

## Open-Ended Template

**Names:** Andy Heiser, Dennis Garvin, Matt Lohr, C J. Rich, Pat Owens

**Grade Level:** 6-8      **Content Area:** Numbers and Computation

**PA Standard(s) addressed:** 2.2. Computation and Estimation  
2.2.8 D Estimate Amount of Tips and Discounts Using Ratios, Proportions and Percentages

**NCTM Standard(s) addressed:** Compute fluently and make reasonable estimates. Develop and use strategies to estimate the results of rational number computations and judge the reasonableness of the results.

**Problem Name:** Le Jeune Chef (Dinner Out)

**Problem:** Frank and Carolyn went to dinner at Le Jeune Chef. The bill came to \$107.74. Frank stated that he enjoyed the service and wanted to leave a 20% tip. Carolyn was unhappy with the service and wanted to leave a 15% tip. **Estimate** the amount of tip that each person wants to leave.

To receive full credit you must show and describe all of the work you would use to estimate the amount for each tip without the use of a calculator.

**Directions:** Show or describe all your work, even if you used a calculator or did it mentally, AND explain WHY you did each step.

**Problem Solution(s):** Round \$107.74 to \$110 .00 (range for rounding \$100.00 - \$110.00)

Estimate 15% of \$110.00

$$10\% \text{ of } 110 = \$11.00$$

$$\frac{1}{2} \text{ of } \$11 = \$5.50$$

$$\$11.00 + \$5.50 = \$16.50 \text{ (range } \$15 - \$16.50)$$

Explanation for 15%

- Find \$10 of rounded number (\$100 - \$110)
- Find 5% of \$100 - \$110 by taking  $\frac{1}{2}$  of answer for 10%
- Add 10% and 5% to make up estimate for 15%

Estimate 20% of \$110

$$10\% \text{ of } \$110 = \$11.00$$

$$2 \times \$11 = \$22$$

Explanation for 20%

- Can estimate for \$10 (see above) or just use 10% from above
- Multiply 10% by 2 to get 20%

Alternate Solution for 20% (Recognizing that 20% is  $\frac{1}{5}$ )

- Divide \$100 - \$110 by 5
- Multiply \$100 - \$110 by  $\frac{1}{5}$

Students must show all steps of estimation and explain all procedures to receive full credit.

**Specific Rubric:**

**5. Advanced Understanding:**

Correct answer, correct procedures shown and described. Written explanation to support work. Dollar units must be present in solution. (a) Round bill between \$100.00 - \$110.00 (b) Estimates for 15%, 20%, showing all steps with complete explanations

**4. Satisfactory Understanding:**

- (a) Correct answer for each tip with no explanation.
- (b) Correct answer for each tip with all calculations and complete explanations but missing unit. (\$)

**3. Almost Satisfactory Understanding:**

- (a) Correct answer with most correct procedures/ calculations shown or described, and no explanations. Some steps are missing but you can follow what is being done.
- (b) Correct answer with few procedures/calculations shown or described and some explanations. Some steps are missing, but you can follow what is being done.
- (c) Incorrect answer with correct procedures shown or described and some explanation but one calculation or copying error copied through.
- (d) Correct answer but rounding is not within stated range of \$100 -\$110.

**2. Partial Understanding:**

- (a) Correct answer with few procedures/calculations shown or described or some explanation. Too many steps are missing to follow what is being done.
- (b) Incorrect answer with few procedures / calculations shown or described and some or no

explanations. The student did not proceed far enough or proceeded incorrectly.

**1. Minimal Understanding:**

- (a) Correct answer with few procedures/calculations shown or described or some explanation, or explanation not legible.
- (b) No answer or incorrect answer, but student has provided some of the information critical to the solution. There is some indication that the student has read the item, and/ or some explanation that may lead to correct solutions.

**0. No Understanding:**

- (a) Incorrect answer in which the student attempts the task incorrectly or gives an incorrect or incomplete answer with an incorrect explanation or no explanation of the procedure or logic used in the solution. Nothing is correct.
- (b) Blank responses and Off-Task responses (profanity, refusal to perform, unrelated drawings or comments such as "doodles") are scored as "Incorrect responses"
- (c) Question marks and "I don't know" are scored as "Incorrect responses." The student has read the task and responded to it.