PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

After watching the *Multiplying and Dividing Mentally* video, make sense of the mathematics by taking a closer look at the problem situations and solutions. Use the comments and questions in bold to help you solve the problems and develop strategies for mental multiplication and division.

Allie helped with the local Humane Society's annual fundraiser. At the end of the day, she determined how much money was made on each event. Describe how Allie could use mental math to solve each of the following problems.

Problem 1: Bake Sale

Cherry pies sold for $4 each. If the tally shows that Allie and her friends sold 70 cherry pies, how much money was earned by selling pies?

Write a multiplication problem that you could use to find the amount of money that was raised by selling cherry pies. 70 pies x $4 = money raised

You can multiply and divide multiples of ten easily if you know your basic facts. What basic fact can help you solve this problem? (7 x 4 = 28) **How can you use this fact to help you mentally compute 70 x 4?**

> To solve 70 times 4 mentally, think of 70 as 7 tens. ⟶ 70 x 4 = 7 tens x 4
>
> Now multiply. Four groups of 7 tens equals 28 tens. ⟶ = 28 tens
>
> 28 tens is the same as 280. ⟶ = 280
>
> **The Humane Society raised $280 by selling cherry pies.**

Problem 2: Photos with a Pet

A person could have a picture taken with some of Allie's furry friends for $6. If the Humane Society raised $420 by selling photos, how many pictures were taken?

Write a division problem that you could use to find how many pictures were taken.
$420 ÷ $6 for each picture = number of pictures taken

What basic fact can help you solve this problem? (42 ÷ 6) **How can you use this fact to help you mentally compute 420 ÷ 6?**

> To solve 420 ÷ 6 mentally, think of 420 as 42 tens. ⟶ 420 ÷ 6 = 42 tens ÷ 6
>
> Now divide. 42 tens divided by 6 equals 7 tens. ⟶ = 7 tens
>
> 7 tens is the same as 70. ⟶ = 70
>
> **The Humane Society sold 70 pictures with a pet.**

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Problem 3: Honorary Pet Pal

Thirty-two people each donated $25 in order to become an Honorary Pet Pal. How much money was raised on this event?

Write a multiplication problem that you could use to find out how much money was raised.
32 people x $25 each = amount of money raised

How can you mentally compute 32 x 25?

It is easier to multiply by 100 than 25, so determine the amount of money raised if each person donated $100. →	32 x 100 = 3200
Since $25 is one fourth of $100, find one fourth of 3200. To find one fourth of 3200, divide by 4. →	3200 ÷ 4 = 800

The Humane Society raised $800 with Honorary Pet Pals.

Study this reasoning. Will you get the same result if you divide before you multiply?

32 x 25

32 x 100 = 3200	32 ÷ 4 = 8
3200 ÷ 4 = 800	8 x 100 = 800

Dividing by four is the same as multiplying by one fourth. The order in which you multiply numbers does not change the answer.

$$32 \times 100 \times \frac{1}{4} = 32 \times \frac{1}{4} \times 100$$

You can determine ways to multiply and divide mentally if you look for relationships among the numbers in the problem. Efficient strategies often involve using your knowledge of basic facts or using *nice numbers* like 25, 50, and 100.

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