Pre-Algebra 1

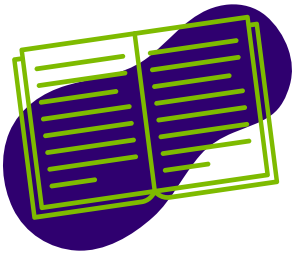
Curriculum Sample

A Grade Ahead will challenge your students and help them achieve their goals!

Beginning in June 2021, our Pre-Algebra 1 students will be participating in A Grade Ahead Online, a blended learning program that integrates both traditional and electronic methods to teach students.

Our students begin the week learning a lesson and answering practice questions with paper and pencil in our monthly lesson booklets. Then they go online to a website to complete three days of online activities to master the topic of the week.

Here's how it works:



Monthly Blended Learning Lesson Booklet

Students receive a lesson booklet each month that is broken into four weeks. Every week, students are introduced to a new topic with explanations and examples followed by student practice questions.

At the end of this document, you will find a full sample of one week's lesson and practice problems from A Grade Ahead's Pre-Algebra 1 curriculum.

A Grade Ahead Online Activities

After learning the lesson and practicing problems with a traditional approach, students continue learning online through activities at online.agradeahead.com. Every week, students have three days of homework that can include both curriculum facts and word problems.

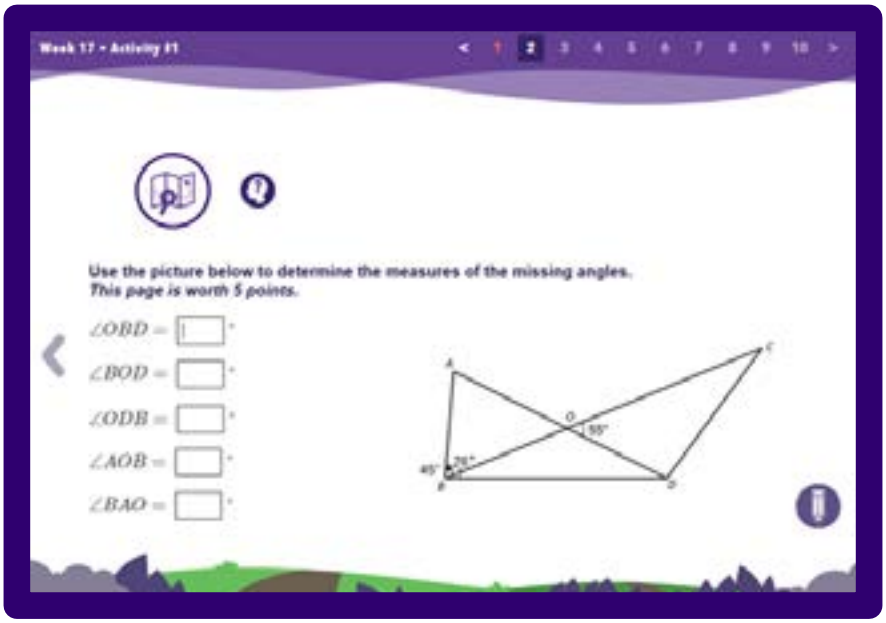
Register online today!

Questions? Call 866.628.4628, chat at **enrichmentathome.com**, or email **enrichmentathome@agradeahead.com**.

A Grade Ahead Online offers many benefits to students and parents, including

- **Interactive and colorful questions** with formats like matching, drag and drop, fill in the blank, multiple choice, and more.
- **Automatic grading** that saves times for parents and provides immediate feedback for students. They know whether they got a question right or wrong as they are going through the homework, so they can make adjustments if necessary.
- **A rationale for every online question** that explains the correct answer, so students can learn from their mistakes immediately.
- **Student progress reports** that are easily accessible without parents needing to upload any data. In fact, a parent has access to raw data from all of his or her student's online work.
- **Adaptive learning paths** that provide more challenging questions to students who perform well on the first set of activities.

Here is a peek at a few of our online exercises:



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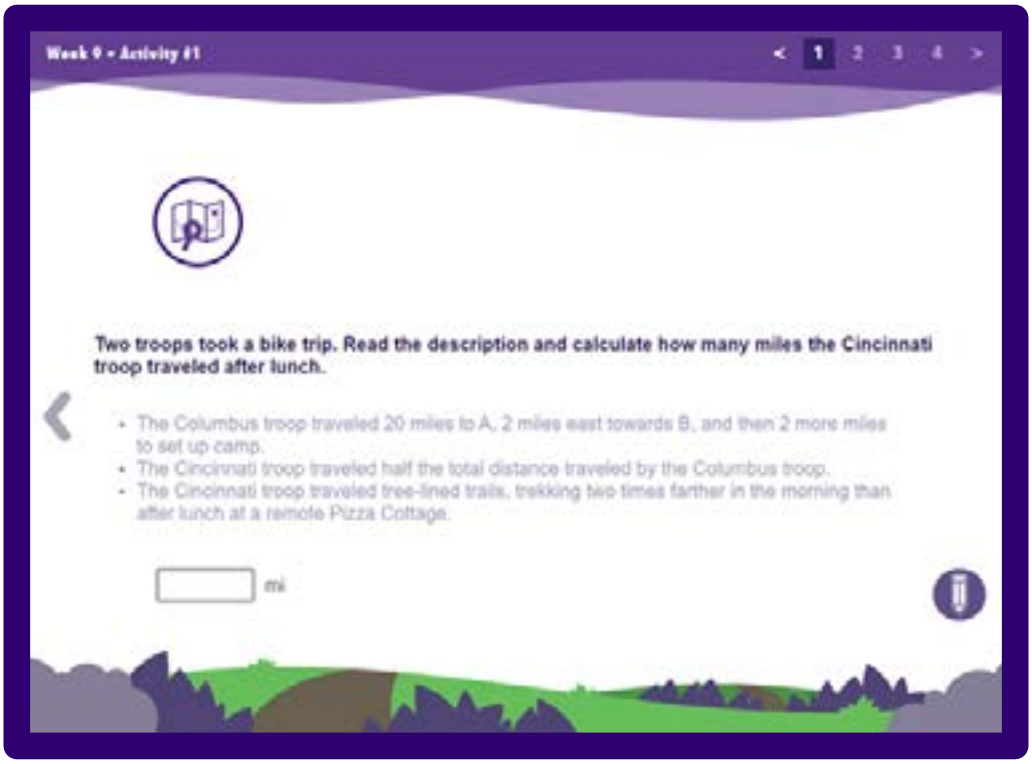

Want to see how A Grade Ahead works first-hand?

We have attached an entire lesson and one day's worth of homework for you to print out and try.

Register online today!

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agradeahead™
blended learning

Lesson Booklet Sample

Pre-Algebra 1

Print it out and try it!

Agradeahead™

Pre-Algebra 1 • Month 1

MATH

BLENDED LEARNING LESSON BOOKLET

NAME _____

Factors and Prime Factorization

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

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.

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: $3 \times 4 = 12$

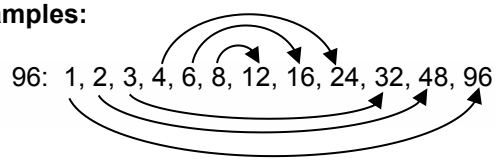
3 and 4 are factors of 12.
3 and 4 are divisors of 12.

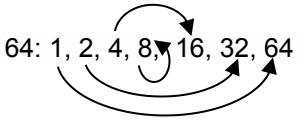
Example: $\frac{18}{5}$ = 3 with 3 left over

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:





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.

Student Practice

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

_____

2. Write all the factors of 32.

_____

3. Is 6 a factor or a divisor of 19? Why?

_____

4. Find common factors of 18 and 30.

_____

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 $2 \times 2 \times 2 \times 2$. In this example, 2 is the base, and 4 is an exponent.

Student Practice	5. 17 is a composite number: True or False? 6. Select all that apply for exponential notation. (A) It is a shorthand for addition. (B) 5^4 means $5 \times 5 \times 5 \times 5$. (C) In 5^4, 5 is the base, and 4 is an exponent. (D) Base is also a factor of the answer.

D. Prime Factorization

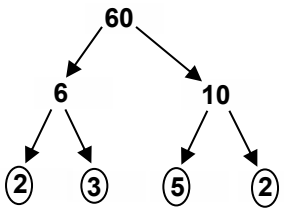
Every composite number can be expressed as a product of prime factors. This is called the prime factorization of the number. We eliminate the duplicate prime factors in the list of prime factorization when we find the prime factors. There are several methods you can use to find the prime factorization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

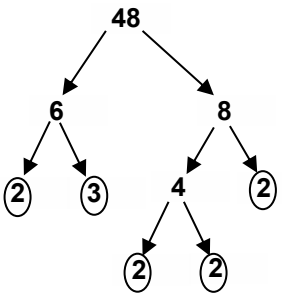
Teaching Tip: *Focus on method 2 (division method) as it would be keep students more organized to find factors, GCF, and LCM.*

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.

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.

Student Practice

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

7. 48	8. 42	9. 70
10. 80	11. 90	12. 182
13. 110	14. 170	15. 144

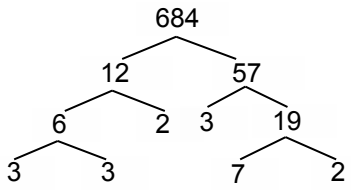
16-18. Kyle just took a test on prime factorization. He got these three problems incorrect. Fix his mistake(s) in each question.

16.

2	306
3	153
2	50
5	25
	5

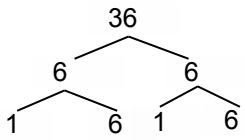
$306 = 2^2 \times 3 \times 5^2$

17.



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

18.



$36 = 6^2$

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.*

Teaching Tip: *This week, word problems do not pertain to factors. They are generic.*

E. Word Problems

Student Practice

Encourage students to show their work.

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) $(45 \times 4 + 65 \times 5) \div (4 + 5)$

Answers of Student Practice

1) 7, 14, and 21
2) 1, 2, 4, 8, 16, and 32
3) It is a divisor. 19 ÷ 6 = 3 R 1. Because there is a remainder, 6 is not a factor.
4) 1, 2, 3, 6 [Factors of 18: 1, 2, 3, 6, 9, and 18. Factors of 30: 1, 2, 3, 5, 6, 10, 15, and 30]
5) False [17's factors are 1 and 17 only.]
6) B, C, D
7) $2^4 \times 3$
8) $2 \times 3 \times 7$
9) $2 \times 5 \times 7$
10) $2^4 \times 5$
11) $2 \times 3^2 \times 5$
12) $2 \times 7 \times 13$
13) $2 \times 5 \times 11$
14) $2 \times 5 \times 17$
15) $2^4 \times 3^2$
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)]

Head online to complete all days of the course:

MATH: Prime Factorization (W1)

Agradeahead™
blended learning

Now, more than ever, kids need supplemental education!

A Grade Ahead's Enrichment at Home program makes it easy for you to help your students get caught up – and even stay ahead of – their peers. Our students are top performers at the heads of their classes who get into Ivy League schools and perform well on standardized tests. They reach their goals of becoming doctors, engineers, and other well-paid professionals.

Why Enrichment at Home?

1. **Our curriculum is outstanding**, with clear lessons and worksheets that are challenging and interesting. They are not boring and repetitive like some other programs.
2. **Our parents love us**, with more than 90% referring us to their friends and families year after year. **See what real parents are saying in "Our Results"**.
3. **It's flexible.** You decide what curriculum your child needs and when to complete the lessons and worksheets.
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Whether your child is ahead of his or her peers or has some catching up to do, the Enrichment at Home program allows you to select the lessons your child will receive. By reviewing our **curriculum calendar**, you can look at each month's topics and decide what is best for your child. Visit our **Math** or **English** web pages, and choose the grade you want to review. You will find the details on the right-hand side. When **registering**, you can specify which month you want to receive. If your student is on pace with his or her peers, simply register, and we will send you the current month of curriculum. We can always make adjustments if the work is too hard or too easy.

Is your student ready to join the 25,000 other students who have benefited from our pragmatic, effective approach? Register today to see what A Grade Ahead can do for your family.

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