# A gradeahead™
blended learning

Pre-Algebra 2
Curriculum Sample

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

This school year, our academy's Pre-Algebra 2 students will be participating in A Grade Ahead's 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. Each month also includes three weekly quizzes and one test.
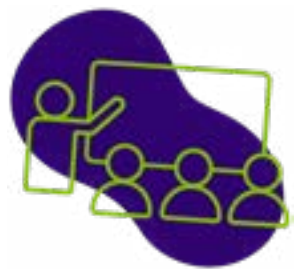
Here's how it works:
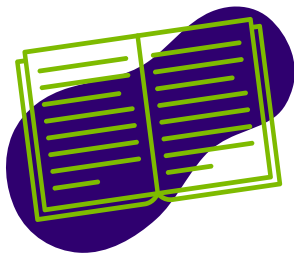
Blended Learning Booklet

Each month, students receive a lesson booklet that is split into four weeks of lessons and practice problems.

(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 2 curriculum.)

Weekly Class

Each week, students attend a weekly class, either in person or online, and learn a lesson from a teacher. Together, the class completes practice problems to understand the weekly topic.

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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.

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 explanations 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.

- **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:

1 2 3 4

Two troops took a bike trip. Read the description and calculate how many miles the Cincinnati troop traveled after lunch.

- The Columbus troop traveled 20 miles to A, 2 miles east towards B, and then 2 more miles to set up camp.
- The Cincinnati troop traveled half the total distance traveled by the Columbus troop.
- The Cincinnati troop traveled tree-lined trails, trekking two times farther in the morning than after lunch at a remote Pizza Cottage.

[   ] mi.

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.

Lesson Booklet Sample
Pre-Algebra 2

Print it out and try it!

A gradeahead™

Pre-Algebra 2 • Month 1

MATH

BLENDED LEARNING LESSON BOOKLET

NAME _____

Fractions, Decimals, and Percents

Teaching Tip: *This week is a review of concepts covered in previous grades. Please focus on the concepts your students find to be the most challenging. Review Section A fast. Focus on Sections B & C, but even the concepts there might be a review to many students.*

Student Goals:

✓ I will recognize that fractions, decimals, and percents are three ways to represent the same number.

✓ I will be able to convert between fractions, decimals, and percents.

✓ I will be able to find the fraction, decimal, or percent of a number.

✓ I will be able to use fractions, decimals, and percents in word problems.

A. Quick recap

A *fraction* is a quotient of numbers expressed in two parts: the numerator and denominator. The *numerator* of a fraction is the number on the top. The *denominator* of a fraction, also called the *divisor*, is the number on the bottom. Fractions represent division, the numerator divided by denominator.

There are 3 types of fractions.

(1) Proper fractions	$\dfrac{2}{3}$	The numerator is less than the denominator, so the fraction is less than 1.
(2) Improper fractions	$\dfrac{12}{7}$	The numerator is greater than or equal to the denominator, so the fraction is greater than or equal to 1.
(3) Mixed numbers	$3\dfrac{3}{4}$	Mixed numbers represent the sum of a whole number and a fraction. Mixed numbers can always be written as improper fractions.

A *decimal* is a number expressed in two parts:
- the *whole number* to the left of the decimal point and
- the *part of the whole* to the right of the decimal point.

Decimals have place values on both sides of the decimal point.

The decimal 52.209 is read "52 and 209 thousandths."

Decimals may
- *terminate* or end, such as 0.35
- *repeat*, such as 0.33333... = $0.\overline{3}$
- *never repeat or terminate*. These numbers are called *irrational numbers*. Numbers like π and $\sqrt{3}$ are irrational numbers.

TENS	ONES	DECIMAL POINT	TENTHS	HUNDREDTHS	THOUSANDTHS
5	2	.	2	0	9

A *percent* is a decimal expression that represents the number per 100. "Percent" means "per one hundred." Percents usually represent a portion out of the whole. If 60 out of 100 kids in a grade are girls, we would say that 60% of the grade is girls. For any calculations done with percents, you must first *convert* the percent to a decimal or fraction, then calculate. *60% is NOT equal to 60. 60% is 60 per 100.*

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B. Conversions

Decimals to Percents

To convert a decimal to a percent, multiply the decimal by 100. This is the same as moving the decimal point two places (two digits) to the right. After moving the decimal, add the percent symbol.

> **Example:** Convert 3.3 to a percent.
> $3.3 = 3.3 \cdot 100 = 330\%$

In math, **convert** means to change from one form to another using multiplication or division.

Percents to Decimals

To convert a percent to a decimal, remove the percent symbol and divide the number by 100. This is the same as moving the decimal point two places (two digits) to the left.

> **Example:** Convert 1.45% to a decimal.
> $1.45\% = \dfrac{1.45}{100} = 0.0145$

> *Note: If there is no digit to the left of the decimal point, place a 0 there as a placeholder for clarity. The 0 does not change the value of the decimal. Example: Write .65 as 0.65*

Fractions to Decimals

To convert a fraction to a decimal, rewrite the fraction as a division problem and solve.

> **Example***: Convert $\dfrac{1}{8}$ to a decimal.*

$$\frac{1}{8} = 1 \div 8 =$$

```
          0.125
      8 | 1.000
         -  8
         ----
           20
         - 16
         ----
           40
         - 40
         ----
           00
```

$$\frac{1}{8} = 0.125$$

> *Notes: 1 can be written as 1.000 without changing its value.*
>
> *Just place the decimal in the quotient in the right place, and ignore it in the division.*

Decimals to Fractions

If the decimal terminates, rewrite the decimal as a fraction based on place value. Always reduce the fraction if possible.

> **Example:** Convert the decimal 0.37 to a fraction.
> $0.37 = 37 \text{ hundredths} = \dfrac{37}{100}$

> **Example:** Convert the decimal 0.65 to a fraction.
> $0.65 = \dfrac{65}{100} = \dfrac{65 : 5}{100 : 5} = \dfrac{13}{20}$

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Example: Convert $0.\overline{6}$ to a fraction.

$$0.\overline{6} = 6(0.\overline{1}) = 6\left|\frac{1}{9}\right| = \frac{6}{9} = \frac{2}{3}$$

Every repeating decimal can be expressed as the repeating digits divided by the number of 9s given by the last place value. If the decimal expansion repeats, convert using products or quotients of 9.

Example: Convert $0.\overline{428571}$ to a fraction.

$$0.\overline{428571} = \frac{428571}{999999} = \frac{3}{7}$$

Fractions to Percents

Converting fractions to percents is a two step process. First, convert the fraction to a decimal by writing the fraction as a division problem and evaluating. Then, convert the decimal to a percent by multiplying by 100 or moving the decimal point two digits to the right and adding a percent symbol.

Example: Convert $\frac{4}{5}$ to a percent.

Step 1: $\frac{4}{5}$ 4 : 5 0.8

Step 2: 0.8 = 80%

Percents to Fractions

Converting percents to fractions is also a two step process. First, convert the percent to a decimal by removing the percent symbol and dividing by 100 or moving the decimal two places to the left. Then, rewrite the decimal as a fraction based on place value.

Example: Convert 56% to a decimal.

Step 1: 56% = 0.56

Step 2: 0.56 $\frac{56}{100}$ $\frac{14}{25}$

Student Practice

Perform the following conversions.

Decimal to fraction & percent	Fraction to decimal & percent	Percent to decimal & fraction
1. **1.28**	2. $\frac{7}{12}$	3. **1.06%**
Fraction: _____	Decimal: _____	Decimal: _____
Percent: _____	Percent: _____	Fraction: _____
4. $0.1\overline{5}$	5. $1\frac{3}{25}$	6. **65%**
Fraction: _____	Decimal: _____	Decimal: _____
Percent: _____	Percent: _____	Fraction: _____

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C. Applications

Comparing Fractions

To compare fractions, cross multiply, then insert <, >, or =.

Example: Compare $\dfrac{13}{18}$ and $\dfrac{5}{6}$.

$\dfrac{13}{18}$? $\dfrac{5}{6}$

(13×6) ? (5×18) [Cross multiply]

 78 < 90

Hence, $\dfrac{13}{18}$ < $\dfrac{5}{6}$

Note: When comparing fractions $\dfrac{A}{B}?\dfrac{C}{D}$, always compare AD ? BC.

Comparing Decimals

When comparing decimals, you need to first write both decimals by matching the decimal point in the same place for each number. Then, start by comparing the digits with the greatest place value from left to right. Compare each digit until you reach a place with different values. Insert <, >, or =.

Example: 0.2854 ? 0.2845

0.2854 ⟵ 1st Decimal
0.2845 ⟵ 2nd Decimal
Compare each digit from left to right. They are equal until the thousandths place.
5 > 4 in the thousandths place
0.2854 > 0.2845

	Insert the appropriate relation symbol (>, <, or =) between the given values without using a calculator.
Student Practice	7. $\dfrac{3}{4}$ ☐ $\dfrac{12}{16}$ 8. $\dfrac{11}{7}$ ☐ $1\dfrac{2}{3}$
	9. 0.781 ☐ $0.7\overline{8}$ 10. 1.7535 ☐ 1.7553

Percent of a Number

To find the percent of a given number, multiply the decimal form of the percent by the number.

Example: What is 1.25% of 3,250,000?
1.25% = 0.0125
0.0125 × 3,250,000 = 40,625
40,625 is 1.25% of 3,250,000

Finding a Number When a Percent is Known

To find a number when the percent is known, turn the percent into a reduced fraction. Then, multiply the number by the *reciprocal* of the fraction. [This is the same as dividing by the percent.]

Example: 40% of a number is 24. What is the number?

40% is $\frac{40}{100}$, which reduces to $\frac{2}{5}$.

Multiply 24 by the reciprocal of $\frac{2}{5}$:   24 $\frac{5}{2}$ = 60.

In math, the **reciprocal** of a number is the number you get by dividing 1 by that number.

Example: The reciprocal of $\frac{2}{3}$ is 1 : $\frac{2}{3}$ = $\frac{3}{2}$

Essentially, you can reverse the denominator and the numerator to obtain the reciprocal.

Student Practice

Students must show their work in the space provided.

Find the percent of the given number. You may use a calculator.

11.   1.5% of 413,000

a) 6,195   b) 6,100   c) 6,700   d) 7,000

12.   0.9% of 9,323,000

a) 83,907   b) 88,707   c) 81,927   d) 91,077

13.   What is the number whose 0.04% is 1,094?

14.   What is the number whose 0.5% is 26,145?

15. Karen has $50 to go clothes shopping. She spends 60% of her money at the department store. Then she spends half of the remaining money at the shoe store. What fraction of her total money does she have left?

16-17. A piece of jewelry weighs 3 ounces and contains 0.75 ounces of gold.

16. What is the percent of gold in the piece of jewelry?

_____

17. At the same rate, what is the weight of gold in a ring that weighs 5 oz?

_____

18. 4.5 gallons of gas cost $15.75. The price of gas drops 10%. What is the cost of gas per gallon after the price drop?

_____

19. A bus takes 3 hours 40 minutes to complete its journey. 60% of that time is spent on the highway. How much time does the bus spend <u>off</u> the highway? Answer in hours and minutes.

_____

20. A new fish tank costs $120 before tax and $127.50 after tax. What percent tax is charged?

_____

Answers of Student Practice

1) $1\frac{7}{25}$; 128% $[1.28 = \frac{128}{100} = \frac{32}{25} = 1\frac{7}{25}; 1.28 = 1.28 \times 100 = 128\%]$

2) $0.58\bar{3}$; 58.$\bar{3}$% $[\frac{7}{12}$; divide to get $0.58\bar{3}; 0.58\bar{3} \times 100 = 58.\bar{3}\%]$

3)   0.0106; $\frac{53}{5,000}$ $[1.06\% = \frac{1.06}{100} = 0.0106; \frac{1.06}{100} = \frac{106}{10,000} = \frac{53}{5,000}]$

4) $\frac{5}{33}$; $15.\overline{15}$ % $[0.\overline{15} = \frac{15}{99} = \frac{5}{33}; 0.\overline{15} \times 100 = 15.\overline{15}\%]$

5)   1.12; 112% $[1\frac{3}{25} = 1\frac{12}{100} = 1.12; 1.12 \times 100 = 112\%]$

6)   0.65; $\frac{13}{20}$ $[65\% = \frac{65}{100} = 0.65; \frac{65}{100} = \frac{13}{20}]$

7)   =
8)   <
9)   <
10) <
11) a
12) a
13) 2,735,000
14) 5,229,000
15) $\frac{1}{5}$ [After the department store she has: $50 × 0.4 = $20. After the shoe store, she has

$20 × 0.5 = 10; $\frac{10}{50}$ $\frac{1}{5}$]

16) 25% [0.75 ÷ 3]
17) 1.25 oz [5 × 0.25]
18) $3.15/gal [Price of gas: $15.75 ÷ 4.5 = $3.50/gal; Price after 10% drop: $3.5 × 0.9]
19) 1 hr 28 min [3 hr 40 min = 3 × 60 + 40 = 220 min; 220 × 0.4 = 88 min not on the highway]
20) 6.25% [127.50 – 120 = 7.50; 7.50 ÷ 120 = 6.25%]

STOP END OF TRAIL

Head online to complete all days of the course:

MATH: Fractions/Decimals/Percents (W1)

Agradeahead™
blended learning

Now, more than ever, kids need supplemental education!

A Grade Ahead 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 A Grade Ahead?

Check out your academy's home page for pricing and more details at <u>academy.agradeahead.com</u>.

1. **Our curriculum is outstanding**, with clear lessons and homework activities 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. **<u>See what real parents are saying in "Our Results"</u>**.

3. **Our small group classes are like tutoring, only better.** With a maximum of 8 students per class, your child will get plenty of individualized attention.

4. **It's cost-effective.** Unlike private tutoring, A Grade Ahead's classes are affordable and provide a fun environment to learn.

Is your student ready to join the 27,500 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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