

Lesson 3-7

Monday, September 30, 2019 1:45 PM

MB 149

Name _____



Solve & Share

A group of 44 students is planning a train trip to Washington, D.C. They held many fundraisers and raised \$10,880. Nathan said, "We should have enough money to pay for the train tickets. There are about 50 students going on the trip and one round trip ticket costs about \$200. That makes the total cost of the tickets less than \$10,000."

Does Nathan's reasoning make sense?

Train Travel

April 14 Clorissville to Washington, D.C.	\$92
April 18 Washington, D.C., to Clorissville	\$92
Total Ticket Price	\$184

$$44 \times \$184 = \text{c}$$
$$\downarrow \quad \downarrow$$
$$50 \times 200 = 10000$$

Nathan's estimate using compatible numbers is correct

Math Practices and Problem Solving

Lesson 3-7

Critique Reasoning

I can ...

critique the reasoning of others by using what I know about estimating products.

Mathematical Practices MP.3 Also MP.1, MP.2, MP.6
Content Standard 5.NBT.B.5

Thinking Habits

Be a good thinker!
These questions can help you.

- What questions can I ask to understand people's thinking?
- Are there mistakes in other people's thinking?
- Can I improve other people's thinking?



Look Back! **MP.3 Critique Reasoning** What argument would I make to support Nathan's estimate?

Nathan made an overestimate. This shows that it will cost less than \$10,000. \$10,880 will be enough. * Overestimate for money

How Can You Critique Reasoning of Others?

A

Ms. Lynch needs to ship 89 boxes. 47 boxes weigh 150 pounds each. Each of the other boxes weighs 210 pounds.

Mia says that all 89 boxes can fit into one container. She reasons that 47×150 is less than 7,500 and 42×210 is a little more than 8,000, so the sum of their weights should be less than 15,400.



What is Mia's reasoning to support her estimate?

Mia estimates the total weight of the lighter boxes and the total weight of the heavier boxes, then adds the two estimates.

B

How can I critique the reasoning of others?

I can

- ask questions for clarification.
- decide if the strategy used makes sense.
- look for flaws in estimates or calculations.

C

Here's my thinking...

Mia's reasoning has flaws. She estimated that 42×210 is a little more than 8,000, but a better estimate is 9,000.

She underestimated the products so her conclusion is not valid.

The weight of the heavier boxes is 8,820 pounds. The weight of the lighter boxes is 7,050 pounds.

The total weight is 15,870 pounds. The sum is greater than 15,400. Mia's reasoning does not make sense.



Convince Me! **MP.3 Critique Reasoning** Raul states that one way to get the cargo under the weight limit is to remove two of the heavier boxes and one of the lighter boxes. How can you decide if Raul's reasoning makes sense?

Do the calculation to see if it is correct.

$$\begin{array}{r} 210 \\ 210 \\ +150 \\ \hline 570 \end{array}$$

$$\begin{array}{r} 15,870 \\ - 570 \\ \hline 15,300 \end{array}$$

Raul's reasoning makes sense.

☆ Guided Practice

MP.3 Critique Reasoning

A stadium has 58 sections of seats. There are 288 seats in each section. Mary estimated the total number of seats by multiplying 60×300 . She concluded that the stadium has fewer than 18,000 seats.

1. What is Mary's argument? How does she support it?

The stadium has fewer than 18,000 seats. She rounded the factors and estimated the total seats.

2. Describe at least one thing you would do to critique Mary's reasoning.

Check her estimates: $58 \times 288 = 5$
 $60 \times 300 = 18,000$ over-estimate.

3. Does Mary's conclusion make sense? Explain.

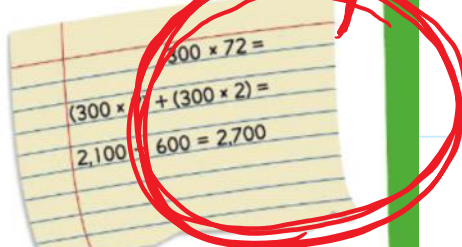
Yes. She overestimated the number of seats as 18,000 so the actual number must be less than 18,000.

Complete 4-6

☆ Independent Practice

MP.3 Critique Reasoning

An office manager has \$10,000 to spend on new equipment. He planned to purchase 300 lamps for \$72 each. He completed the calculations at the right and concluded that there would be plenty of money left to buy additional equipment.



4. What does the office manager do to support his thinking?

He calculated the cost of 300 lamps and compared it to \$10,000

5. Describe how you could decide if the office manager's calculation is reasonable.

Estimate for reasonableness and check his calculations

6. Does the office manager's conclusion make sense? Explain.

No. An underestimate of \$21,000 shows his answer is not reasonable.

The manager had a mistake in his calculation.

$$\begin{array}{r} (300 \times 70) + (300 \times 2) \\ 21,000 + 600 = \$21,600 \end{array}$$

When you critique reasoning, you need to explain if the method used by another makes sense.



$$\begin{array}{r} 300 \times 72 = x \\ 300 \times 70 = 21,000 \end{array}$$

Math Practices and Problem Solving

Common Core Performance Assessment

Buying a Piano

Over the summer Kathleen sold 1,092 jars of jam at outdoor markets. She made a \$12 profit on each one. She wants to use the profits to buy the Ivory-5K piano. She said, "Since $1,000 \times 12 = 12,000$, and 1,092 is greater than 1,000, I know my profits add up to more than \$12,000. So, I can buy the piano."

Piano Model	Price with tax
Harmony-2L	\$8,675
Ivory-5K	\$11,500
Goldtone-TX	\$14,250

7. **MP.1 Make Sense and Persevere** Does it make sense for Kathleen to find an overestimate or an underestimate to decide if she has earned enough money? Why?

8. **MP.2 Reasoning** Should Kathleen use multiplication to estimate her total profits? Explain your reasoning.

9. **MP.6 Be Precise** Is Kathleen's estimate appropriate? Is her calculation correct? Explain.

10. **MP.3 Critique Reasoning** Explain whether Kathleen's conclusion is logical. How did you decide? If it is not logical, what can you do to improve her reasoning?

When you **critique reasoning**, ask questions to help understand someone's thinking.

