



“I Don’t Get It!”

**The Middle School Math
Dictionary and
Instruction Manual**

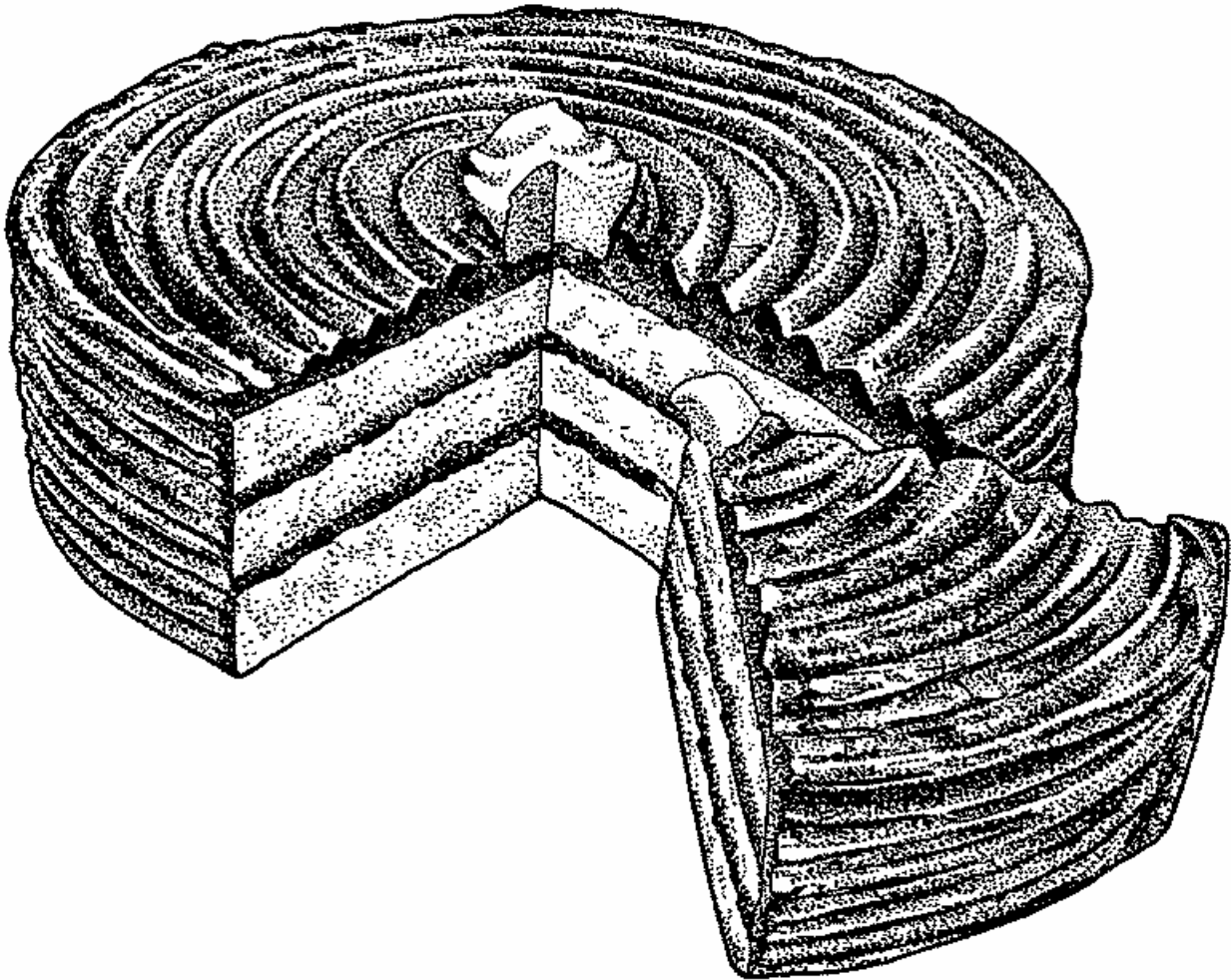
By Nancy L. Wilkinson



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Fractions

$$\frac{1}{5}$$



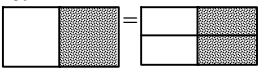
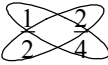

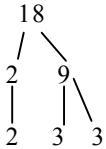
| Subject Area | Word | Definition |
|--------------|--|--|
| Fractions | Adding Fractions | <p><u>How to add fractions</u></p> <ol style="list-style-type: none"> 1) If the fraction is mixed, rewrite it as an improper fraction. 2) You must first rewrite the two fractions so they have the same denominator. To do this, find the <i>Lowest Common Multiple</i> for each denominator. $\frac{1}{2} + \frac{1}{4} =$ The Lowest Common Multiple would be 4. 3) Change each fraction into an equivalent fraction with the common multiple as the denominator. To do this, find out what you had to multiply the denominator by to get the <i>lowest common multiple</i>. Then multiply the numerator by the same amount. $\frac{1}{2} \cdot 2 = \frac{2}{4}$ $\frac{1}{4} \cdot 1 = \frac{1}{4}$ $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$ 4) Add your numerators only. $\frac{2}{4} + \frac{2}{4} = \frac{4}{4}$ 6) Reduce or simplify your fraction. $\frac{4}{4} = 1$ |
| Fractions | Adding Fractions with a Numerator of One | <p><u>How to add fractions with a numerator of one.</u></p> <ul style="list-style-type: none"> • Note: This trick only works if both fractions have a numerator of one. <p>Example: $\frac{1}{4} + \frac{1}{5} =$, $\frac{1}{3} + \frac{1}{2} =$</p> <ol style="list-style-type: none"> 1) Add the denominators. This is the numerator in your answer. Example: $4+5 = 9$, $3+ 2 = 5$ 2) Multiply the denominators. This is the denominator in your answer. Example: $\frac{1}{4} + \frac{1}{5} = \frac{9}{20}$, $\frac{1}{3} + \frac{1}{2} = \frac{5}{6}$ |

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| Fractions | Comparing Fractions | <p><u>To find which fraction is greater</u></p> <p>How to compare fractions – Way number 1</p> <p>1) Rewrite each fraction so that they have equivalent denominators</p> $\frac{2}{3} \square \frac{3}{5} = \frac{10}{15} \square \frac{9}{15}$ <p>2) Which ever fractions has the highest numerator is the larger fraction</p> $\frac{10}{15} > \frac{9}{15}$ Because 10 is greater than 9. <p>How to compare fractions – Way number 2</p> <p>1) Rewrite each fraction as a decimal.</p> $\frac{2}{3} \square \frac{3}{5} = .66 \square .6$ <p>2) Whichever decimal is larger is the higher fraction.</p> $\frac{2}{3} > \frac{3}{5}$ Because .66 is greater than .6. <p>How to compare fractions – Way number 3</p> <p>1) Cross-multiply the two fractions.</p> $2 \bullet 5 = 10 \quad 3 \bullet 3 = 9$ $\frac{2}{3} \square \frac{3}{5}$ <p>2) Whichever number is greater compares with the fraction that is greater.</p> $\frac{2}{3} > \frac{3}{5}$ Because 10 is greater than 9. |

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| Fractions | Decimal to Fraction | <p><u>How to change from a decimal to a fraction</u></p> <ol style="list-style-type: none"> 1) Read the place value of the decimal to the last number. $\begin{array}{r} .1 \quad 2 \quad 5 \\ \text{tenths} \quad \text{hundredths} \quad \text{thousandths} \end{array}$ Example: 2) Look at the last place value. 3) Write the decimal without the decimal point as the numerator. $\frac{125}{?}$ 4) Write the last place value as the denominator. $\frac{125}{1000}$ 5) Reduce or simplify your fraction. $\frac{125}{1000} = \frac{1}{8}$ |
| Fractions | Denominator | <p><u>The bottom number in the fraction</u></p> $\frac{1}{2} \leftarrow \text{Denominator}$ |
| Fractions | Dividing Fractions | <p><u>How to divide fractions</u></p> <ol style="list-style-type: none"> 1) If the fraction is mixed, rewrite it as an improper fraction. 2) Find the reciprocal of the second fraction. (Turn the second fraction upside down). $\frac{4}{8} \div \frac{1}{2}; \frac{1}{2} = \frac{2}{1}$ 3) Rewrite your new equation and multiply. (See how to multiply fractions.) $\frac{4}{8} \cdot \frac{2}{1} = \frac{8}{8}$ 4) Reduce (simplify) or place in mixed form in necessary. $\frac{8}{8} = 1$ |

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| Fractions | Equivalent Fractions | <p><u>Two fractions that mean the same thing</u></p> <p>Example:</p> $\frac{1}{2} = \frac{2}{4}$  <p>How to find if two fractions are equivalent.</p> <ol style="list-style-type: none"> Write down the two fractions. $\frac{1}{2} \cdot \frac{2}{4}$ Multiply the denominator of the first fraction with the numerator of the second fraction.  $1 \bullet 4 = 2 \bullet 2$ If the answers are the same, the two fractions are equivalent. $4 = 4$ |
| Fractions | Factor | <p><u>A number that will go into a number without a remainder.</u></p> <p>Example: The factors of 6 are 1, 2, 3 and 6</p> |
| Fractions | Factor Tree | <p><u>The tree that is produced when prime factorization is done</u></p> <p>To find the prime factors:</p> <ol style="list-style-type: none"> Write down the number to be factored. 18 Find two numbers that are the product of the chosen number.  Look at each factor, if it is not prime, find two more factors of the number.  Repeat step three until you only have prime numbers on your last row |
| Fractions | Fraction to Decimal | <p><u>How to change from a fraction to a decimal</u></p> <p>Divide the numerator by the denominator.</p> <p>Example: $\frac{5}{8} = 5 \div 8$ (5 goes inside the house $\rightarrow 8 \overline{)5}$) = .625</p> |

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| Fractions | Greatest Common Factor | <p><u>The greatest number that is a factor</u></p> <p>To find the greatest common factor:</p> <ol style="list-style-type: none"> 1) Write down the two numbers that you are comparing: 6, 4 2) Write down all of the factors of each number (the numbers that will divide into the number without a remainder). 6 – 1, 2, 3, 6 4 – 1, 2, 4 3) Circle the largest number that is the same in both groups. 6 – 1, (2), 3, 6 4 – 1, (2), 4 |
| Fractions | Improper Fraction to Mixed Number | <p><u>How to change from improper fraction to mixed fraction</u></p> <ol style="list-style-type: none"> 1) Divide the numerator by the denominator. Example: $\frac{23}{6} = 23 \div 6 = 3$ remainder 5 2) The dividend (your answer) is the whole number. Write the remainder over the denominator. Example: $3\frac{5}{6}$ |
| Fractions | Lowest Common Denominator | <p><u>The smallest number that two numbers can be divided into</u></p> <p>To find the lowest common denominator (LCD)</p> <ol style="list-style-type: none"> 1) Write down the numbers side by side. EXAMPLE: 6 18 2) Find the prime factorization for each number. (The first seven prime numbers are 2,3,5,7,11,13 and 17) Example: $\begin{array}{c c} 6 & 18 \\ \swarrow & \swarrow \\ 2 \cdot 3 & 3 \cdot 6 \\ & \quad \swarrow \searrow \\ & 3 \cdot 2 \cdot 3 \end{array}$ 3) Write down the most of each prime number. For the example above, two is used once on both sides so 2 would be written only once. Three is written once on one side and twice on the other, so 3 would be written twice. You would write down $2 \cdot 3 \cdot 3$ 4) Multiply the numbers together: $2 \cdot 3 \cdot 3 = 18$. Eighteen is the LCD for 6 and 18. |

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| Fractions | Lowest Common Multiple | <p><u>The smallest number that two numbers can be divided into</u></p> <p>To find the lowest common multiple (LCM)</p> <p>3) Write down the numbers side by side. EXAMPLE: 6 18</p> <p>4) Find the prime factorization for each number. (The first seven prime numbers are 2,3,5,7,11,13 and 17)</p> <p>Example:</p> <div style="text-align: center;"> $\begin{array}{c c} 6 & 18 \\ \swarrow \searrow & \swarrow \searrow \\ 2 \bullet 3 & 3 \bullet 6 \\ & \quad \swarrow \searrow \\ & 3 \bullet 2 \bullet 3 \end{array}$ </div> <p>3) Write down which prime number was used the most. For the example above, two is use once on both sides so 2 would be written only once. Three is written once on one side and twice on the other so 3 would be written twice. You would write down $2 \bullet 3 \bullet 3$</p> <p>5) Multiply the numbers together: $2 \bullet 3 \bullet 3 = 18$. Eighteen is the LCM for 6 and 18.</p> |
| Fractions | Mixed Numbers to Improper Fractions | <p><u>How to change from mixed number to improper fraction</u></p> <p>1) Multiply the denominator by the whole number. Example: $3\frac{4}{6} = 6 \bullet 3 = 18$</p> <p>2) Add the numerator. Example: $3\frac{4}{6} = 6 \bullet 3 = 18; 18 + 4 = 22$</p> <p>3) Put the sum over the denominator. Example: $3\frac{4}{6} = 6 \bullet 3 = 18; 18 + 4 = 22; = \frac{22}{6}$</p> |
| Fractions | Multiple | <p><u>The product of the number and any non-zero number</u></p> <p>Example: Multiples of 4 are 8, 12, 16, 20, 24</p> |

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| Fractions | Multiplying Fractions | <p><u>How to multiply fractions</u></p> <ol style="list-style-type: none"> 1) If there is a mixed fraction, rewrite it in improper fraction form first. 2) Multiply the numerator and denominator. $\frac{4}{8} \cdot \frac{1}{2} = \frac{4}{16}$ 3) Reduce the fraction or place in mixed form if necessary. |
| Fractions | Numerator | <u>The top number in the fraction</u> |
| Fractions | Prime | <p><u>A number that is only divisible by itself and one</u></p> <p>The first 10 prime numbers are: 1, 2, 3, 5, 7, 11, 13, 17, 19 and 23</p> |
| Fractions | Prime Factors | <p><u>A set of prime numbers that have the product of the chosen number</u></p> <p>To find the prime factors:</p> <ol style="list-style-type: none"> 5) Write down the number to be factored. 18 6) Find two numbers that are the product of the chosen number. $\begin{array}{c} 18 \\ / \quad \backslash \\ 2 \quad 9 \end{array}$ 7) Look at each factor, if it is not prime, find two more factors of the number. $\begin{array}{c} 18 \\ / \quad \backslash \\ 2 \quad 9 \\ \quad / \quad \backslash \\ 2 \quad 3 \quad 3 \end{array}$ 8) Repeat step three until you only have prime numbers on your last row |
| Fractions | Reciprocal | <p><u>The fraction you would add to get zero</u></p> <p>How to find the reciprocal Turn the fraction upside down. Example: The reciprocal of $\frac{5}{6}$ is $\frac{6}{5}$</p> |

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| Fractions | Reducing Fractions - Simplest Form - | <p><u>A fraction where the only common divisor of the numerator and denominator is one</u></p> <p>How to simplify or reduce fractions:</p> <ol style="list-style-type: none"> 1) Find the greatest common factor (GCF). It is the greatest number that can be evenly divided into the numerator and denominator. Example: $\frac{4}{6}$ - The greatest common factor is 2. It is the largest number that can be divided into 4 and 6. 2) Divide the numerator and denominator by the GCF. Example: $\frac{4}{6}$ $4 \div 2 = 2$, $6 \div 2 = 3$ 3) Write your new fraction with the new numerator and denominator. Example: $\frac{2}{3}$ |
| Fractions | Subtracting Fractions | <p><u>How to subtract fractions</u></p> <ol style="list-style-type: none"> 1) If the fraction is mixed, rewrite it as an improper fraction. 2) You must first rewrite the two fractions so they have the same denominator. To do this, find the <i>Lowest Common Multiple</i> for each denominator. $\frac{1}{2} - \frac{1}{4} =$ The Lowest Common Multiple would be 4. 3) Find out what you had to multiply the denominator by to get the LCM. $\frac{1}{2} = \frac{?}{4} =$ You had to multiply 2 by 2 to get 4. $\frac{?}{4} - \frac{1}{4} =$ 4) Multiply the numerator by the same amount. $\frac{1}{2} = \frac{2}{4} =$ multiply $1 \bullet 2 = 2$ $\frac{2}{4} - \frac{2}{4} =$ 5) Subtract your numerators only. $\frac{2}{4} - \frac{2}{4} = \frac{0}{4}$ 6) Reduce or simplify your fraction. $\frac{0}{4} = 0$ |