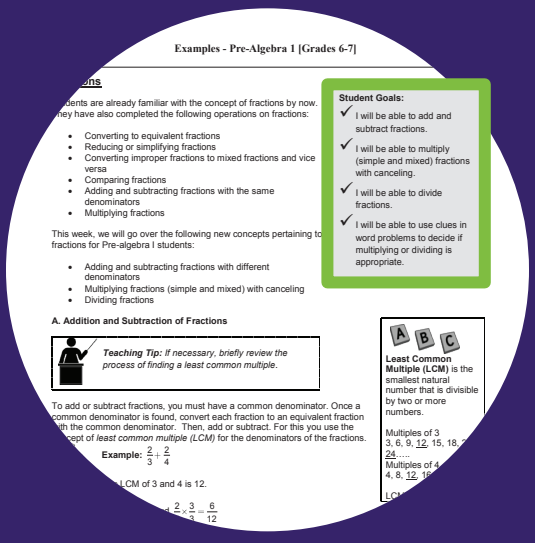
Pre-Algebra 1

Curriculum Sample

A Grade Ahead's rigorous, year-round enrichment program will challenge your child to a higher academic standard. Our math material consists of two components: **numerical drills** and **curriculum**. Numerical drills are quick exercises that will improve your child's speed and accuracy in computational skills while our monthly curriculum includes mathematical topics that your child will see in school. Both numerical drills and curriculum work together to ensure a complete understanding and mastery of each topic.

The numerical drills and curriculum will each have an in-depth lesson (which we call Examples), as well as homework, and answers. In these next pages, we offer a closer look at what our examples, homework, and answers offer as well as a specific sample of both numerical drills and curriculum.



Examples - Pre-Algebra 1 [Grades 6-7]

...ons

...dents are already familiar with the concept of fractions by now. ...hey have also completed the following operations on fractions:

- Converting to equivalent fractions
- Reducing or simplifying fractions
- Converting improper fractions to mixed fractions and vice versa
- Comparing fractions
- Adding and subtracting fractions with the same denominators
- Multiplying fractions

This week, we will go over the following new concepts pertaining to fractions for Pre-algebra I students:

- Adding and subtracting fractions with different denominators
- Multiplying fractions (simple and mixed) with canceling
- Dividing fractions

Student Goals:
- ✓ I will be able to add and subtract fractions.
- ✓ I will be able to multiply (simple and mixed) fractions with canceling.
- ✓ I will be able to divide fractions.
- ✓ I will be able to use clues in word problems to decide if multiplying or dividing is appropriate.

A. Addition and Subtraction of Fractions

Teaching Tip: If necessary, briefly review the process of finding a least common multiple.

To add or subtract fractions, you must have a common denominator. Once a common denominator is found, convert each fraction to an equivalent fraction with the common denominator. Then, add or subtract. For this you use the ...cept of *least common multiple (LCM)* for the denominators of the fractions.

Example: $\frac{2}{3} + \frac{2}{4}$

...LCM of 3 and 4 is 12.

$\frac{2}{3} \times \frac{3}{3} = \frac{6}{12}$

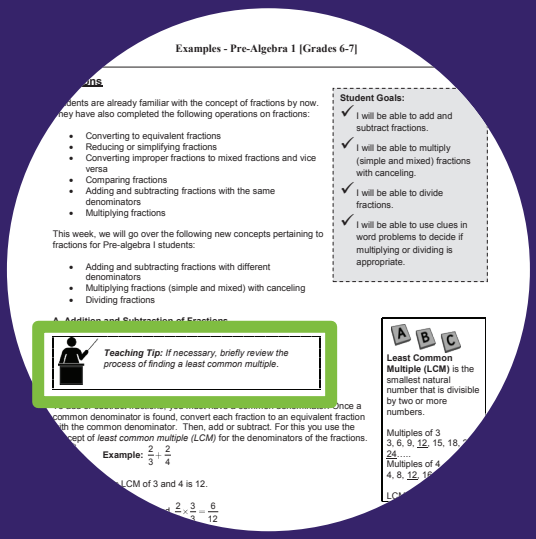
Least Common Multiple (LCM) is the smallest natural number that is divisible by two or more numbers.

Multiples of 3
3, 6, 9, 12, 15, 18, ...
24, ...
Multiples of 4
4, 8, 12, 16, ...
LCM ...

Student Goals

Student goals are listed at the top right of the Examples each week. These are topics that your child should understand by the end of the week.

Lesson pages are titled "Examples – Pre-Algebra 1 [Grades 6-7]," answer pages are titled "Answers – Pre-Algebra 1 [Grades 6-7]," and homework pages are simply titled "Pre-Algebra 1 [Grades 6-7]."



Examples - Pre-Algebra 1 [Grades 6-7]

Student Goals:

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- ✓ I will be able to multiply (simple and mixed) fractions with canceling.
- ✓ I will be able to divide fractions.
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This week, we will go over the following new concepts pertaining to fractions for Pre-algebra I students:

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- Multiplying fractions (simple and mixed) with canceling
- Dividing fractions

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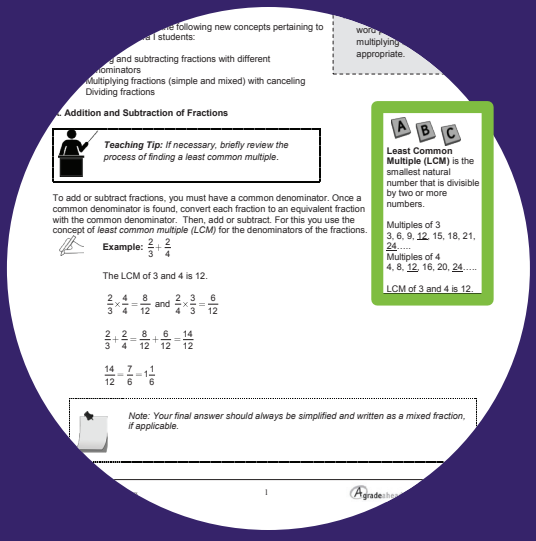
Least Common Multiple (LCM) is the smallest natural number that is divisible by two or more numbers.

Multiples of 3
3, 6, 9, 12, 15, 18, 21, 24, ...
Multiples of 4
4, 8, 12, 16, 20, 24, ...

LCM of 3 and 4 is 12.

Teaching Tip

Teaching tips are suggestions to help you or your teacher present the topic to your child. These could include topics to review first or even an activity to do with your child.



Dividing fractions

Addition and Subtraction of Fractions

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3, 6, 9, 12, 15, 18, 21, 24, ...
Multiples of 4
4, 8, 12, 16, 20, 24, ...

LCM of 3 and 4 is 12.

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Example: $\frac{2}{3}+\frac{2}{4}$

The LCM of 3 and 4 is 12.

$\frac{2}{3}\times\frac{4}{4}=\frac{8}{12}$ and $\frac{2}{4}\times\frac{3}{3}=\frac{6}{12}$

$\frac{2}{3}+\frac{2}{4}=\frac{8}{12}+\frac{6}{12}=\frac{14}{12}$

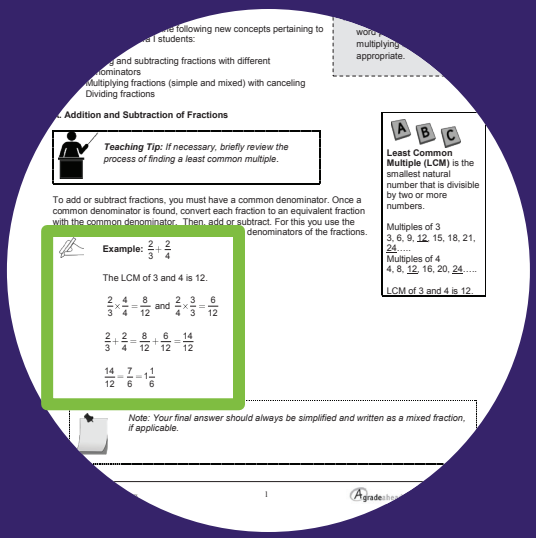
$\frac{14}{12}=\frac{7}{6}=1\frac{1}{6}$

Note: Your final answer should always be simplified and written as a mixed fraction, if applicable.

ABC Word Boxes

These word boxes define terms used within the lesson that your child may not know.

Each day's homework usually takes about 30 minutes to complete.



Addition and Subtraction of Fractions

Teaching Tip: *If necessary, briefly review the process of finding a least common multiple.*

To add or subtract fractions, you must have a common denominator. Once a common denominator is found, convert each fraction to an equivalent fraction with the common denominator. Then, add or subtract. For this you use the denominators of the fractions.

Example: $\frac{2}{3} + \frac{2}{4}$

The LCM of 3 and 4 is 12.

$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$ and $\frac{2}{4} \times \frac{3}{3} = \frac{6}{12}$

$\frac{2}{3} + \frac{2}{4} = \frac{8}{12} + \frac{6}{12} = \frac{14}{12}$

$\frac{14}{12} = \frac{7}{6} = 1\frac{1}{6}$

Least Common Multiple (LCM) is the smallest natural number that is divisible by two or more numbers.

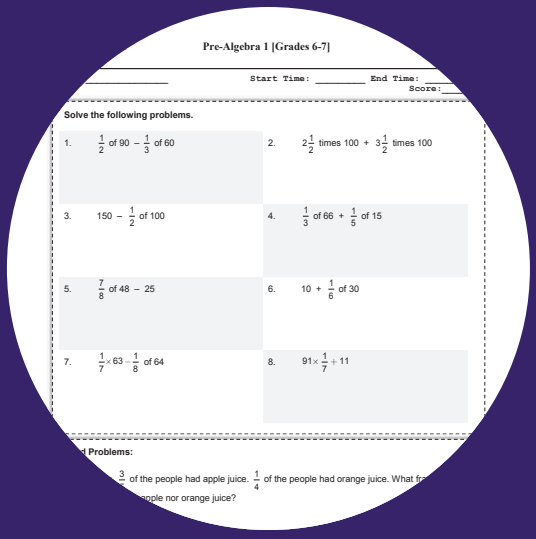
Multiples of 3
3, 6, 9, 12, 15, 18, 21, 24,....
Multiples of 4
4, 8, 12, 16, 20, 24,....

LCM of 3 and 4 is 12.

Note: Your final answer should always be simplified and written as a mixed fraction, if applicable.

Examples

To illustrate the topic, examples are provided to you and your child. These examples help demonstrate how to solve the problem or figure out the answer.



Pre-Algebra 1 [Grades 6-7]

Start Time: _____ End Time: _____

Score: _____

Solve the following problems.

1. $\frac{1}{2}$ of 90 − $\frac{1}{3}$ of 60
2. $2\frac{1}{2}$ times 100 + $3\frac{1}{2}$ times 100
3. 150 − $\frac{1}{2}$ of 100
4. $\frac{1}{3}$ of 66 + $\frac{1}{5}$ of 15
5. $\frac{7}{8}$ of 48 − 25
6. 10 + $\frac{1}{6}$ of 30
7. $\frac{1}{7} \times 63 - \frac{1}{8}$ of 64
8. $91 \times \frac{1}{7} + 11$

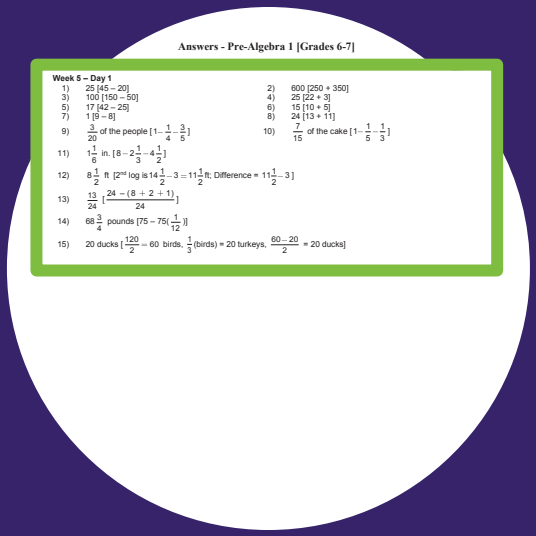
d Problems:

$\frac{3}{}$ of the people had apple juice. $\frac{1}{4}$ of the people had orange juice. What fr

ople nor orange juice?

Homework

Each week, four days of homework are given to apply concepts from that week's lesson and reinforce the topic.



Answers - Pre-Algebra 1 [Grades 6-7]

Week 5 – Day 1

1) 25 [45 – 20]
2) 600 [250 + 350]
3) 100 [150 – 50]
4) 25 [22 + 3]
5) 17 [42 – 25]
6) 15 [10 + 5]
7) 1 [9 – 8]
8) 24 [13 + 11]
9) $\frac{3}{20}$ of the people $[1-\frac{1}{4}-\frac{3}{5}]$
10) $\frac{7}{15}$ of the cake $[1-\frac{1}{5}-\frac{1}{3}]$
11) $1\frac{1}{6}$ in. $[8-2\frac{1}{3}-4\frac{1}{2}]$
12) $8\frac{1}{2}$ ft $[2^{nd}$ log is $14\frac{1}{2}-3=11\frac{1}{2}$ ft; Difference = $11\frac{1}{2}-3]$
13) $\frac{13}{24}$ $[\frac{24-(8+2+1)}{24}]$
14) $68\frac{3}{4}$ pounds $[75-75(\frac{1}{12})]$
15) 20 ducks $[\frac{120}{2}=60$ birds, $\frac{1}{3}$(birds) = 20 turkeys, $\frac{60-20}{2}$ = 20 ducks]

Answers

Answers are provided to check your child's homework. Enter the scores into the Parent Portal to track progress and note which areas may need more work.

Day: 1

Decimals 7

(Time Goal: 10 minutes)

Score:_____/24

Date: _____ Time Taken: _____

Multiply the following.

1. 33.39 × 0.3 = --------

2. 91.8 × 0.2 = --------

3. 90.46 × 0.7 = --------

4. 40.54 × 0.7 = --------

5. 35.72 × 0.1 = --------

6. 43.31 × 0.9 = --------

7. 89.29 × 0.5 = --------

8. 76.82 × 1.1 = --------

9. 30.6 × 0.3 = --------

10. 98.53 × 0.6 = --------

11. 23.45 × 0.7 = --------

12. 12.15 × 0.7 = --------

Divide the following.

13. 639.45 ÷ 10 =

14. 607.33 ÷ 1,000 =

15. 654.94 ÷ 1,000 =

16. 747.37 ÷ 10,000 =

17. 892.36 ÷ 100 =

18. 360 ÷ 1,000 =

19. 699.7 ÷ 10,000 =

20. 918.2 ÷ 10,000 =

21. 770.69 ÷ 10,000 =

22. 513.7 ÷ 10 =

23. 108 ÷ 10,000 =

24. 869 ÷ 1,000 =

Answers – Decimals 7

Day: 1

1) 10.017	2) 18.36	3) 63.322	4) 28.378	5) 3.572
6) 38.979	7) 44.645	8) 84.502	9) 9.18	10) 59.118
11) 16.415	12) 8.505	13) 63.945	14) 0.60733	15) 0.65494
16) 0.074737	17) 8.9236	18) 0.36	19) 0.06997	20) 0.09182
21) 0.077069	22) 51.37	23) 0.0108	24) 0.869	

Factors and Prime Factorization

Student Goals:

- ✓ I will be able to list the factors of a number and common factors between two or more numbers.
- ✓ I will be able to differentiate between a prime and composite number.
- ✓ I will be able to perform prime factorization on a number and write it in exponential notation.

Teaching Tip: *Have students multiply out their factors or the prime factorization of a number to reinforce the understanding and to check their work.*

A. Introduction

With a good understanding of factors, students will be better equipped to work with fractions and division problems. Also, understanding factors builds a number knowledge that will build a foundation for beginning algebraic thinking.

A number can be made by multiplying two or more other numbers together. The numbers that are multiplied together are called **factors** of the final number. This means a factor will always evenly divide a number leaving no remainder. 1 is always a factor of any number since any number can be divided by 1. Likewise, any number can be divided by itself to produce 1. Therefore, any number has 1 and itself as factors.

A factor can also be thought of as a divisor. But, a divisor cannot be thought of as a factor.

Example: $3 \times 4 = 12$

3 and 4 are factors of 12.
3 and 4 are divisors of 12.

Example: $\frac{18}{5}$ = 3 with 3 left over

5 is a divisor of 18, but 5 is not a factor since it leaves a remainder when 18 is divided by 5.

The easiest way to find all the factors of a number is to list the "pairs" of numbers that you can multiply together to get that number.

Examples:

96: 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96

64: 1, 2, 4, 8, 16, 32, 64

Common factors are simply factors that two numbers have in common.

Example: Find the common factors of 24 and 36. Listing the factors of two numbers can help determine the common factors.
24: 1, 2, 3, 4, 6, 8, 12, 24
36: 1, 2, 3, 4, 6, 9, 12, 18, 36
The common factors are 1, 2, 3, 4, 6, and 12, because they are shared between 24 and 36.

B. Prime and Composite Numbers

Prime and composite numbers are whole numbers. A **prime number** is when a whole number greater than one has exactly two factors: 1 and the number itself. **Composite numbers** are whole numbers that have more than two different factors.

Note: 0 and 1 are neither prime nor composite. 0 is neither prime nor composite because it has an endless number of factors. 1 is not prime because it does not have exactly two different factors (the only factor of 1 is 1) and it is not composite because it does not have more than two factors.

Examples: Determine whether 16 and 5 are prime or composite numbers.

Factors of 16 are 1, 2, 4, 8, and 16. There are 5 factors, so it is a composite number.
Factors of 5 are 1 and 5. There are exactly two factors, so it is a prime number.

C. Exponential Notation

Multiplication is a shorthand way of representing repeated addition.
Exponential notation is a shorthand way of representing repeated multiplication.
When a number is written in exponential notation (e.g., 4^3), it tells how many times the base is used as a factor. For example, 2^4 represents $2 \times 2 \times 2 \times 2$.

D. Prime Factorization

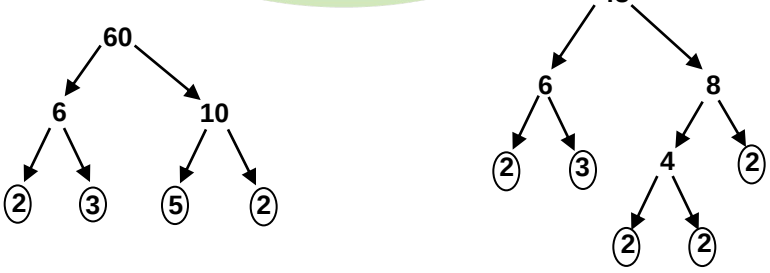
Every composite number can be expressed as a product of prime factors. This is called the prime factorization of the number. We eliminate the duplicate prime factors in the list of prime factorization when we find the prime factors. There are several methods you can use to find the prime factorization of a number.

Method 1: Factor Tree (Multiplication Method)

1. Start with the number of which you are trying to find the prime factorization.
2. "Break" the number down into any two of its factors.
3. Continue "breaking" numbers until you have all prime numbers.

Teaching Tip: *Focus on method 2 (division method) as it would be keep students more organized to find factors, GCF, and LCM.*

Example:



The prime factorization of 60 is $2^2 \times 3 \times 5$ and for 48 the prime factorization is $2^4 \times 3$.
The prime factors of 60 are 2, 3, and 5. The prime factors of 48 are 2 and 3.

Method 2: List All Prime Factors Except 1 (Division Method)

1. Divide the number you are trying to factor by the smallest prime number that will go into it with no remainders.
2. Divide the quotient from step one by the smallest prime number that will go into it with no remainders.
3. Continue the process until you get a quotient that is a prime number.

Example: Perform prime factorization of 24.

$24 \div (2) = 12$ $12 \div (2) = 6$ $6 \div (2) = (3)$

Prime factorization of 24 is: $2 \times 2 \times 2 \times 3$ OR $2^3 \times 3$

Or, this can be done using "upside down" division:

(2)	24
(2)	12
(2)	6
(3)	

The prime factorization of 24 is $2 \times 2 \times 2 \times 3$ or $2^3 \times 3$.
The prime factors of 24 are 2 and 3.

Teaching Tip: *This upside down division method will be later extended to calculate GCF and LCM. Encourage students to learn that so that it can be adopted in later weeks for efficient calculations.*

Date: _____ Start Time: _____ End Time: _____

Score:____/22

Perform prime factorization on the following numbers. Express your answers in exponential form.

1.	30	2.	32	3.	54
4.	48	5.	42	6.	70
7.	80	8.	90	9.	182
10.	110	11.	170	12.	144

13. Name three numbers between 1 and 24 that have 7 as a factor.

_____

14. Write all the factors of 32.

_____

15. Is 6 a factor or a divisor of 19?

_____

Word Problems:

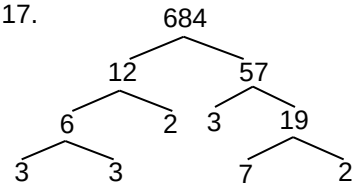
16-18. Kyle just took a test on prime factorization. He got these three problems incorrect. Fix his mistakes.

16.

2	306
3	153
2	50
5	25
	5

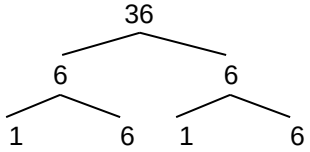
$306 = 2^2 \times 3 \times 5^2$

17.



$684 = 2^2 \times 3^3 \times 7$

18.



$36 = 6^2$

19-20. A horse takes 25 seconds to run around a farm.

19. Which of the following will calculate the number of times it will run around the farm in 45 minutes?

a) $45 \times 25 \div 60$ b) $25 \div 60 \times 45$ c) $45 \times 60 \div 25$ d) $45 \times 60 \times 25$

20. The distance (in yards) covered by running around the farm is 300 yards. What is the distance the horse will cover in 100 seconds?

a) 100×300 b) $25 \div 100 \times 300$ c) $100 \times 25 \div 300$ d) $100 \div 25 \times 300$

21. A car's odometer reads 15,250 miles. The car goes 20 miles on every gallon of gas. What will the odometer read after 25 gallons of gas?

a) 15,500 miles b) 15,750 miles c) 15,900 miles d) 15,650 miles

22. CHALLENGE! Shane drives his car at 45 miles per hour for 4 hours and 65 miles per hour for 5 hours. His average speed in miles per hour can be calculated as…

a) $(45 + 65) \times 4 \div 5$
b) $45 \times 4 + 65 \times 5 \div 9$
c) $(45 \times 4 + 65 \times 5) \div 4 + 5$
d) $(45 \times 4 + 65 \times 5) \div (4 + 5)$

Week: 1 – Day 1

1) $2 \times 3 \times 5$
2) 2^5
3) 2×3^3
4) $2^4 \times 3$
5) $2 \times 3 \times 7$
6) $2 \times 5 \times 7$
7) $2^4 \times 5$
8) $2 \times 3^2 \times 5$
9) $2 \times 7 \times 13$
10) $2 \times 5 \times 11$
11) $2 \times 5 \times 17$
12) $2^4 \times 3^2$
13) 7, 14, and 21
14) 1, 2, 4, 8, 16, and 32
15) It is a divisor.
16) $153 \div 3 = 51$; then $51 \div 3 = 17$; Prime factorization is $306 = 2 \times 3^2 \times 17$
17) Below the 6 should be a 2 and 3; also 19 is already prime; Prime Factorization is $684 = 2^2 \times 3^2 \times 19$
18) He did not find the factors of 6 which are 2 and 3: $36 = 2^2 \times 3^2$
19) c [45 min= 45×60 seconds; so it will run 45×60÷25 times]
20) d [In 100 seconds, the horse goes 100÷25 times around the farm. So the distance it covers is 100÷25×300 yards]
21) b [distance traveled in 25 gallons of gas is 20×25=500 miles. Odometer reads = 15,250+500]
22) d [Avg speed = total distance ÷ total time; total distance = $(45 \times 4 + 65 \times 5)$ and total time = (4+5)]