

MATH LITERACY

GRADE 11



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1	Numbers and calculations with numbers: Read numbers, write numbers, estimate, operations (addition, subtraction, multiplication, and division), of-sums, word problems, whole numbers, order of operations, exponents and roots, fractions, percentages, decimals, rounding, words in math, multiplication with 10, 100, 1 000, division with 10, 100, 1 000, ratio, rate, addresses, proportionality	2
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CHAPTER 1: NUMBERS AND OPERATIONS WITH NUMBERS

READ NUMBERS

Example

136 131 628

One hundred and thirty-six million one hundred and thirty-one thousand six hundred and twenty-eight

WRITE NUMBERS

Group in groups of 3:

Million			Thousand			Units			,	decimals		
HM	TM	M	HT	TT	T	H	T	U		t	h	t

million 1 000 000 (6 zero's)

billion 1 000 000 000 (9 zero's)

trillion 1 000 000 000 000 000 (12 zero's)

Example

Write 246 552 698 in words:

Two hundred and forty-six million, five hundred and fifty-two thousand, six hundred and ninety-eight

Example

Write 56 000 000, 708 in words:

Fifty-six million, comma seven zero eight

ESTIMATE

Round to get an easier answer. This is just an estimated answer.

Example

Estimate $8\,312 + 68 - 755$ by rounding to the nearest 100:

$$\approx 8\,300 + 100 - 800 = 7\,600$$

Example

Estimate $8\,312 + 68 - 755$ by rounding to the nearest 10:

$$\approx 8\,310 + 70 - 760 = 7\,620$$

$$\begin{array}{r}
 8\ 3\ 1\ 0 \\
 + \quad \quad 7\ 0 \\
 \hline
 8^7\ 1^3\ 8\ 0 \\
 - \quad \quad 7\ 6\ 0 \\
 \hline
 7\ 6\ 2\ 0
 \end{array}$$

OPERATIONS WITH COUNTING NUMBERS

ADDITION (+)

Example

$$9\,813 + 1\,769 = 11\,582$$

$$\begin{array}{r}
 9^1\ 8\ 1^1\ 3 \\
 + \ 1\ 7\ 6\ 9 \\
 \hline
 1\ 1\ 5\ 8\ 2
 \end{array}$$

SUBTRACTION (-)

Example

$$7\ 356 - 1\ 987 = 5\ 369$$

$$\begin{array}{r} 7^6\ 13^2\ 15^4\ 16 \\ - 1\ 9\ 8\ 7 \\ \hline 5\ 3\ 6\ 9 \end{array}$$

6 - 7 → we must borrow
cross out 5, it becomes 4
put borrowed 1 in front of 6
then 16 - 7 = 9

2 - 9 → we must borrow
cross out 7, it becomes 6
put borrowed 1 in front of
2
then 12 - 9 = 3

4 - 5 → we must borrow
cross out 3, it becomes 2,
put borrowed 1 in front of
4
then 14 - 8 = 6

MULTIPLICATION (X)

Multiplication tables are very important!

Example

$$38 \times 15 = 570$$

$$\begin{array}{r} +4 \\ 3\ 8 \\ \times 1\ 5 \\ \hline 1^1\ 9\ 0 \\ + 3\ 8\ 0 \\ \hline 5\ 7\ 0 \end{array}$$

$$8 \times 5 = 40$$

$$3 \times 5 + 4 = 19$$

Cross out the 5. Put a 0.

Multiply by 1.

$$8 \times 1 = 8$$

$$3 \times 1 = 3$$

Add the two answers.

Example

$$\begin{array}{r} 1 \quad 4 \quad 2 \quad \text{res } 1 \\ 4 \overline{) 5 \quad 16 \quad 9} \end{array}$$

$$\begin{array}{l} 5 \div 4 = 1 \text{ r } 1 \\ 16 \div 4 = 4 \\ 9 \div 4 = 2 \text{ r } 1 \end{array}$$

With bigger numbers

Example

$$\begin{array}{r} . \quad 3 \quad 4 \quad 5 \\ 12 \overline{) 4 \quad 1 \quad 54 \quad 60} \end{array}$$

First count in 12's: 12, 24, 36, 48, 60, 72, 84, 96, 108

$$\begin{array}{l} 4 \div 12 = \text{can't} \\ 41 \div 12 = 3 \text{ r } 5 \\ 54 \div 12 = 4 \text{ r } 6 \\ 60 \div 12 = 5 \end{array}$$

Long division

Example

$$\begin{array}{r} 1 \quad 2 \quad 3 \\ 3 \overline{) 3 \quad 6 \quad 9} \\ - 3 \quad \downarrow \\ \hline . \quad 6 \\ - 6 \quad \downarrow \\ \hline . \quad 9 \\ - 9 \\ \hline . \end{array}$$

$$\begin{array}{l} 3 \div 3 = 1 \\ 1 \times 3 = 3 \\ 3 - 3 = 0 \\ \downarrow 6 \\ 6 \div 3 = 2 \\ 2 \times 3 = 6 \\ 6 - 6 = 0 \\ \downarrow 9 \\ 9 \div 3 = 3 \\ 3 \times 3 = 9 \\ 9 - 9 = 0 \end{array}$$

$$\div \quad \times \quad - \quad \downarrow$$

Division with larger numbers

Example

$$\begin{array}{r}
 \overline{) 4372 \text{ r } 5} \\
 \underline{13 39} \\
 94 \\
 \underline{ 91} \\
 32 \\
 \underline{ 26} \\
 5
 \end{array}$$

Count in

13's:

1. 13
2. 26
3. 39
4. 52
5. 65
6. 78
7. 91
8. 104
9. 117

$4 \div 13 = \text{can't}$

$48 \div 13 = 3$ (take the number just smaller than or equal to 48)

$$3 \times 13 = 39$$

$$48 - 39 = 9$$

↓4

$$94 \div 13 = 7$$

$$7 \times 13 = 91$$

$$94 - 91 = 3$$

↓1

$$31 \div 13 = 2$$

$$2 \times 13 = 26$$

OF-SUMS

Of means multiply. Write the whole number on 1 and multiply.

Example

$$\begin{aligned}
 & \frac{3}{4} \text{ of } 40 \\
 &= \frac{3}{4} \times \frac{40}{1} \\
 &= \frac{3}{4} \times \frac{40 \cancel{10}}{1} \\
 &= \mathbf{30}
 \end{aligned}$$

Example

$$\begin{aligned}
 & \frac{5}{6} \text{ of } 12 \\
 &= \frac{5}{6} \times \frac{12}{1} \\
 &= \frac{5}{\cancel{6}^2} \times \frac{\cancel{12}^2}{1} \\
 &= \mathbf{10}
 \end{aligned}$$

WORD PROBLEMS

VERY IMPORTANT: READ CAREFULLY AND UNDERLINE IMPORTANT WORDS AND NUMBERS!

ADDITION

Be on the lookout for important words like: altogether, add together, sum of, add...

Example

Carl has 12 blue balls, 10 red balls and 8 green balls. How many does he have all together?

$12 + 10 + 8 = 30$ balls (remember to write the units of your answer, for example balls)

SUBTRACTION

Be on the lookout for important words like: more than, less than, difference between, subtract, minus...

Example

On Monday we packed 230 boxes of apples, on Tuesday 300 boxes of apples and on Wednesday 180 boxes of apples.

1. How many boxes were packed less on Monday than on Tuesday?
 $300 - 230 = 70$ boxes
2. How many boxes were packed more on Tuesday than on Wednesday?
 $300 - 180 = 120$ boxes
3. What is the difference between Monday's boxes and Wednesday's boxes?
 $230 - 180 = 50$ boxes

MULTIPLICATION

Be on the lookout for important words like: times, multiply, each, if 1 box = R10 then 5 boxes are...

Example

How much will 6 boxes of apples cost if one box costs R 10?

$$1 \text{ box} = \text{R } 10$$

$$6 \text{ boxes} = 6 \times \text{R } 10 = \text{R } 60$$

DIVISION

Be on the lookout for important words like: divide by, each, divide between, division...

Example

Jan buys 8 donuts for R 80, how many can he buy for R 60?

8 donuts = R 80 (first calculate the price for one donut)

$$1 \text{ donut} = \text{R } 80 \div 8 = \text{R } 10$$

$$1 \text{ donut} = \text{R } 10$$

? can I buy for R60?

$$\text{R } 60 \div \text{R } 10 = 6 \text{ donuts}$$



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