

## Unit 2 : More Calculations with Whole Numbers

### Friendly Notes

#### Order of Operations

Do multiplication or division from left to right, then addition or subtraction from left to right.

Compute the expression in parentheses first, if any.

1. Find the value of  $6 \times 8 + 30 \div 5 - 4 \times 9$ .

$$\begin{aligned}6 \times 8 + 30 \div 5 - 4 \times 9 &= 48 + 6 - 36 \\ &= 18\end{aligned}$$



If the expression in the parentheses has different kinds of operations, use the order of operations.

2. Find the value of  $600 \div (5 + 11 \times 5) - 8$ .

$$\begin{aligned}600 \div (5 + 11 \times 5) - 8 &= 600 \div (5 + 55) - 8 \\ &= 600 \div 60 - 8 \\ &= 10 - 8 \\ &= 2\end{aligned}$$

## Methods for Mental Calculation

When we add numbers close to 100 to another number, we can add 100 first and then subtract the difference between the number and 100.

1. Add 455 and 99.

$$\begin{aligned}455 + 99 &= 455 + 100 - 1 \\ &= 555 - 1 \\ &= 554\end{aligned}$$

$$100 - 99 = 1$$

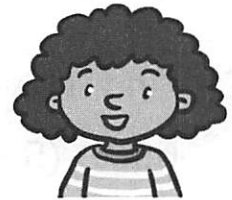


When we subtract numbers close to 100 from another number, we can subtract 100 first and then add the difference between the number and 100.

2. Subtract 98 and 367.

$$\begin{aligned}367 - 98 &= 367 - 100 + 2 \\ &= 267 + 2 \\ &= 269\end{aligned}$$

$$100 - 98 = 2$$



When we multiply mentally, we can multiply the tens, multiply the ones, and then add the products.

3. Multiply 85 by 6.

$$\begin{aligned}85 \times 6 &= 80 \times 6 + 5 \times 6 \\ &= 480 + 30 \\ &= 510\end{aligned}$$

There are many different ways to multiply mentally. Here are some ways.



4. Multiply 85 by 60.

$$\begin{aligned}85 \times 60 &= 85 \times 6 \times 10 \\ &= 510 \times 10 \\ &= 5,100\end{aligned}$$

5. Multiply 67 by 99.

$$\begin{aligned}67 \times 99 &= 67 \times 100 - 67 \\ &= 6,700 - 67 \\ &= 6,633\end{aligned}$$

6. Multiply 36 by 25.

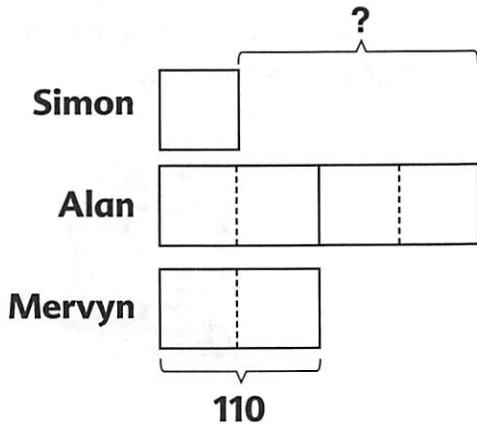
$$\begin{aligned}36 \times 25 &= 9 \times 4 \times 25 \\ &= 9 \times 100 \\ &= 900\end{aligned}$$

$$\begin{aligned}36 &= 9 \times 4 \\ 4 \times 25 &= 100\end{aligned}$$



## Word Problems

1. Mervyn has 110 marbles. Alan has 2 times as many marbles as Mervyn and 4 times as many marbles as Simon. How many more marbles does Alan have than Simon?



When we draw the model, we draw Simon's part first as he has the least number of marbles.



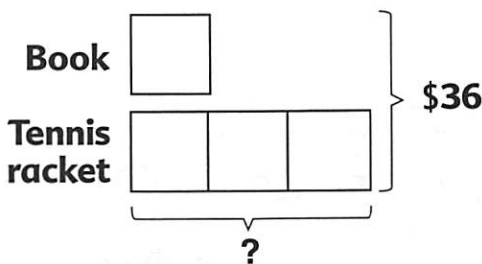
$$2 \text{ units} = 110 \text{ marbles}$$

$$1 \text{ unit} = 55 \text{ marbles}$$

$$3 \text{ units} = 165 \text{ marbles}$$

Alan has 165 more marbles than Simon.

2. A tennis racket costs 3 times as much as a book. If the total cost of the book and the tennis racket is \$36, find the cost of the tennis racket.



$$4 \text{ units} = \$36$$

$$1 \text{ unit} = \$9$$

$$3 \text{ units} = \$27$$

The cost of the tennis racket is \$27.

## Multiplication by a 2-Digit Whole Number

1. Multiply 57 by 60.

**Method 1:**

$$\begin{aligned} 57 \times 60 &= 57 \times 6 \times 10 \\ &= 342 \times 10 \\ &= 3,420 \end{aligned}$$

**Method 2:**

$$\begin{array}{r} \phantom{0} 57 \\ \times \phantom{0} 60 \\ \hline 3,420 \end{array}$$

**Method 3:**

	50	7		
60	50 × 60 = 3,000	7 × 60 = 420	+	3,000 420 <hr style="width: 100%;"/> 3,420

2. Multiply 368 by 25.

$$\begin{array}{r} \phantom{0} 368 \\ \times \phantom{0} 25 \\ \hline 1,840 \leftarrow 368 \times 5 \\ 7,360 \leftarrow 368 \times 20 \\ \hline 9,200 \end{array}$$

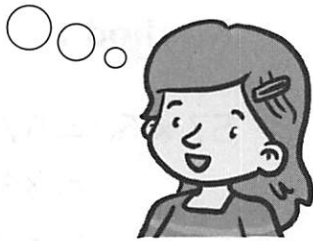
	300	60	8	
20	300 × 20 = 6,000	60 × 20 = 1,200	8 × 20 = 160	
5	300 × 5 = 1,500	60 × 5 = 300	8 × 5 = 40	+
				6,000 1,200 160 1,500 300 40 <hr style="width: 100%;"/> 9,200

# Division by a 2-Digit Whole Number

1. Divide 98 by 36.

$$\begin{array}{r} 2 \\ 36 \overline{) 98} \\ \underline{72} \\ 26 \end{array}$$

$\begin{array}{r} 2 \\ 40 \overline{) 98} \\ 40 \times 2 = 80 \quad 40 \times 3 = 120 \\ \text{The estimated quotient is 2.} \end{array}$
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$$30 \times ? = 90$$

	30	6
2	60	12
	72	

$$\begin{array}{r} 98 \\ - 72 \\ \hline 26 < 36 \end{array}$$

$$98 \div 36 = 2 \text{ R } 26$$

$$36 \times 2 + 36 = 98$$

2. Divide 225 by 25.



$\begin{array}{r} 7 \\ 30 \overline{) 225} \\ \text{The estimated quotient is 7.} \end{array}$
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$$25 \overline{) 225} \begin{array}{r} 7 \\ \underline{175} \\ 50 \end{array} \rightarrow 25 \overline{) 225} \begin{array}{r} 9 \\ \underline{225} \\ 0 \end{array}$$

The estimated quotient is too small. Try 9.

$$20 \times ? = 200$$

	20	5
7	140	35
+ 2	40	10
9	225	

$$\begin{array}{r} 225 \\ - 175 \\ \hline 50 \\ - 50 \\ \hline 0 \end{array}$$

$$225 \div 25 = 9$$

$$25 \times 9 = 225$$