable! (7 is <u>NOT</u> close to 60)!

1.   <u>DO NOT WORK THESE PROBLEMS. JUST ESTIMATE THE ANSWERS.</u>

a. 67 + 28   b. 3542 − 186

c. 743 × 293   d. 5284 $\div$ 254

e. 5060 × 307 $\overline{}$ f. 62 $\overline{25,234}$

2.   Now find the answers and compare them with your estimations. Does estimating give you the exact answer? (NO.) Does estimating help you to see if your answer is reasonable? (IT
SHOULD!)

<u>ANSWERS:</u>
1. ESTIMATIONS: (your estimates may not be 2. ACTUAL exactly
   like these.)

a. 70 + 30 = 100   a. 95
b. 3500 − 200 = 3300   b. 3,356
c. 700 × 300 = 210,000   c. 217,699
d. 5000 ÷ 250 = 20   d. 20 remainder 204 (2 is not reasonable)

$$\frac{5000}{250} = \frac{500 \cdot 10}{25 \cdot 10} = \frac{20 \cdot 25}{2520} = 250$$

OR (see * below)

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        16
      _____          Your result will be a
 300)5,000 little more than 16
     − 300
      2000
     −1800
      200
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e. 5000 × 300 = 1,500,000 e. 1,553,420
       500 f.   407 (47 is not reasonable)   f. 60 $\overline{30,000}$

* The book tells us to round multiplication and division this second way, using only <u>one</u> non-zero digit in each number.