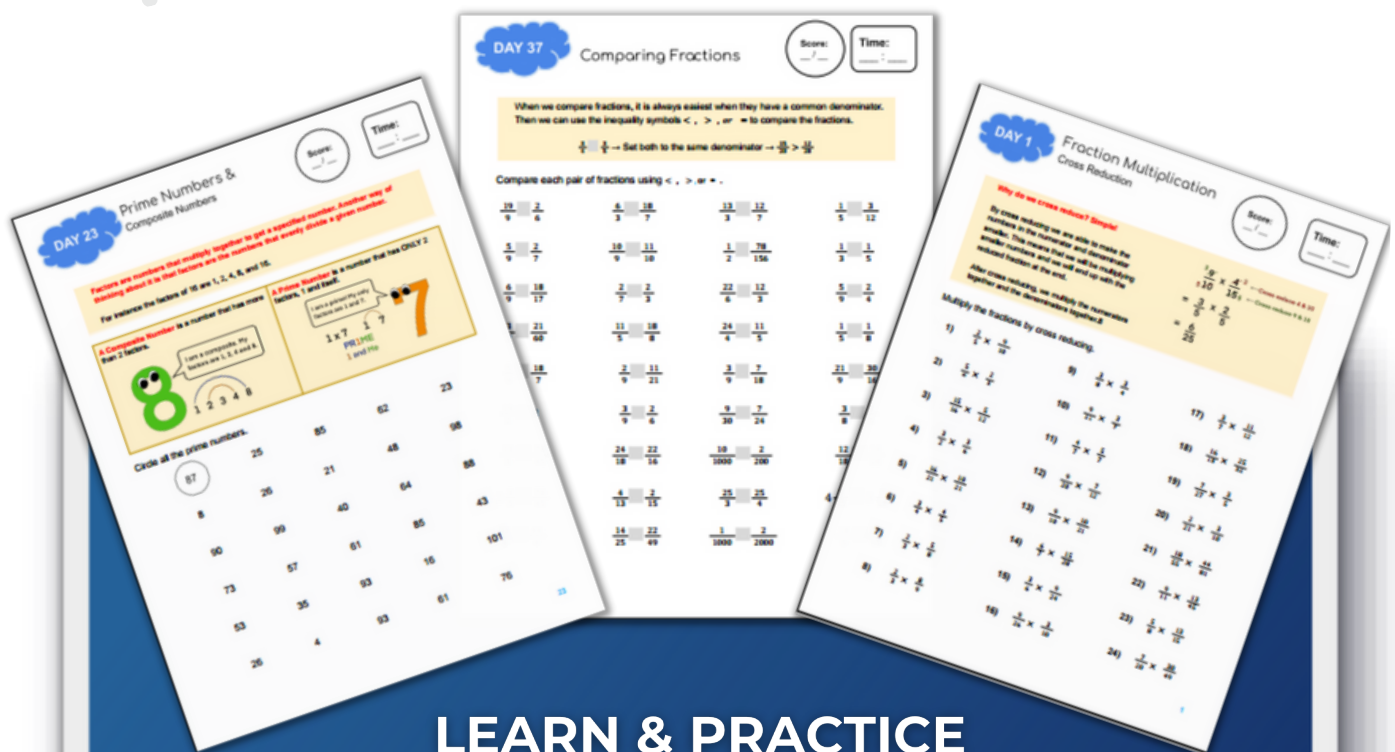


ABRIDGED VERSION



MATHPROJECT
Empowering minds

MATH FUNDAMENTALS



LEARN & PRACTICE

- ☒ Fractions
- ☒ Decimals
- ☒ Percentages
- ☒ Integers
- ☒ Order of Operations
- ☒ Exponents
- ☒ Ratios & Proportions
- ☒ Algebra

Why do we cross reduce? Simple!

By cross reducing we are able to make the numbers in the numerator and denominator smaller. This means that we will be multiplying smaller numbers and we will end up with the reduced fraction at the end.

After cross reducing, we multiply the numerators together and the denominators together.

$$\begin{array}{l}
 \overset{3}{\cancel{9}} \times \overset{2}{\cancel{4}} \leftarrow \text{Cross reduce 4 \& 10} \\
 \underset{5}{\cancel{10}} \times \underset{5}{\cancel{15}} \leftarrow \text{Cross reduce 9 \& 15} \\
 = \frac{3}{5} \times \frac{2}{5} \\
 = \frac{6}{25}
 \end{array}$$

Multiply the fractions by cross reducing.

1) $\frac{2}{5} \times \frac{9}{10}$

9) $\frac{3}{8} \times \frac{3}{4}$

17) $\frac{3}{7} \times \frac{11}{12}$

2) $\frac{5}{6} \times \frac{2}{3}$

10) $\frac{9}{21} \times \frac{3}{7}$

18) $\frac{16}{15} \times \frac{25}{32}$

3) $\frac{15}{16} \times \frac{5}{12}$

11) $\frac{4}{7} \times \frac{5}{7}$

19) $\frac{7}{27} \times \frac{3}{5}$

4) $\frac{3}{2} \times \frac{3}{6}$

12) $\frac{9}{20} \times \frac{7}{12}$

20) $\frac{2}{21} \times \frac{3}{10}$

5) $\frac{16}{21} \times \frac{10}{21}$

13) $\frac{9}{10} \times \frac{10}{21}$

21) $\frac{18}{55} \times \frac{44}{81}$

6) $\frac{3}{4} \times \frac{4}{5}$

14) $\frac{6}{7} \times \frac{15}{28}$

22) $\frac{9}{11} \times \frac{13}{45}$

7) $\frac{2}{3} \times \frac{5}{8}$

15) $\frac{3}{6} \times \frac{9}{24}$

23) $\frac{5}{8} \times \frac{13}{15}$

8) $\frac{2}{3} \times \frac{8}{9}$

16) $\frac{9}{26} \times \frac{3}{10}$

24) $\frac{7}{20} \times \frac{30}{49}$

Fraction Division

Two Mixed Fractions &
Cross Reduction

Score:

___/___

Time:

___:___

$$\begin{aligned}
 &= \frac{17}{18} \div 1 \frac{1}{4} \quad \leftarrow \text{Convert the mixed fraction into an improper fraction} \\
 &= \frac{35}{18} \div \frac{5}{4} \quad \leftarrow \text{Flip the divisor and change from } \div \rightarrow \times \\
 &= \frac{35}{18} \times \frac{4}{5} \quad \leftarrow \text{Cross reduce} \\
 &= \frac{7}{9} \times \frac{2}{1} \quad \leftarrow \text{Multiply} \\
 &= \frac{14}{9}
 \end{aligned}$$

Divide and cross reduce where possible.

1) $2 \frac{5}{10} \div 5 \frac{5}{18}$

4) $6 \frac{5}{5} \div 2 \frac{5}{15}$

7) $7 \frac{5}{7} \div 1 \frac{12}{14}$

2) $3 \frac{2}{6} \div 8 \frac{1}{2}$

5) $2 \frac{2}{10} \div 10 \frac{4}{6}$

8) $10 \frac{2}{8} \div 2 \frac{3}{4}$

3) $2 \frac{6}{12} \div 6 \frac{1}{5}$

6) $2 \frac{5}{15} \div 1 \frac{1}{3}$

9) $5 \frac{3}{10} \div 2 \frac{6}{15}$

Factors are numbers that multiply together to get a specified number. Another way of thinking about it is that factors are the numbers that evenly divide a given number.

For instance the factors of 16 are 1, 2, 4, 8, and 16.

A Composite Number is a number that has more than 2 factors.

A Prime Number is a number that has only two factors, **1** and **itself**.

Circle all the prime numbers.

87	25	85	62	23
8	26	21	48	98
90	99	40	64	88
73	57	61	85	43
53	35	93	16	101
26	4	93	61	76

Prime Factorization & Factor Trees

Score:

/

Time:

_: _

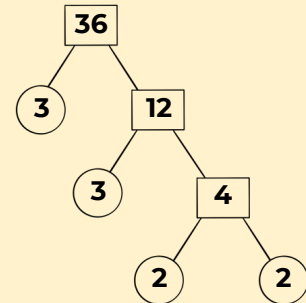
Prime factorization is where we write a composite number as a product of prime numbers. To break down a composite number into prime numbers we use factor trees.

Step 1: Write the composite number.

Step 2: Find two numbers, one of them should be a prime number, whose product is the composite and write it directly below.

Step 3: Repeat step 2 for the new composite number until you end up with only a prime number.

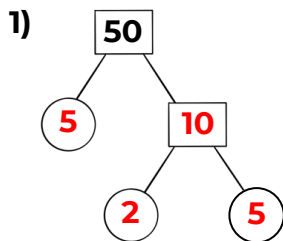
Step 4: Write the multiplication statement with your prime numbers.



$$36 = 3 \times 3 \times 2 \times 2$$

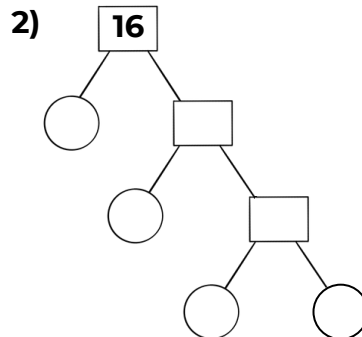
$$\text{or } 3^2 \times 2^2$$

Using the factor trees, determine the prime factorization of each number.

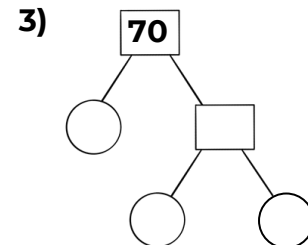


$$50 = 2 \times 5 \times 5$$

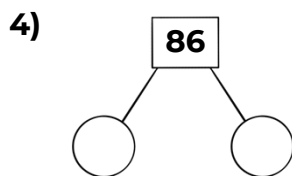
$$\text{or } 2 \times 5^2$$



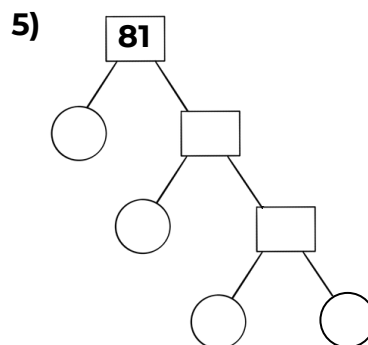
$$16 =$$



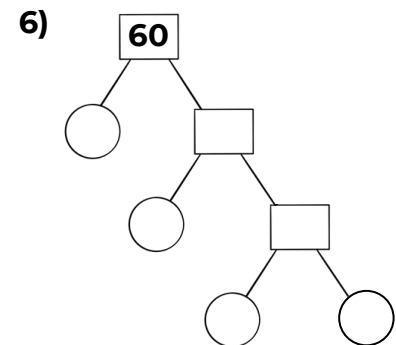
$$70 =$$



$$86 =$$



$$81 =$$



$$60 =$$



Lowest Common Multiples

Score:
____/____

Time:
____:____

A **multiple** is a number product of a given number and another number. They can be found by skip counting. For instance the multiples of 5 are 5, 10, 15, 20, 25,

The **lowest common multiple (LCM)** of two or more numbers is the smallest multiple that they have in common. There are a few ways to find the LCM of a group of numbers. Below is one way you can find the LCM.

Start by listing a few multiples of each number and checking to see if they have any common multiple.

If no multiple is found, continue listing more multiples until you find a common one for both.

Number	Multiples
14	14 , 28 , 42 , 56 , 70 , 84 , 98 , 112 , 126 , 140
10	10 , 20 , 30 , 40 , 50 , 60 , 70 , 80 , 90 , 100

Find the Lowest Common Multiple for each number pair.

1) 14, 10 **70**

6) 5, 20 _____

2) 30, 6 _____

7) 30, 12 _____

3) 15, 20 _____

8) 30, 50 _____

4) 24, 6 _____

9) 13, 4 _____

5) 12, 8 _____

10) 11, 12 _____

Factors are numbers that multiply together to get a specified number. Another way of thinking about it is that factors are the numbers that evenly divide a given number.

The factors of **24** are **1, 2, 3, 4, 6, 8, 12, and 24.**

You can see that the factors pair up to give a product of 24.



List all the factors for each number.

1) 14 _____

8) 39 _____

2) 27 _____

9) 58 _____

3) 57 _____

10) 63 _____

4) 88 _____

11) 56 _____

5) 22 _____

12) 86 _____

6) 36 _____

13) 25 _____

7) 20 _____

14) 46 _____

Here is another method you can use to find the GCF.

Step 1: Divide by a factor common to both 15 and 45. (5)

Step 2: Divide by a factor common to both 3 and 9. (3)

Step 3: Continue until the only factor left is 1.

Step 4: Make a box around the numbers in the left column and multiply them to find the GCF.

5	15	45
3	3	9
1	1	3

GCF: $5 \times 3 \times 1 = 15$

Find the Greatest Common Factor for each number pair.

1) 24, 3 _____

6) 39, 65 _____

2) 30, 24 _____

7) 50, 28 _____

3) 45, 81 _____

8) 20, 30 _____

4) 30, 4 _____

9) 15, 10 _____

5) 10, 2 _____

10) 28, 70 _____

GRASS Method

G: Given	R: Required	A: Action	S: Solve	S: Statement
Write down what information is given in the question.	Write down what you need to find/answer.	Write down how you will solve the question.	Calculate the answer.	State your answer in a full sentence.

For more information on how to solve word problems refer to Appendix A.

Solve the word problems using GRS / GRASS Method.

Questions	Solutions
Macy is making gifts for each of her classmates. She has 45 pencils, 30 gumballs and 15 stickers. If each gift should have the same number of items, how many gifts can she make?	G: 45 pencils, 30 gumballs and 15 stickers find the GCF S: Pencils → 45: 1, 3, 5, 9, 15, 45 Gumballs → 30: 1, 2, 3, 5, 6, 10, 15, 30 Stickers → 15: 1, 3, 5, 15 Therefore, she can make 15 gifts for her classmates.
1) To become a better shooter, Steph practices free throws every 2 days, three pointers every 4 days, and half court shots every 7 days. If Steph did all three activities today, in how many days will he do all three practices on the same day?	
2) James wants to cook 12 corn, 24 potatoes, and 66 cabbages. If James puts the same amount of vegetables in each pot and each pot has only one type of vegetable, what is the greatest number of vegetables he can put in one pot?	

3) Nate needs to ship 16 sports games, 20 platform games, and 10 puzzle games. He can pack only one type of game in each box and he must pack the same number of games in each box. What is the greatest number of games Nate can pack in each box?	
4) Knives are sold in packages of 3 and forks are sold in packages of 5. If you want to have the same number of each item, what is the least number of packages of each you need to buy?	
5) Taco day occurs every 14 days, if the last Taco Day occurred on a Tuesday. How many days will until taco day occurs again on a Tuesday?	
6) A chef is preparing lunch. There are 9 loaves of bread and 18 cabbages. If the chef wants all the dishes to be identical, then what is the greatest number of dishes that the chef serves?	

Here is another method we can use to add fractions.

Step 1: Each fraction must have the same denominator.

Step 2: Add the whole numbers together and add the fractions together.

Step 3: Simplify and reduce if possible.

$$\begin{aligned}
 & 2\frac{3}{4} + 3\frac{1}{3} \\
 & \quad \text{Find a common denominator} \\
 & = 2\frac{9}{12} + 3\frac{4}{12} \\
 & \quad \text{Add whole numbers} \\
 & \quad \text{Add fractions} \\
 & = 5\frac{13}{12} \\
 & \quad \text{Simplify } 5 + 1\frac{1}{12} \\
 & = 6\frac{1}{12}
 \end{aligned}$$

Add the fractions.

1) $2\frac{3}{6} + 3\frac{8}{11}$

6) $6\frac{1}{10} + 3\frac{1}{5}$

2) $3\frac{3}{8} + 4\frac{1}{2}$

7) $7\frac{1}{3} + 3\frac{1}{15}$

3) $4\frac{4}{8} + 1\frac{5}{7}$

8) $3\frac{6}{9} + 2\frac{3}{9}$

4) $2\frac{5}{8} + 1\frac{3}{6}$

9) $1\frac{5}{6} + 3\frac{1}{7}$

5) $1\frac{3}{4} + 1\frac{6}{8}$

10) $3\frac{2}{7} + 1\frac{5}{10}$

Subtracting Fractions

Mixed Fractions

Score:

___/___

Time:

___:___

$$2\frac{2}{12} - 1\frac{3 \times 3}{4 \times 3} \leftarrow \text{Let's leave it as mixed fractions and do a **common denominator**.$$

$$= 2 - 1\frac{2+12}{12} - 1\frac{9}{12} \leftarrow \text{If the **numerator** of the first fraction is greater than the numerator of the second fraction, subtract 1 from the whole number of the first fraction and add the denominator of the first fraction to the numerator of the first fraction.}$$

$$= 1\frac{14}{12} - 1\frac{9}{12} \leftarrow \text{**Subtract** the whole numbers first and the fraction.}$$

$$= \frac{5}{12}$$

Subtract the fractions.

1) $3\frac{3}{15} - 1\frac{4}{9}$

7) $3\frac{4}{6} - 1\frac{1}{5}$

13) $3\frac{3}{5} - 2\frac{4}{11}$

19) $10\frac{5}{6} - 5\frac{1}{4}$

2) $3\frac{1}{2} - 1\frac{10}{11}$

8) $2\frac{7}{12} - 1\frac{4}{20}$

14) $5\frac{1}{2} - 3\frac{1}{15}$

20) $3\frac{7}{10} - 1\frac{4}{11}$

3) $3\frac{2}{11} - 1\frac{3}{4}$

9) $5\frac{5}{11} - 3\frac{1}{4}$

15) $2\frac{2}{12} - 1\frac{3}{4}$

21) $3\frac{2}{13} - 2\frac{3}{4}$

4) $3\frac{2}{10} - 1\frac{2}{16}$

10) $3\frac{2}{10} - 1\frac{2}{16}$

16) $11\frac{3}{10} - 6\frac{5}{6}$

22) $9\frac{9}{10} - 4\frac{2}{12}$

5) $8\frac{4}{8} - 1\frac{6}{10}$

11) $8\frac{1}{3} - 1\frac{6}{7}$

17) $1\frac{3}{8} - 1\frac{1}{10}$

23) $4\frac{2}{7} - 3\frac{6}{11}$

6) $4\frac{8}{21} - 1\frac{8}{9}$

12) $4\frac{6}{21} - 2\frac{6}{7}$

18) $5\frac{11}{20} - 4\frac{3}{10}$

24) $10\frac{3}{14} - 5\frac{6}{7}$

When subtracting decimals we need to make sure that:

1. The decimal points line up with each other.
2. Where necessary, put zero placeholders in empty spaces.
3. Drop the decimal point.
4. Starting from the far right, subtract and borrow when necessary.

$$\begin{array}{r} 0.\overset{6}{\cancel{7}}\overset{13}{3} \\ - 0.37 \\ \hline 0.36 \end{array}$$

Subtract.

$$\begin{array}{r} 1) \quad .38 \\ - .14 \\ \hline \end{array}$$

$$\begin{array}{r} 7) \quad .99 \\ - .42 \\ \hline \end{array}$$

$$\begin{array}{r} 13) \quad .53 \\ - .20 \\ \hline \end{array}$$

$$\begin{array}{r} 19) \quad .78 \\ - .04 \\ \hline \end{array}$$

$$\begin{array}{r} 25) \quad .92 \\ - .53 \\ \hline \end{array}$$

$$\begin{array}{r} 2) \quad .85 \\ - .36 \\ \hline \end{array}$$

$$\begin{array}{r} 8) \quad .79 \\ - .63 \\ \hline \end{array}$$

$$\begin{array}{r} 14) \quad .89 \\ - .34 \\ \hline \end{array}$$

$$\begin{array}{r} 20) \quad .45 \\ - .30 \\ \hline \end{array}$$

$$\begin{array}{r} 26) \quad .19 \\ - .03 \\ \hline \end{array}$$

$$\begin{array}{r} 3) \quad .25 \\ - .15 \\ \hline \end{array}$$

$$\begin{array}{r} 9) \quad .35 \\ - .21 \\ \hline \end{array}$$

$$\begin{array}{r} 15) \quad .35 \\ - .19 \\ \hline \end{array}$$

$$\begin{array}{r} 21) \quad .77 \\ - .69 \\ \hline \end{array}$$

$$\begin{array}{r} 27) \quad .09 \\ - .01 \\ \hline \end{array}$$

$$\begin{array}{r} 4) \quad .63 \\ - .12 \\ \hline \end{array}$$

$$\begin{array}{r} 10) \quad .53 \\ - .34 \\ \hline \end{array}$$

$$\begin{array}{r} 16) \quad .33 \\ - .21 \\ \hline \end{array}$$

$$\begin{array}{r} 22) \quad .33 \\ - .22 \\ \hline \end{array}$$

$$\begin{array}{r} 28) \quad .51 \\ - .43 \\ \hline \end{array}$$

$$\begin{array}{r} 5) \quad .88 \\ - .78 \\ \hline \end{array}$$

$$\begin{array}{r} 11) \quad .99 \\ - .75 \\ \hline \end{array}$$

$$\begin{array}{r} 17) \quad .49 \\ - .34 \\ \hline \end{array}$$

$$\begin{array}{r} 23) \quad .43 \\ - .28 \\ \hline \end{array}$$

$$\begin{array}{r} 29) \quad .89 \\ - .78 \\ \hline \end{array}$$

$$\begin{array}{r} 6) \quad .53 \\ - .20 \\ \hline \end{array}$$

$$\begin{array}{r} 12) \quad .77 \\ - .14 \\ \hline \end{array}$$

$$\begin{array}{r} 18) \quad .99 \\ - .69 \\ \hline \end{array}$$

$$\begin{array}{r} 24) \quad .50 \\ - .40 \\ \hline \end{array}$$

$$\begin{array}{r} 30) \quad .81 \\ - .44 \\ \hline \end{array}$$

$$\begin{array}{r}
 \begin{array}{c} 5 \ 2 \\ 6 \ 3 \end{array} \\
 0.984 \leftarrow 3 \text{ decimal places} \\
 \times 0.078 \leftarrow 3 \text{ decimal places} \\
 \hline
 7872 \\
 + 06888 \\
 \hline
 0.0767252 \leftarrow \text{Move 6 decimal places:} \\
 \quad \quad \quad 3 + 3 = 6 \\
 \text{Answer: } 0.076752
 \end{array}$$

Multiply.

1) $\begin{array}{r} .455 \\ \times .049 \\ \hline \end{array}$

5) $\begin{array}{r} .964 \\ \times .064 \\ \hline \end{array}$

9) $\begin{array}{r} .547 \\ \times .025 \\ \hline \end{array}$

13) $\begin{array}{r} .507 \\ \times .005 \\ \hline \end{array}$

17) $\begin{array}{r} .044 \\ \times .120 \\ \hline \end{array}$

2) $\begin{array}{r} .898 \\ \times .055 \\ \hline \end{array}$

6) $\begin{array}{r} .199 \\ \times .087 \\ \hline \end{array}$

10) $\begin{array}{r} .659 \\ \times .059 \\ \hline \end{array}$

14) $\begin{array}{r} .039 \\ \times .109 \\ \hline \end{array}$

18) $\begin{array}{r} .611 \\ \times .789 \\ \hline \end{array}$

3) $\begin{array}{r} .462 \\ \times .125 \\ \hline \end{array}$

7) $\begin{array}{r} .814 \\ \times .066 \\ \hline \end{array}$

11) $\begin{array}{r} .123 \\ \times .321 \\ \hline \end{array}$

15) $\begin{array}{r} .145 \\ \times .201 \\ \hline \end{array}$

19) $\begin{array}{r} .003 \\ \times .908 \\ \hline \end{array}$

4) $\begin{array}{r} .484 \\ \times .048 \\ \hline \end{array}$

8) $\begin{array}{r} .576 \\ \times .076 \\ \hline \end{array}$

12) $\begin{array}{r} .601 \\ \times .012 \\ \hline \end{array}$

16) $\begin{array}{r} .222 \\ \times .333 \\ \hline \end{array}$

20) $\begin{array}{r} .921 \\ \times .129 \\ \hline \end{array}$

Long Division

3 Digit by 1 Digit - No Remainder

Score:

___/___

Time:

___:___

	Quotient
Divisor	Dividend
Dividend ÷ Divisor = Quotient	

Divisor: The number of pieces we want to break another number up into.

Dividend: A number that is being divided.

Quotient: The number of times the divisor fits into the dividend evenly.

Remainder: The amount left over. It occurs when the divisor doesn't exactly divide the dividend.

Long Division Steps

Step 1 - Divide: How many times does the divisor, 5, go into the first digit of the dividend, 375? If it is 0 times, then look at how many times 5 goes into the first 2 digits of the dividend. 5 goes into 37 at least 7 times.

$$\begin{array}{r}
 \text{Divisor} \rightarrow 5 \overline{) 375} \\
 \underline{- 35} \\
 25 \\
 \underline{- 25} \\
 0 \leftarrow \text{Remainder}
 \end{array}$$

75 ← Quotient
375 ← Dividend

Step 2: Multiply 5 by 7 to get the number that goes below 37.

Step 3: Subtract 35 from 37.

Step 4: Bring down the next number.

Step 5: Repeat steps 1 - 4 until the remainder is zero or smaller than the divisor.

Divide.

1) $8 \overline{) 216}$ 5) $7 \overline{) 161}$ 9) $5 \overline{) 730}$ 13) $6 \overline{) 744}$ 17) $5 \overline{) 925}$

2) $3 \overline{) 396}$ 6) $3 \overline{) 639}$ 10) $2 \overline{) 226}$ 14) $3 \overline{) 285}$ 18) $3 \overline{) 936}$

3) $6 \overline{) 252}$ 7) $8 \overline{) 184}$ 11) $4 \overline{) 192}$ 15) $8 \overline{) 792}$ 19) $2 \overline{) 872}$

4) $2 \overline{) 136}$ 8) $9 \overline{) 828}$ 12) $4 \overline{) 540}$ 16) $7 \overline{) 385}$ 20) $4 \overline{) 636}$

Remember the process:

- ÷ Divide
- × Multiply
- – Subtract
- ↓ Bring Down
- Repeat / Remainder

$$\begin{array}{r}
 174 \text{ R}7 \\
 35 \overline{) 6097} \\
 \underline{-35} \\
 259 \\
 \underline{-245} \\
 147 \\
 \underline{-140} \\
 7
 \end{array}$$

Divide.

$$1) 15 \overline{) 5737} \quad 4) 24 \overline{) 4969} \quad 7) 56 \overline{) 7439} \quad 10) 16 \overline{) 5649} \quad 13) 81 \overline{) 9039}$$

$$2) 23 \overline{) 3574} \quad 5) 14 \overline{) 4700} \quad 8) 27 \overline{) 8546} \quad 11) 22 \overline{) 1345} \quad 14) 30 \overline{) 3342}$$

$$3) 25 \overline{) 5835} \quad 6) 34 \overline{) 5796} \quad 9) 11 \overline{) 6843} \quad 12) 99 \overline{) 7649} \quad 15) 42 \overline{) 7040}$$

Before starting the long division steps, **remember** to place the decimal point in the quotient directly above the decimal point in the dividend. Then follow the same step you did for **long division**.

If necessary, you will write zeros after the last digit in the dividend in order to continue dividing until you reach a remainder of zero **OR** until you reach the necessary decimal places.

$$\begin{array}{r}
 23 \overline{) 79.35} \\
 \underline{-69} \\
 103 \\
 \underline{-92} \\
 115 \\
 \underline{-115} \\
 0
 \end{array}$$

Divide to 2 decimal places.

1) $46 \overline{) 13.34}$

6) $38 \overline{) 34.96}$

11) $14 \overline{) 12.60}$

16) $21 \overline{) 44.50}$

21) $92 \overline{) 84.64}$

2) $75 \overline{) 23.25}$

7) $25 \overline{) 20.75}$

12) $16 \overline{) 14.08}$

17) $16 \overline{) 25.44}$

22) $25 \overline{) 59.75}$

3) $64 \overline{) 71.04}$

8) $22 \overline{) 74.80}$

13) $35 \overline{) 12.25}$

18) $13 \overline{) 59.28}$

23) $36 \overline{) 72.36}$

4) $46 \overline{) 4.14}$

9) $47 \overline{) 39.95}$

14) $15 \overline{) 52.05}$

19) $60 \overline{) 51.00}$

24) $47 \overline{) 25.85}$

5) $75 \overline{) 48.75}$

10) $58 \overline{) 13.34}$

15) $20 \overline{) 39.4}$

20) $20 \overline{) 99.80}$

25) $16 \overline{) 60.64}$

Use GRS or GRASS method to answer the word problems.

Questions	Solutions
Eshal’s class is planning on taking a trip to the movie theater. Her teacher tells the class that the trip would cost a total of \$558.25. How much does each student need to pay if there are 25 students, including Eshal, in the class?	Given: Total cost = \$558.25, and there are 25 students Required: How much does each student pay? Solution: Since we need an amount per student, we will divide 558.25 by 25. Therefore, each student needs to pay \$22.33. 22.33 25 558.25 -50 58 -50 82 -75 75 0
1) Jordan works at a coffee shop and gets paid \$15.20 per hour. After working for 20 hours, he was paid \$325. How much money should Jordan have been paid?	
2) A water tank holds 2205.36 litres of water, and 6 litres of water is drained per day. How many days will it take for the water tank to empty?	
3) Will is fixing the fence around his house. At the store he found out that fencing costs \$29.25 per meter. If Will needs to buy 33.66 meters of fencing, how much will it cost him?	

4) Melissa's total grocery bill was \$49.44. The cashier gave her \$0.58 in change when she paid with a \$50 bill. How much change should the cashier have given Melissa?	
5) A 30-foot piece of electrical tape has 6 pieces that are each 3.50 feet cut from it. What is the new length of the tape?	
6) Your new job pays a weekly salary of \$1020.00. Your weekly salary needs to cover your weekly spending. • Rent = \$422.80 • Internet = \$15.25 • Electricity = \$46.38 • Groceries = \$180.70 How much do you have left each week after you pay for the following?	
7) Ibrahim trained a total of 27.9 hours over the course of 6 days. On average, how many hours did Ibrahim train per day?	
8) Mr.Barley went to the supermarket to buy BBQ sauce. He noticed that they had 2 different bottles, one bottle was 16.9 ounces and the other was 28.32 ounces. What is the weight difference of the two bottles of BBQ sauce?	

When adding and subtracting more than one integer it is always best to do it in groups of two, this way you avoid the chance of making a wrong calculation.

For instance the question on the right.

First, $-10 + 30$ which is **20**.
Then, $20 - 50$ which is **-30**.

$$\begin{aligned} & -10 + 30 - 50 \\ & = 20 - 50 \\ & = -30 \end{aligned}$$

Evaluate.

1) $-5 - 5 =$

9) $-80 + 120 =$

17) $1 - 1 + 1 - 1 + 1 =$

2) $-20 - (-40) =$

10) $-90 + 60 - 20 =$

18) $40 - 80 =$

3) $-20 - 200 =$

11) $8 - 9 - 12 =$

19) $20 - 20 =$

4) $-4 - 4 - 4 =$

12) $-30 - 30 + 100 =$

20) $-10 - 10 - 10 =$

5) $-9 + 9 - 9 =$

13) $-50 + 50 =$

21) $-8 + 6 + 6 =$

6) $60 + 90 - 50 =$

14) $-30 - 20 - 10 =$

22) $-80 + 100 =$

7) $-8 + (-8) + 6 =$

15) $20 - 40 =$

23) $100 - 100 + 200 =$

8) $-200 - (-200) =$

16) $-16 + 18 =$

24) $20 - 40 =$

BEDMAS is an acronym that is used to refer to the order of operations.

When evaluating a mathematical expression we have to follow the correct order, otherwise we get the wrong answer.

B	B rackets, ()
E	E xponents, a^n
D M	D ivision or M ultiplication (Left or right)
A S	A ddition or S ubtraction (Left or right)

$$\begin{aligned}
 & 3 \times 6 - (3 \times 6 + 3) \\
 &= 3 \times 6 - (18 + 3) \\
 &= 3 \times 6 - (21) \\
 &= 18 - 21 \\
 &= -3
 \end{aligned}$$

HELPFUL TIP: Always do 'division and multiplication' or 'addition and subtraction' from left to right!

Correct:

$$\begin{aligned}
 & 8 - 4 + 2 \\
 &= 4 + 2 \\
 &= 6
 \end{aligned}$$

Incorrect:

$$\begin{aligned}
 & 8 - 4 + 2 \\
 &= 8 - 6 \\
 &= 2
 \end{aligned}$$

Solve the following problems using the order of operations.

1) $8 - 4 + 2 + (4 - 5)$

4) $(5 - 4) - (10 - 5)$

7) $(8 \times 8 + 8) - 4$

2) $16 - 8 - 8$

5) $[(20 - 2) - 4]$

8) $[(22 - 1) - 19]$

3) $(8 - 4) - (4 - 1)$

6) $(16 + 3) - 18$

9) $4 - (4 \times 8 + 4)$

One Step Equations & Inverse Operations

When it comes to solving equations the goal is to determine what the value is for the variable (ie. x).
In order to solve the equation we need to **isolate the variable**, which means we need to use **inverse (opposite) operations**. The reason behind this is that we need to always keep the equation balanced, therefore, what we do to one side we do to the other.

ADDITION $x + 7 = 10$ $\quad -7 \quad -7$ $x = 3$	SUBTRACTION $y - 2 = 5$ $\quad +2 \quad +2$ $y = 7$	MULTIPLICATION $\frac{3a}{3} = \frac{-9}{3}$ $a = -3$	DIVISION $2 \times \left(\frac{b}{2} \right) = 4 \times 2$ $b = 8$
--	--	--	--

Solve for the unknown variable.

- | | | | | |
|----------------------|------------------------|----------------------|---------------------|------------------------|
| 1) $n + 8 = 5$ | 8) $n \div 13 = 3$ | 15) $n - 18 = 25$ | 22) $n \div 3 = 33$ | 29) $n + 8 = -5$ |
| 2) $36 \div n = 6$ | 9) $18 - n = 16$ | 16) $-36 \div n = 6$ | 23) $8n = 64$ | 30) $6 \div n = -6$ |
| 3) $8 \times n = 64$ | 10) $25 \div n = 5$ | 17) $2n = 84$ | 24) $-5 \div n = 5$ | 31) $10n = 80$ |
| 4) $n - 4 = 10$ | 11) $6 \times g = 24$ | 18) $n + 14 = 14$ | 25) $-6g = -60$ | 32) $n - 25 = -25$ |
| 5) $n + 16 = 30$ | 12) $8 + k = 1$ | 19) $-5n = 30$ | 26) $8 - k = -10$ | 33) $9n = 81$ |
| 6) $6 + n = 21$ | 13) $-6 \times m = 12$ | 20) $-1 + g = 9$ | 27) $6m = -24$ | 34) $8 \times g = 800$ |
| 7) $16 \div n = 4$ | 14) $-8 + k = 1$ | 21) $k \div 8 = -4$ | 28) $18 + k = 6$ | 35) $k \div 4 = -5$ |

Step 1: Isolate for x by subtracting 9 from both sides.

The opposite of +9 is -9.

**You can also think of it as moving it to the other side of the = .
This causes the opposite operation.**

Step 2: Simplify/ evaluate the right side to get the final answer.

$$x + 9 = 3$$

$$- 9 \quad - 9$$

$$x = 3 - 9$$

$$x = - 6$$

Solve for the unknown variable.

1) $16 + s = 43$

8) $s \div 12 = 60$

15) $10 - s = - 13$

22) $s \div (-11) = 6$

2) $s - 7 = 18$

9) $s \div 39 = 3$

16) $s + 10 = 8$

23) $s \div 3 = - 22$

3) $22 - s = 42$

10) $s \times 15 = 60$

17) $- m = 42$

24) $m \times 5 = 100$

4) $s \times 60 = 480$

11) $s + 14 = 23$

18) $s \div 60 = 10$

25) $m + 14 = - 3$

5) $s \div 6 = 24$

12) $23 - s = 23$

19) $m \div 6 = - 24$

26) $- 11 + m = 23$

6) $44 - s = 45$

13) $22 s = 44$

20) $- 4 - m = 15$

27) $-12 s = - 144$

7) $48 \div s = 4$

14) $63 \div s = 3$

21) $- 4 s = - 4$

28) $36 \div s = - 3$

Decimal

Percent

Move decimal 2 places right

0.44

→

0.44

→

44%

Right

Decimal

Percent

Move decimal 2 places left

8%

→

8.

→

0.08

Left

Part A: Change the following percents into decimals.	Part B: Change the following decimals into percents.
1) 14% = 2) 335 % = 3) 53% = 4) 75% = 5) 50% = 6) 11% = 7) 4% = 8) 25% = 9) 44% = 10) 56% = 11) 63% = 12) 70% =	13) 0.35 = 14) 0.5 = 15) 2.03 = 16) 0.12 = 17) 0.42 = 18) 0.46 = 19) 0.75 = 20) 0.24 = 21) 2.22 = 22) 9.9 = 23) 0.45 = 24) 0.79 =

$$120\% \text{ of } 56 \Rightarrow 1.2 \times 56$$

1.2 ← 1 decimal place

x 56

72

+600

672 ← move 1 decimal place

Therefore, 120% of 56 is **67.2**

Evaluate.

1) 34% of 116

6) 48% of 64

11) 39% of 145

16) 25% of 56

2) 54% of 94

7) 66% of 350

12) 20% of 166

17) 36% of 244

3) 26% of 36

8) 55% of 220

13) 55% of 330

18) 78% of 404

4) 10% of 20

9) 10% of 210

14) 84% of 116

19) 22% of 240

5) 95% of 12

10) 18% of 124

15) 100% of 260

20) 11% of 100

Percent $\Rightarrow$ Fraction	Fraction $\Rightarrow$ Percent
Step 1: Remove the % sign and make the number your numerator. Step 2: Use 100 as the denominator. Step 3: Reduce the fraction to lowest terms. $70\% \longrightarrow \frac{70}{100} \div 10$ $\frac{7}{10}$	Step 1: Change the fraction so that the denominator is 100. Step 2: Remember that what you do to the denominator you do to the numerator too. Step 3: Take only the numerator and add the % sign. $\frac{3}{5} = \frac{60}{100}$ $\frac{3}{5} \longrightarrow 60\%$

Change the percentages into fractions. Reduce your answer.

1) $100\% =$

6) $28\% =$

2) $2\% =$

7) $25\% =$

3) $3\% =$

8) $22\% =$

4) $4\% =$

9) $70\% =$

5) $20\% =$

10) $80\% =$

Change the fractions into percentages.

1) $\frac{1}{2}$

5) $\frac{3}{15}$

9) $\frac{3}{10}$

2) $\frac{1}{20}$

6) $\frac{7}{100}$

10) $\frac{4}{25}$

3) $\frac{6}{8}$

7) $\frac{49}{50}$

11) $\frac{5}{2}$

4) $\frac{1}{4}$

8) $\frac{16}{20}$

12) $\frac{11}{50}$

Change the percentages into decimals.

1) 50% =

5) 100% =

2) 35 % =

6) 150% =

3) 20% =

7) 3% =

4) 75 % =

8) 1000% =

Change the decimals into percentages.

1) 0.05 =

5) 1.04 =

2) 0.9 =

6) 7.02 =

3) 2.5 =

7) 0.34 =

4) 0.25 =

8) 0.15 =

Use the GRS / GRASS Method to answer the following word problems

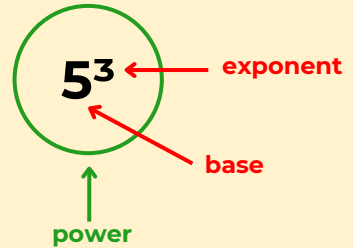
Questions	Solutions
1) What is the number 50 increased by 150% of itself?	
2) A jacket is on sale for 25% off, if the sale price is \$246, what is the original price?	
3) At the pizza place, pizza cost \$24. For pizza day, there is a 14% off deal for the pizza. If you bought the pizza at the deal price, how much would it cost including 7% tax?	
4) If P is 25% of Q and Q is 40% of W, find P in terms of W	

5) Determine what $\frac{4}{5}\%$ of 275 is?	
6) When you bought your car it cost \$8,255. After the first year its value dropped by 15% and then an additional 8% the second year. How much is your car worth today?	
7) A 1925 Peace Silver Dollar coin is worth \$128 and it is expected to increase in value every year by 4%. How much will it be worth in 3 years?	
8) A box set of the top five 2020 video games is on sale for 15% off. If it originally cost \$189.90, how much money do you save?	
9) Adult movie tickets cost \$15.77 and every Tuesday they are 22% off. If tax is 13%, how much do two adult tickets cost on Tuesday?	

What are exponents?

An exponent is a small number that is written to the upper-right of a base number.

Exponents are used to show repeated multiplication of a specific number. It tells us how many times the base number is being multiplied by itself.



Exponential Form (written as a power)	Word Form	Expanded Form (written as repeated multiplication)	Standard Form (the evaluated answer)
5^3	Five to the power of three	$5 \times 5 \times 5$	125

Part A:

Rewrite the following powers using repeated multiplication and calculate its value.

For example, $4^3 = 4 \times 4 \times 4 = 64$

1) 5^2

3) 3^3

5) 16^2

2) 2^5

4) 7^1

6) 4^4

Part B:

Rewrite the following expanded forms into exponential form.

For example: $5 \times 5 = 5^2$

7) $1 \times 1 \times 1 \times 1 \times 1$

9) 2×2

11) $7 \times 7 \times 7 \times 7 \times 7 \times 7$

8) 5

10) 4×4

12) $8 \times 8 \times 8 \times 8$

Evaluating Postive & Negative Exponents

Score:

____/____

Time:

____:____

Step 1: Flip fraction**Step 2:** Positive exponent**Step 3:** Bring the exponent to the numerator and denominator**Step 4:** Evaluate: $10^2 = 10 \times 10 = 100$

$$7^2 = 7 \times 7 = 49$$

$$\begin{aligned} \left(\frac{7}{10}\right)^{-2} &= \left(\frac{10}{7}\right)^2 \\ &= \frac{10^2}{7^2} \\ &= \frac{100}{49} \end{aligned}$$

Evaluate the exponents. Remember that all fractions must be reduced.

1) $\left(-\frac{1}{12}\right)^2$

6) $\left(\frac{4}{3}\right)^{-3}$

11) $\left(\frac{3}{5}\right)^{-2}$

16) $\left(-\frac{6}{9}\right)^{-2}$

2) $\left(-\frac{5}{9}\right)^2$

7) $\left(-\frac{4}{6}\right)^8$

12) $\left(-\frac{1}{8}\right)^{-3}$

17) $\left(-\frac{1}{2}\right)^2$

3) $\left(\frac{7}{8}\right)^{-4}$

8) $\left(-\frac{1}{4}\right)^2$

13) $\left(-\frac{6}{10}\right)^{-8}$

18) $\left(-\frac{2}{3}\right)^{-3}$

4) $\left(\frac{1}{3}\right)^{-5}$

9) $\left(-\frac{1}{2}\right)^4$

14) $\left(-\frac{1}{2}\right)^{-2}$

19) $\left(-\frac{1}{10}\right)^2$

5) $\left(\frac{7}{12}\right)^3$

10) $\left(\frac{2}{5}\right)^{-2}$

15) $\left(\frac{10}{3}\right)^{-3}$

20) $\left(\frac{6}{7}\right)^1$

Ratio	Rate	Unit Rate
A comparison between two or more quantities that have the same units . ____ : ____ Reduce the ratio and never write the units.	A comparison between two or more quantities that have different units . Reduce the ratio and write the units.	A ratio that compares two different quantities by stating how many of the first quantity compare to ONE unit of the second quantity. For instance: 100 km/hour or \$12/kg.
Example: There are 16 boys and 14 girls in the math class. The ratio would be expressed as Boys : Girls 16 : 14 ← Divide by 2 8 : 7 ← Reduced Ratio	Example: To get to grandma's house we have to drive 250 km for 3 hours. The rate would be express as $\frac{250 \text{ km}}{3 \text{ hours}}$ OR 250 km : 3 hours	Example: Jon paid \$45 for 9 hotdogs. The ratio would be expressed as \$ 45 : 9 Hotdogs ← Divide by 9 \$ 5 : 1 Hotdog ← Reduced Ratio The unit rate is \$5 per hotdog.

Complete the table by expressing each phrase as a rate and unit rate.

Phrase	Rate	Unit Rate
1) 21 pineapples for \$63		
2) 405 points for 44 games won		
3) 3909 points made over 710 shot attempts		
4) 14 inches of water in 4 hours		
5) 70 miles per hour		
6) 3 monitors cost 240 pesos		
7) 18 phones cost \$16400		
8) \$40 for 20 wings		
9) 26 years in prison for 5 banks robbed		
10) 7 pencils for 20 dollars		

It's inventory time at your smoothie shop!

Answer the following using ratios.
If needed, round to the nearest hundredth.



Questions	Solution
The ratio of lychee juice bottles to strawberry smoothies is 2:5. If there are 21 lychee juice bottles, how many strawberry smoothies are there?	Lychee : Strawberry $ \begin{array}{rcl} 2 & : & 5 \quad \leftarrow \text{Base ratio} \\ \times \frac{21}{2} \downarrow & & \downarrow \times \frac{21}{2} \\ 21 & : & x \quad \leftarrow x = \# \text{ of strawberry smoothies} \end{array} $ $x = 5 \times \frac{21}{2} = 52.5$ There are 52.5 strawberry smoothies
1) The ratio of mango bubble tea to Watermelon slush is 3 : 4. If there are 20 mango bubble teas, how many watermelon slush are there?	
2) The ratio of milk teas to matcha teas is 1 : 24. If there are 72 matcha teas, how many milk teas are there?	

3) The ratio of orange smoothies to peach teas is 6 : 2. If there are 14 orange smoothies, how many peach teas are there?	
4) The ratio of cranberry juice to lemon juice is 12 : 5. If there are 40 lemon juices, how many cranberry juices are there?	
5) There are 36 yogurt smoothies. If the ratio of yogurt smoothies to grape teas is 4 : 5, how many grape teas are there?	
6) There are 25 pina colada smoothies. If the ratio of avocado smoothies to pina colada smoothies is 6 : 10, how many avocado smoothies are there?	

Math Fundamentals Answer Key: Day 1-28

Day 1

1. $9/25$
2. $5/9$
3. $25/64$
4. $3/4$
5. $160/441$
6. $3/5$
7. $5/12$
8. $16/27$
9. $9/32$
10. $9/49$
11. $20/49$
12. $21/80$
13. $3/7$
14. $45/98$
15. $3/16$
16. $27/260$
17. $11/28$
18. $5/6$
19. $7/45$
20. $1/35$
21. $8/45$
22. $13/55$
23. $13/24$
24. $3/14$

Day 2

1. $9/19$
2. $20/51$
3. $25/62$
4. 3
5. $33/160$
6. $7/4$
7. $54/13$
8. $41/11$
9. $53/24$

Day 3

Prime numbers are:

- 87
23
73
43

53

101

61

Day 4

1. $2 \times 5 \times 5 = 50$
2. $2 \times 2 \times 2 \times 2 = 16$
3. $2 \times 5 \times 7 = 70$
4. $2 \times 43 = 86$
5. $3 \times 3 \times 3 \times 3 = 81$
6. $2 \times 2 \times 3 \times 5 = 60$

Day 5

1. 70
2. 30
3. 60
4. 24
5. 24
6. 20
7. 60
8. 150
9. 52
10. 132

Day 6

1. 1, 2, 7, 14
2. 1, 3, 9, 27
3. 1, 3, 19, 57
4. 1, 2, 4, 8, 11, 22, 44, 88
5. 1, 2, 11, 22
6. 1, 2, 3, 4, 6, 9, 12, 18, 36
7. 1, 2, 4, 5, 10, 20
8. 1, 3, 13, 39
9. 1, 2, 29, 58
10. 1, 3, 7, 9, 21, 63
11. 1, 2, 4, 7, 8, 14, 28, 56
12. 1, 2, 43, 86
13. 1, 5, 25
14. 1, 2, 23, 46

Day 7

1. 3
2. 6

3. 9

4. 2

5. 2

6. 13

7. 2

8. 10

9. 5

10. 14

Day 8

1. List multiples of each, notice that all have the lowest common multiple of 28
2. List factors of each, notice that all have the greatest common factor of 6
3. List factors of each, notice that all have the greatest common factor of 2
4. List multiples of each, notice that all have the lowest common multiple of 15
5. A Tuesday is a week day meaning that they occur every 7 days. The LCM of 7 and 14 is 14
6. GCF between 9 and 18 is 9

Day 9

1. $6 \frac{5}{22}$
2. $7 \frac{7}{8}$
3. $6 \frac{3}{14}$
4. $4 \frac{1}{8}$

5. $3\frac{1}{2}$
6. $9\frac{3}{10}$
7. $10\frac{2}{5}$
8. 6
9. $4\frac{41}{42}$
10. $4\frac{11}{14}$

Day 10

1. $1\frac{34}{45}$
2. $1\frac{13}{22}$
3. $1\frac{19}{44}$
4. $2\frac{3}{40}$
5. $6\frac{9}{10}$
6. $2\frac{31}{63}$
7. $2\frac{7}{15}$
8. $1\frac{23}{60}$
9. $2\frac{9}{44}$
10. $2\frac{3}{40}$
11. $6\frac{10}{21}$
12. $1\frac{3}{7}$
13. $1\frac{13}{55}$
14. $2\frac{13}{30}$
15. $5\frac{1}{12}$
16. $4\frac{7}{15}$
17. $11\frac{1}{40}$
18. $1\frac{1}{4}$
19. $5\frac{7}{12}$
20. $2\frac{37}{110}$
21. $21\frac{5}{2}$
22. $5\frac{11}{15}$
23. $57\frac{7}{77}$
24. $4\frac{5}{14}$

Day 11

1. 0.24
2. 0.49
3. 0.1
4. 0.51
5. 0.1
6. 0.33
7. 0.57
8. 0.16
9. 0.14
10. 0.19
11. 0.24
12. 0.63

13. 0.33
14. 0.55
15. 0.16
16. 0.12
17. 0.15
18. 0.3
19. 0.74

20. 0.15
21. 0.08
22. 0.11
23. 0.15
24. 0.1
25. 0.39
26. 0.16
27. 0.08
28. 0.08
29. 0.11
30. 0.37

Day 12

1. 0.022295
2. 0.04939
3. 0.05775
4. 0.023232
5. 0.061696
6. 0.017313
7. 0.053724
8. 0.043776
9. 0.013675
10. 0.038881
11. 0.039483
12. 0.007212
13. 0.002535
14. 0.004251
15. 0.029145
16. 0.073926
17. 0.00528
18. 0.482079
19. 0.002724
20. 0.118809

Day 13

1. 27
2. 132
3. 42
4. 68
5. 23
6. 213

7. 23
8. 92
9. 146
10. 113
11. 48
12. 135
13. 124
14. 95
15. 99
16. 55
17. 185
18. 312
19. 436
20. 159

Day 14

1. 382 R7
2. 155 R9
3. 233 R10
4. 207 R1
5. 335 R10
6. 170 R16
7. 132 R47
8. 316 R14
9. 622 R1
10. 353 R1
11. 61 R3
12. 77 R26
13. 111 R48
14. 111 R12
15. 167 R26

Day 15

1. 0.29
2. 0.31
3. 1.11
4. 0.09
5. 0.65
6. 0.92
7. 0.83
8. 3.4
9. 0.85
10. 0.23
11. 0.90
12. 0.88
13. 0.35
14. 3.47
15. 1.97

16. 2.12
17. 1.59
18. 4.56
19. 0.85
20. 4.99
21. 0.92
22. 2.39
23. 2.01
24. 0.55
25. 3.79

Day 16

1. $15.20 \times 20 = \$304$
2. $2205.36 / 6 =$
367.56 days
3. $29.25 \times 33.66 =$
\$984.56
4. $50 - 49.44 =$
\$0.56
5. $30 - (6 \times 3.5)$
= 9 feet
6. $1020 - 422.8 -$
 $15.52 - 46.38 -$
 $180.7 = \$354.87$
7. $27.9/6=4.65$
hours per day
8. $28.32-16.9= 11.42$

Day 17

1. -10
2. 20
3. -220
4. -12
5. -9
6. 100
7. -10
8. 0
9. 40
10. -50
11. -13
12. 40
13. 0
14. -60
15. -20
16. 2
17. 1
18. -40

19. 0
20. -30
21. 4
22. 20
23. 200
24. -20

Day 18

1. 5
2. 0
3. 1
4. -4
5. 14
6. 1
7. 68
8. 2
9. -32

Day 19

1. -3
2. 6
3. 8
4. 14
5. 14
6. 15
7. 4
8. 39
9. 2
10. 5
11. 4
12. -7
13. -2
14. 9
15. 43
16. -6
17. 42
18. 0
19. -6
20. 10
21. -32
22. 99
23. 8
24. -1
25. 10
26. 18
27. -4
28. -12

29. -13
30. -1
31. 8
32. 0
33. 9
34. 100
35. -20

Day 20

1. 27
2. 25
3. -20
4. 8
5. 144
6. -1
7. 12
8. 720
9. 117
10. 4
11. 9
12. 0
13. 2
14. 21
15. 23
16. -2
17. -42
18. 600
19. -144
20. -19
21. 1
22. -66
23. -66
24. 20
25. -17
26. 34
27. 12
28. -12

Day 21

1. 0.14
2. 3.35
3. 0.53
4. 0.75
5. 0.5
6. 0.11
7. 0.04

8. 0.25
9. 0.44
10. 0.56
11. 0.63
12. 0.7
13. 35%
14. 50%
15. 203%
16. 12%
17. 42%
18. 46%
19. 75%
20. 24%
21. 222%
22. 990%
23. 45%
24. 79%

Day 22

1. 39.44
2. 50.76
3. 9.36
4. 2
5. 11.4
6. 30.72
7. 231
8. 121
9. 21
10. 22.32
11. 56.55
12. 33.2
13. 181.5
14. 97.44
15. 260
16. 14
17. 87.84
18. 315.12
19. 52.8
20. 11

Day 23

1. 1
2. 1/50
3. 3/100
4. 1/25
5. 1/5
6. 7/25

7. 1/4
8. 11/50
9. 7/10
10. 4/5
11. 5/2
12. 17/25
13. 19/10
14. 11/25
15. 18/25

1. 50%
2. 5%
3. 75%
4. 25%
5. 20%
6. 7%
7. 98%
8. 80%
9. 30%
10. 16%
11. 250%
12. 22%

1. 0.5
2. 0.35
3. 0.2
4. 0.75
5. 1
6. 1.5
7. 0.03
8. 10

1. 5%
2. 90%
3. 250%
4. 25%
5. 104%
6. 702%
7. 34%
8. 15%

Day 24

1. $50 \times 2.50 = 125$
2. $246 / 0.75 = \$328$

3. $(24 \times 0.86) \times 1.07 = \22.08
4. $(0.25 \times 0.4W) = 0.1W$
5. $0.008 \times 275 = 2.2$
6. $8255 \times 0.85 \times 0.77 = \5402.89
7. $128 \times 1.04 \times 1.04 \times 1.04 = \143.98
8. $189.90 \times 0.85 = 161.415$
 $189.9 - 161.415 = \$28.485 \rightarrow \28.49
9. $15.77 \times 2 = 31.54$
 $31.54 \times 0.78 \times 1.13 = 27.799... \rightarrow \27.80

Day 25

1. 25
2. 32
3. 27
4. 7
5. 256
6. 256
7. 1^5
8. 5^1
9. 2^2
10. 4^2
11. 7^6
12. 8^4

Day 26

1. 1/144
2. 25/81
3. 4096/2401
4. 243
5. 343/1728
6. 27/64
7. 256/6561
8. 1/16
9. 1/16
10. 25/4
11. 25/9
12. -512
13. 390 625/6561
14. 4

Day 26

15. 27/1000

16. 9/4

17. 1/4

18. -27/8

19. 1/100

20. 6/7

Day 27

Phrase	Rate	Unit Rate
1) 21 pineapples for \$63	$\frac{\$63}{21 \text{ pineapples}}$	\$3 per pineapple
2) 405 points for 44 games won	$\frac{405 \text{ points}}{44 \text{ win}}$	9.20 points per win
3) 3909 points made over 710 shot attempts	$\frac{3909 \text{ points}}{710 \text{ shots}}$	5.51 points per shot
4) 14 inches of water in 4 hours	$\frac{14 \text{ inches}}{4 \text{ hours}}$	3.5 inches per hour
5) 70 miles per 2 hour	$\frac{70 \text{ miles}}{2 \text{ hour}}$	35 miles per hour
6) 3 monitors cost 240 pesos	$\frac{240 \text{ pesos}}{3 \text{ monitors}}$	80 pesos per monitor
7) 18 phones cost \$16400	$\frac{\$1640}{0.18}$	\$911.11 per phone
8) \$40 for 20 wings	$\frac{\$40}{20 \text{ wings}}$	\$2 per wing
9) 26 years in prison for 5 banks robbed	$\frac{26 \text{ years}}{5 \text{ banks}}$	5.2 years per robbed bank
10) 7 pencils for 20 dollars	$\frac{20 \text{ dollars}}{7 \text{ pencils}}$	\$2.86 per pencil

Day 28

1. 26.67 watermelon slush

2. 3 milk teas

3. 4.67 peach teas

4. 96 cranberry juices

5. 45 grape teas

6. 15 avocado smoothies

Math Fundamentals: Appendix A

Strategies for Solving Word Problems

Many students find word problems to be overwhelming, confusing and/or complicated because there is a lot of information being thrown at them all at once. But it does not have to be like that! There are many strategies that can help us understand, organize and answer word problems.

Below you will find 4 great techniques and strategies to help you work with word problems!

1. Start by carefully reading the question. When you have read the question, take a highlighter/pencil/pen and circle/underline key words that will help you figure out the answer. This will help you figure out what you have and what you need.

For example: What is the sum of all the factors of 10? With a different color you should circle/underline the following keywords “sum” and “factors of 10”

2. The “GRASS” Method

When it comes to solving word problems, the examples in this workbook use the GRASS method. The reason we use the GRASS method is because it is a useful strategy that helps us understand what the question is asking and what we need to look for.

G: Given	R: Required	A: Action	S: Solve	S: Statement
Write down what information is given in the question. It helps to underline/circle keywords.	Write down what you need to find/answer. What is missing?	Write down how you will solve the question. Operations? Equations?	Calculate the answer. Calculations. Show all your steps.	State your answer in a full sentence.

Here is an example of how to use this method:

At recess, three children decide to count up how much candies they have all together. Emma has 7, Bucky has 9 and Robin has only 1.
How many candies do they have in total?

Math Fundamentals: Appendix A (Continued)

Given: Write down what you know. Underline keywords.

Emma = 7 candies Bucky = 9 candies Robin = 1 candy

Required: What do we want to find out?

Sum / Total of all candies they have together

Action: Write down how you are going to solve the question.

Add all the candies together.

Emma + Bucky + Robin = Total of Candies

Solution: Solve the question.

Emma + Bucky + Robin = Total of Candies
 $7+9+1=17$

Statement: Write a sentence that answers the question.

In total, they have 17 candies.

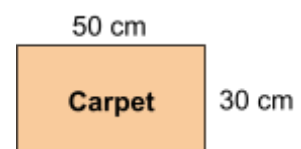
IMPORTANT:

- GRS (Given, Required & Solution) may be used instead of the GRASS method if the student prefers. GRS is just a condensed version of GRASS, where action, solution and statement are combined in a single part.
- GRS is not the only way to solve a word problem but it is highly recommended.

3. Draw pictures! This will help you visualize the question.

For example: What is the area of a carpet that is 50 cm by 30 cm?

Draw the “carpet” and label the side. With the picture we see that we have both sides of the rectangle and now we can solve the area.



Next ➡

Math Fundamentals: Appendix A (Continued)

4. Guess and Check

For example: What is x if $x + 6 = 25$?

Pick different numbers for x and test them out until you get the result you need. Make sure to show all the different numbers you tried.

Let $x = 15 \rightarrow 15 + 6 = 21$ (so $x = 15$ doesn't work)

Let $x = 19 \rightarrow 19 + 6 = 25$ (so $x = 19$ is your answer)



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Customized Learning Plan for each Student	Yes	No	Yes	No
Test Prep for Gifted Programs and Math Contests	Yes	No	No	Yes
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Math Fundamentals (Abridged Version)

This is an abridged version of Math Fundamentals for Grade 6 to 8. Math Fundamentals for Grades 6 to 8 by MathProject provides the necessary math foundation for middle school students before advancing to high school. It is also a great resource for high school students who are looking to polish their foundational math skills. Most calculations in this book can be done using a pencil and paper. Students are encouraged to show their steps as indicated in examples provided at the beginning of each topic (Answer Key Included). Calculators are not permitted.

- Fraction Multiplication
- Fraction Division
- Prime Numbers and Prime Factorization
- Lowest Common Multiple (LCM)
- Factors and Greatest Common Factor (GCF)
- LCM and GCF Word Problems
- Adding Fractions
- Subtracting Fractions
- Comparing Fractions
- Decimal Subtraction
- Decimal Multiplication
- Long Division
- Decimal Long Division
- Decimal Operations Word Problems
- Operations with Integers
- Order of Operations (BEDMAS)
- Solving One-Step Algebraic Equations
- Percentages and Word Problems
- Exponents and Square Roots
- Ratios and Rates



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