TEACHER GUIDE

Level 6

Includes Student Quizzes

Math

📅 Weekly Lesson Schedule
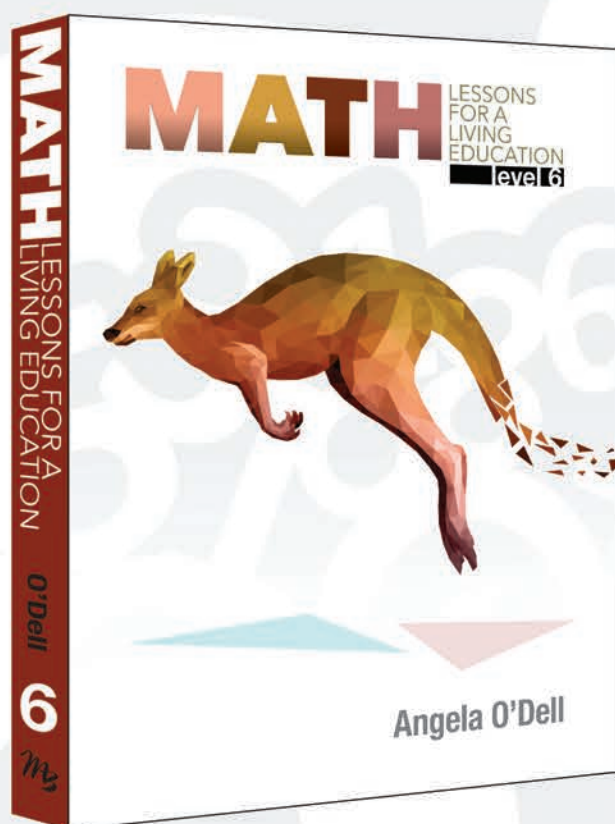📄 Quizzes
🔑 Solutions Manual

MATH LEVEL 6

MATH LESSONS FOR A LIVING EDUCATION level 6

MATH LESSONS FOR A LIVING EDUCATION

O'Dell

6

Angela O'Dell

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Math Lessons
for a
Living Education:
Level 6

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Table of Contents

Author Bio:
As a homeschooling mom and author, **Angela O'Dell** embraces many aspects of the Charlotte Mason method, yet knows that modern children need an education that fits the needs of this generation. Based upon her foundational belief in a living God for a living education, she has worked to bring a curriculum that will reach deep into the heart of home-educated children and their families. She has written over 20 books, including her history series and her math series. Angela's goal is to bring materials that teach and train hearts and minds to find the answers for our generation in the never changing truth of God and His Word.

Using This Course

Features: The suggested weekly schedule enclosed has easy-to-manage lessons that guide the reading, worksheets, and all assessments. The pages of this guide are perforated and three-hole punched so materials are easy to tear out, hand out, grade, and store. Teachers are encouraged to adjust the schedule and materials needed in order to best work within their unique educational program.

Lesson Scheduling: Students are instructed to read the pages in their book and then complete the corresponding section provided by the teacher. Assessments that may include worksheets, activities, quizzes, and tests are given at regular intervals with space to record each grade. Space is provided on the weekly schedule for assignment dates, and flexibility in scheduling is encouraged. Teachers may adapt the scheduled days per each unique student situation.

🕐	**Approximately 30 minutes per day, five days a week, for 36 weeks**
📄	**Quizzes are included to help reinforce learning and provide assessment opportunities**
✏️	**Worksheets are included in the student book for each section**
📄	**Designed for grade 6 in a one-year math course**

Course Description

Welcome to the sixth course in the **Math Lessons for a Living Education** series! This math series is based on these unwavering realities: *God does not separate our life lessons into subjects*; everything touches something else. Likewise, His creation is woven together as a multifaceted, multi-dimensional display of His ingenious creativity. Any given element of the universe that He has created is fascinating to explore. You are challenged to look up and out in this study of mathematics. This course will help students review and master important skills as they prepare to move into more advanced coursework. Designed to present math concepts in the context of real life, the student learns to apply the rules and techniques to solving everyday problems.

Course Objectives: Students completing this course will

- Investigate math through developing critical thinking skills
- Become familiar with whole numbers, averaging, rounding, and fractions
- Identify decimal basics and using decimals in the real world
- Learn how to work with percentages in the real world
- Study basics of geometry from pairs to polygons
- Develop maps, graphs and charts, units of measure, and more.

To the teacher: Mathematics and God's relational character

God teaches us through relationships. He is the One who set the example for this principle, using the perfect relationship between the members of the Trinity. He wants a relationship with us (John 3:16). Our children need a good relationship with us — not just for the sake of that relationship, but to lead them to Jesus. We cannot save our children's souls, but our relationship with our children can build trust and lead them to the One who can. Our children need to know that everything they can learn about the world around them is already known by God.

Think about this: the Alpha and the Omega, the Beginning and the End spoke, and His words created, and carried the power to set in motion everything in the world. God, the supreme architect, sent His words into the dark void and created the intricate, tiniest, most minute building blocks of matter, and then He taught them the secrets that keep them joining and bonding and creating larger building blocks. And in the mix of all of this, He used the part of His wisdom and character that we humans call math. Psalm 19:1 says, "The heavens proclaim the glory of God. The skies display His craftsmanship."

Since God created it, math is a reflection of His character. God is absolute, consistent, and unchanging. No matter how many times His character and promises are tested, they come out true. As we learn about His creation (including operations with numbers!), our faith in His unwavering faithfulness is strengthened.

Those of us who are His children can come and ask for wisdom. I hope you have chosen to accept Jesus as your Savior and Friend. If you have, you have the promise that God will help you and give you wisdom (James 1:5). "Fear of the Lord is the beginning of wisdom" (Prov. 9:10). This means that you can ask Him for help with learning!

Although this course was written mostly for the student, the story segments help the teacher build/strengthen a relationship with each student. The storyline of *Math Lessons for a Living Education Book 6* is not merely written to introduce math concepts; it is meant to bring the element of character and relationship to the study of math. Children learn best when they can learn through relationship. The story in this course is prayerfully crafted to reach into many issues that children this age are facing . . . the question of a personal faith in God, the question of trust in God's goodness even in the midst of hardship, the decision of letting God use pain for their good, etc. Read the story together, knowing that it is our tendency to push our children into independent learning at this age. Although a certain amount of independence is important, it is also extremely important that we maintain an element of closeness. **Our children need contact with us more at this age than almost at any other time. Stay close. Stay plugged in. Stay involved.**

- The concepts of math are a conversation between your student and the text. This Course is meant to grow your child's faith in God, critical thinking ability, and confidence in their God-given ability.

- **Quiz note**: If you have used the previous courses in this series, you are aware that they contain very few quizzes or tests. This is because they are written in such a way that your child is consistently showing you what they know. Book 6 is also written in this way, BUT, because quiz and test taking is a skill that they need in life, they have been added in this teacher guide. If you, as the teacher, do not want your child to take every single lesson quiz, simply use the lesson practice and review. You decide what your student needs and adjust this course to fit them. Please also note that lesson 22 of this course is ten days worth of work on some additional, rather advanced concepts. Please preview this lesson and read the note at the beginning of it. Also note that there is an optional, but highly recommended, two-day student presentation at the end of the book. You may want to tell your student about it, so he or she can be thinking on what to present.

Note: There is a complete list of supplies in the student book.

First Semester Suggested Daily Schedule

Date	Day	Assignment	Due Date	✓	Grade
		First Semester-First Quarter			
Week 1	Day 1	Read Lesson 1: Working with Whole Numbers Pages 7-9 • *Math Level 6 Student Book* • (ML6) Complete Lesson 1 Exercise 1 • Pages 10-12 • (ML6)			
	Day 2	Complete Lesson 1 Exercise 2 • Page 13 • (ML6)			
	Day 3	Complete Lesson 1 Exercise 3 • Pages 14-15 • (ML6)			
	Day 4	Complete Lesson 1 Exercise 4 • Pages 16-17 • (ML6)			
	Day 5	Complete Lesson 1 Exercise 5 • Page 18 • (ML6)			
Week 2	Day 6	Complete Lesson 1 Exercise 6 • Pages 19-20 • (ML6)			
	Day 7	Complete Lesson 1 Exercise 7 • Pages 21-22 • (ML6)			
	Day 8	Complete Lesson 1 Exercise 8 • Pages 23-24 • (ML6)			
	Day 9	Complete Lesson 1 Exercise 9 • Pages 25-26 • (ML6)			
	Day 10	Complete Lesson 1 Exercise 10 Practice and Review Pages 27-28 • (ML6)			
Week 3	Day 11	Complete Lesson 1 Quiz Pages 17-18 • *Math Level 6 Teacher Guide* • (TG)			
	Day 12	Read Lesson 2: Whole Numbers in the Real World Pages 29-31 • (ML6) Complete Lesson 2 Exercise 1 • Page 32 • (ML6)			
	Day 13	Complete Lesson 2 Exercise 2 • Page 33 • (ML6)			
	Day 14	Complete Lesson 2 Exercise 3 • Pages 34-36 • (ML6)			
	Day 15	Complete Lesson 2 Exercise 4 • Pages 37-38 • (ML6)			
Week 4	Day 16	Complete Lesson 2 Exercise 5 • Pages 39-40 • (ML6)			
	Day 17	Complete Lesson 2 Exercise 6 • Pages 41-44 • (ML6)			
	Day 18	Complete Lesson 2 Exercise 7 • Pages 45-46 • (ML6)			
	Day 19	Complete Lesson 2 Exercise 8 Practice and Review Pages 47-48 • (ML6)			
	Day 20	Complete Lesson 2 Quiz • Pages 19-20 • (TG)			
Week 5	Day 21	Read Lesson 3: Averaging, Rounding, and Roman Numerals Pages 49-50 • (ML6) Complete Lesson 3 Exercise 1 • Pages 51-53 • (ML6)			
	Day 22	Complete Lesson 3 Exercise 2 • Pages 54-56 • (ML6)			
	Day 23	Complete Lesson 3 Exercise 3 • Pages 57-60 • (ML6)			
	Day 24	Complete Lesson 3 Exercise 4 • Pages 61-62 • (ML6)			
	Day 25	Complete Lesson 3 Exercise 5 • Pages 63-64 • (ML6)			
Week 6	Day 26	Complete Lesson 3 Exercise 6 • Pages 65-66 • (ML6)			
	Day 27	Complete Lesson 3 Exercise 7 • Pages 67-68 • (ML6)			
	Day 28	Complete Lesson 3 Exercise 8 Practice and Review Pages 69-70 • (ML6)			
	Day 29	Complete Lesson 3 Quiz • Pages 21-22 • (TG)			
	Day 30	Read Lesson 4: Fractions • Pages 71-73 • (ML6) Complete Lesson 4 Exercise 1 • Pages 74-76 • (ML6)			

Date	Day	Assignment	Due Date	✓	Grade
Week 7	Day 31	Complete Lesson 4 Exercise 2 • Pages 77-78 • (ML6)			
	Day 32	Complete Lesson 4 Exercise 3 • Pages 79-81 • (ML6)			
	Day 33	Complete Lesson 4 Exercise 4 • Pages 82-83 • (ML6)			
	Day 34	Complete Lesson 4 Exercise 5 • Pages 84-85 • (ML6)			
	Day 35	Complete Lesson 4 Exercise 6 • Pages 86-87 • (ML6)			
Week 8	Day 36	Complete Lesson 4 Exercise 7 Practice and Review Pages 88-90 • (ML6)			
	Day 37	Complete Lesson 4 Quiz • Pages 23-24 • (TG)			
	Day 38	Read Lesson 5: Working with Factors • Pages 91-92 • (ML6) Complete Lesson 5 Exercise 1 • Pages 93-94 • (ML6)			
	Day 39	Complete Lesson 5 Exercise 2 • Pages 95-96 • (ML6)			
	Day 40	Complete Lesson 5 Exercise 3 • Pages 97-98 • (ML6)			
Week 9	Day 41	Complete Lesson 5 Exercise 4 • Pages 99-100 • (ML6)			
	Day 42	Complete Lesson 5 Exercise 5 • Pages 101-102 • (ML6)			
	Day 43	Complete Lesson 5 Exercise 6 • Pages 103-104 • (ML6)			
	Day 44	Complete Lesson 5 Exercise 7 • Pages 105-108 • (ML6)			
	Day 45	Complete Lesson 5 Exercise 8 Practice and Review Pages 109-110 • (ML6)			
First Semester-Second Quarter					
Week 1	Day 46	Complete Lesson 5 Quiz • Pages 25-26 • (TG)			
	Day 47	Read Lesson 6: More about Fractions - Mixed Numbers Page 111 • (ML6) Complete Lesson 6 Exercise 1 • Pages 112-114 • (ML6)			
	Day 48	Complete Lesson 6 Exercise 2 • Pages 115-117 • (ML6)			
	Day 49	Complete Lesson 6 Exercise 3 • Pages 118-119 • (ML6)			
	Day 50	Complete Lesson 6 Exercise 4 • Pages 120-121 • (ML6)			
Week 2	Day 51	Complete Lesson 6 Exercise 5 • Pages 122-124 • (ML6)			
	Day 52	Complete Lesson 6 Exercise 6 • Pages 125-126 • (ML6)			
	Day 53	Complete Lesson 6 Exercise 7 Practice and Review Pages 127-128 • (ML6)			
	Day 54	Complete Lesson 6 Quiz • Pages 27-28 • (TG)			
	Day 55	Read Lesson 7: Using Factors and Multiples in Operations Pages 129-130 • (ML6) Complete Lesson 7 Exercise 1 • Pages 131-132 • (ML6)			
Week 3	Day 56	Complete Lesson 7 Exercise 2 • Pages 133-134 • (ML6)			
	Day 57	Complete Lesson 7 Exercise 3 • Pages 135-136 • (ML6)			
	Day 58	Complete Lesson 7 Exercise 4 • Pages 137-138 • (ML6)			
	Day 59	Complete Lesson 7 Exercise 5 • Pages 139-140 • (ML6)			
	Day 60	Complete Lesson 7 Exercise 6 • Pages 141-142 • (ML6)			

Review & Quiz Section

Cumulative Review, part 1

You will need these materials:

1. Your math book or notebook if you have been removing the pages as you go

2. A white board / markers / eraser

3. Your teacher

Check off each one as you complete it.

Look through each lesson carefully. If there are any areas of concern, take the time to work through the concept in question, using your whiteboard and discussing it thoroughly with your teacher.

_____ Lesson 1: Working with Whole Numbers

_____ Lesson 2: Whole Numbers in the Real World

_____ Lesson 3: Averaging, Rounding, and Roman Numerals

_____ Lesson 4: Fractions

_____ Lesson 5: Working with Factors

_____ Lesson 6: More About Fractions — Mixed Numbers

_____ Lesson 7: Using Factors and Multiples in Operations

_____ Lesson 8: Review of Fraction Concepts

_____ Lesson 9: Adding and Subtracting Fractions and Mixed Numbers

_____ Lesson 10: Multiplying and Dividing Fractions

Cumulative Review, part 2

You will need these materials:

1. Your math book or notebook if you have been removing the pages as you go

2. A white board / markers / eraser

3. Your teacher

Check off each one as you complete it.

Look through each lesson carefully. If there are any areas of concern, take the time to work through the concept in question, using your whiteboard and discussing it thoroughly with your teacher.

_____ Lesson 12: Decimal Basics

_____ Lesson 13: More Work with Decimals

_____ Lesson 14: Using Decimals in the Real World

_____ Lesson 15: Percents

_____ Lesson 16: Using Decimals and Percents in the Real World — Savvy Shopping

_____ Lesson 18: Geometry

_____ Lesson 19: Maps!

_____ Lesson 20: Graphs and Charts

_____ Lesson 21: Units of Measure

10 problems - 10 points each

1. Write these numbers vertically and add them. Circle the one(s) that used carrying.

    a.   342 + 652 + 702 =   b.   892 + 128 + 286 =

2. Now round all of the numbers in the problems 1a and 1b and estimate the sum of each addition problem. Optional: auditory learners may do this orally.

3. Write these numbers vertically and subtract. Circle the one(s) that used borrowing.

    a.   672 – 599 =   b.   76,984 – 33,218 =

4. Now round all of the numbers in the problems 3a and 3b and estimate the answer of each subtraction problem. Optional: auditory learners may do this orally.

5. Write these numbers vertically and multiply them. Circle the one(s) that used carrying.

    a.   419 x 503 =   b.   7,891 x 888 =

6. Now round all of the numbers in the problems 5a and 5b and estimate the answer of each multiplication problem. Optional: auditory learners may do this orally.

7. Divide. Next to each problem, use rounding to estimate the answer.

a. 735 ÷ 23 =   b. 9,451 ÷ 45 =

8. What are the three ways of writing a division problem? Show them using 9 as the dividend and 3 as the divisor.

9. Write the divisibility rules for:

Dividing 2:

Dividing 5:

Dividing 9:

Dividing 3:

Dividing 4:

10. Multiplication facts! Complete your multiplication drill.

20 problems, 5 points each

1. If you had a list of monthly expenses and bills, how would you find out what your monthly budget should be? Why?

2. If you knew you had a certain amount of money in your bank account, how would you keep track of your current amount as you took money out to pay for your expenses? Why?

3. If you got a job that paid $15 for every hour you worked, how would you figure out what your paycheck should be after working 35 hours? Why?

4. Use the answer to problem 3 to solve. How much money would you have after working 4 weeks of work 35 hrs/week?

5. When you come across a story problem that has too much information, what are the four steps you would follow to find the answer?

What are the clue words for:

6. adding

7. multiplying

8. subtracting

9. dividing

10. Circle the number that you would enter into your calculator first to solve this problem.

    $81,918 \div 9 =$

Solve each problem using regular calculation. Check with your calculator. Draw your calculator's buttons next to each problem to show how you would enter the numbers to solve each problem.

11. $62,215 + 3,110 + 4,879 =$

12. $3,862 - 2,998 =$

13. $3,871 \times 382 =$

14. The mountain climber was determined to climb Mount McKinley. In his first attempt, he climbed 16,385 feet before turning back. In his second attempt, he got dizzy at 14,310 feet and had to return to his base camp. Finally, in his final attempt, he reached the 20,310 foot summit. Write and solve equations showing how close he got to the summit in each of his first two attempts.

15. How many feet did he climb altogether?

16. If the family grocery budget is $7,200 per year, how much do they spend on groceries each month?

17. If their total monthly budget is $4,600, how much do they have left after the grocery budget is spent?

18. How much is their total yearly budget? If they save $300 per month, how much do they save a year?

19. Write your own multi-step story problem using clue words for addition and subtraction. Solve your problem.

20. Write your own multi-step story problem using clue words for multiplication and division. Solve your problem.

25 problems - 4 points each

1. Write 923,805,001 in number words.

2. Reduce these fractions by using factoring and cancellation.

   (a) $\frac{320}{740}$
   (b) $\frac{680}{990}$
   (c) $\frac{700}{1,100}$

3. Factor these numbers down to their prime factors by using factoring trees.

   (a) 615
   (b) 850
   (c) 384

4. $14 \div \frac{3}{7} =$

5. $2\frac{5}{9} \times 6\frac{1}{2} =$

6. $3\frac{1}{4} + 1\frac{4}{5} - 4\frac{3}{10} =$

7. Explain in detail when you should use GCF.

8. Explain in detail when you should use LCM.

9. What is 2% written as a decimal? _____ as a fraction? _____

10. Write 65% as a reduced fraction.

11. Write 4.52 as a percent.

12. Percent means _____ _____.

13. What is 30% of 550?

14. What is 10% of $75.69?

With your protractor, draw these angles. Label them.

15. Acute angle   80°   16. Obtuse angle   170°

17. Find the perimeter of these shapes: A square with 12-foot sides and a rectangle with sides that are 22 feet long and 16 feet long.

18. What is the difference between a line and a segment?

19. How are circles labeled?

20. What is the diameter of a circle that has a 9.5 feet radius?

Exercise 1 — Day 1

Name _____

Practice saying and writing these numbers in number words.

6. 45,782 forty-five thousand, seven hundred eighty-two Even

7. (○) 329,216,335 three hundred twenty-nine million, two hundred sixteen thousand, three hundred thirty-five Odd

8. 6,894 six thousand, eight hundred ninety-four Even

9. 561 five hundred sixty-one Odd

10. (○) 429,531,085 four hundred twenty-nine million, five hundred thirty-one thousand, eighty-five Odd

11. **Use Your Words!** Explain to your teacher what you know about writing and saying large numbers.
Teacher check _____

Concept #3: Odds and Evens
We have learned that all numbers are either odd or even. An odd number cannot be evenly divided into two equal groups; there will always be one left over. An even number can always be divided into two equal groups with nothing left over.

> Odd numbers always end in these numbers: 1, 3, 5, 7, 9
>
> Even numbers always end in these numbers: 0, 2, 4, 6, 8

12. Look at all of the numbers in problems 1–4 and 6–10 in this exercise. Above or beside each number, write O for odd or E for even.

13. **Use Your Words!** Explain what you know about odd and even numbers.

12
Math Level 6 – Lesson 1

Exercise 1 — Day 1

Name _____

Place value / writing large numbers / odds and evens

Concept #1: Place Value
When we are working with whole numbers, it is very important to understand place value. Study the concept below and solve the problems. As you work through the problems, it may help to narrate the process to your teacher. Do you understand completely? If not, take the time now to gain more confidence and understanding.
Let's review the place value up to through the millions.

One Hundred Millions	Ten Millions	One Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
3	8	7	8	3	1	2	2	3
			9	0	0	1	2	6
				3	4	4	9	2

Solve these problems

1. Circle the digit in the ten's place:
(9)5 Odd
Answers #12

2. Circle the digit in the ten thousand's place:
2(3)5,687 Odd   (8)9,700 Even   32,6(8)5 Odd

3. Circle the digit in the hundred's place:
4,982,(0)00 Even   9(1)0 Even   789,(3)51 Odd

4. Fill in the place value chart with this number:
83,223 Odd   387,900,126 Even   34,492 Even

    2(0)1 Odd   1,4(5)6,834 Even

5. **Use Your Words!** Explain to your teacher everything you know about place value.
Teacher check _____

10
Math Level 6 – Lesson 1

Name_____

Exercise 2 Day 2

Rounding tricks

When we work with numbers, we often need to round them to make it easier to do computations with them. For example, we may need to quickly estimate what several large numbers are all together. It is important to know the process of rounding and estimating.

I am going to teach you some fun tricks to remember when you are rounding, but first let's review the steps of rounding.

Example: Round 367 to the hundreds place.

Decide what two "hundreds" 367 is between. 300 and 400

Trick #1: Underline the digit in the place to which you are rounding. (3)

Ask the neighbor number if you should round to the smaller hundred or the larger hundred. Is the neighbor number to the right (6) five or bigger? If it is, round to the bigger hundred. If it is smaller than five, round to the smaller hundred.

Trick #2: Turn all the neighbors to the right of the place to which you are rounding into place holder zeros. 367 becomes 400.

Now you try it:

Round these numbers to the ten's place.

1. 423 420
2. 45 50
3. 391 390

4. 56 60
5. 1,257 1,260

Round these numbers to the hundred's place.

6. 23,490 23,500
7. 823 800
8. 127,947 127,900

9. 309 300
10. 989 1,000

Round these numbers to the thousand's place.

11. 34,980 35,000
12. 5,459 5,000
13. 178,251 178,000

14. 29,589 30,000
15. 1,474,910 1,475,000

16. **Use Your Words!** Explain the process of rounding.

Name_____

Exercise 3 Day 3

Addition (short and long)

Numbers are amazing, aren't they? They can show how many socks we own, or they can show how many socks our whole family owns. When we want to combine two or more numbers, we use an operation called adding. By adding two numbers (addends) together, we come up with an answer called the sum. Remember, addends may be added in any order without changing the sum.

Let's start with a review of simple addition.

We can add horizontally.

1. 20 + 6 = 26
2. 34 + 10 = 44
3. 42 + 8 = 50

4. 90 + 6 = 96
5. 35 + 4 = 39
6. 12 + 12 = 24

We can add vertically.

7.
```
  46
+ 23
----
  69
```
8.
```
  85
+ 14
----
  99
```
9.
```
  13
+ 14
----
  27
```

10.
```
  68
+ 11
----
  79
```
11.
```
  54
+ 14
----
  68
```
12.
```
  76
+ 13
----
  89
```

We can add with carrying.

In this problem, when we add the one's column, we end up with more than what can fit in the one's place (a number larger than 9). This means that we have to carry the group of ten up to the top of the ten's column and add it to the rest of the tens.

Example:
```
   1
  56
+ 16
----
  72
```

Example:
```
  1 1
  367
  134
+ 501
-----
 1,002
```

Add with carrying:

13.
```
  239
+  34
-----
  273
```
14.
```
  1 1
  567
+ 189
-----
  756
```
15.
```
  1 1
   99
+   1
-----
  200
```

16.
```
    1
  469
+  11
-----
  480
```
17.
```
  613
+  18
-----
  631
```
18.
```
    1
  399
+  10
-----
  409
```
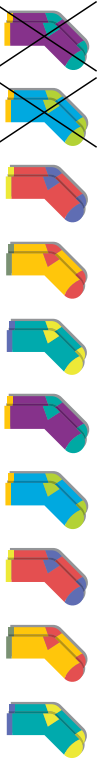
Exercise 4 — Day 4

Name _____

The Short and Long of Subtraction

What happens when you lose a pair of socks, and your mom asks you how many you have left? You know you used to have 10 pairs of socks, but you lost one, when you came in from playing in the snow, only to realize that your boot had eaten your favorite pair, and now another pair has been lost forever in the clutter under your brother's bed. Things aren't looking so good for your sock drawer! You stop to think, I used to have 10 pairs of socks, but my boots ate 1 pair, and then my brother's clutter claimed another pair... so that's 10 minus (that means take away) 1 is 9, and 9 minus 1 is 8. If this keeps up, I'm going to run out of socks before the end of the winter! But you try to stay positive as you answer your mom, "I have 8 pairs of socks left, Mom. At least I still have one for every day of the week, plus one more just in case..."

So, what does that look like on paper?

Example: $10 - 1 = 9$ $9 - 1 = 8$

We can subtract horizontally.

1. $26 - 4 = 22$ 2. $54 - 2 = 52$ 3. $49 - 8 = 41$

4. $98 - 6 = 92$ 5. $67 - 4 = 63$ 6. $12 - 12 = 0$

We can subtract vertically.

7.
```
  56
- 22
────
  34
```

8.
```
  95
- 34
────
  61
```

9.
```
  32
- 11
────
  21
```

10.
```
  65
- 11
────
  54
```

11.
```
  54
- 24
────
  30
```

12.
```
  66
- 16
────
  50
```

We can subtract where we have to borrow a group of ten from the ten's place.

Example:
```
   4
  3 ͢5 6
- 2 3 7
───────
  1 1 9
```

We can subtract where we have to borrow a group of ten from the ten's place and and group of a hundred from the hundred's place.

Example:
```
    7 11
  8 ͡4 3
- 6 5 4
───────
  1 6 9
```

16

Exercise 3 — Day 3

Name _____

You can add more than two numbers.

Horizontal addition.

19. $12 + 34 + 10 = 56$ 20. $31 + 17 + 11 = 59$ 21. $10 + 5 + 13 = 28$

Vertical addition.

22.
```
   1
 124
  12
+ 15
────
 151
```

23.
```
   1
  56
  13
+ 11
────
  80
```

24.
```
   1
 354
  45
+ 10
────
 409
```

You can use rounding to estimate the answer to an addition problem by rounding the addends before adding. This will give you an estimated answer. For example:

```
 610 ──→  600
+489     + 500
──────   ──────
          1,100
```

Now you try some:

Round to estimate the sums. Graphics, these need to be laid out like the sample.

25.
```
 439 ──→  400
+227     + 200
──────   ──────
          600
```

26.
```
 981 ──→  1,000
+238     + 200
──────   ──────
          1,200
```

27.
```
 561 ──→  600
+484     + 500
──────   ──────
          1,100
```

28.
```
 735 ──→  700
+652     + 700
──────   ──────
          1,400
```

29. **Use Your Words!** Explain the process of adding with carrying.

15

Name _____

Subtract. Circle the problems in which you used borrowing.

13.
$$\begin{array}{r} 245 \\ -\ 231 \\ \hline 14 \end{array}$$

14. (circled)
$$\begin{array}{r} {}^{3}\!4^{16}\!7{}^{1}8 \\ -\ 399 \\ \hline 79 \end{array}$$

15. (circled)
$$\begin{array}{r} {}^{1}2^{13} \\ -\ 15 \\ \hline 198 \end{array}$$

16. (circled)
$$\begin{array}{r} {}^{7}9^{8}8{}^{1}1 \\ -\ 756 \\ \hline 225 \end{array}$$

17. (circled)
$$\begin{array}{r} {}^{6}6{}^{1}71 \\ -\ 445 \\ \hline 226 \end{array}$$

18.
$$\begin{array}{r} 387 \\ -\ 222 \\ \hline 165 \end{array}$$

Using the same process, try these:

19.
$$\begin{array}{r} {}^{5}6,\!{}^{11}2{}^{12}3{}^{1}1 \\ -\ 4,\!999 \\ \hline 1,\!232 \end{array}$$

20.
$$\begin{array}{r} 23,\!612 \\ -\ 19,\!212 \\ \hline 4,\!400 \end{array}$$

21.
$$\begin{array}{r} {}^{9}1{}^{9}0,\!{}^{9}0{}^{9}0{}^{10}0 \\ -\ 999 \\ \hline 9,\!001 \end{array}$$

22.
$$\begin{array}{r} {}^{4}5{}^{10}1,\!{}^{12}3{}^{9}09 \\ -\ 24,\!648 \\ \hline 26,\!661 \end{array}$$

23.
$$\begin{array}{r} 183,\!272 \\ -\ 61,\!151 \\ \hline 122,\!121 \end{array}$$

We can use rounding to estimate an answer in a subtraction problem by rounding the minuend and the subtrahend before finding the estimated difference.

For example:

Round to the nearest 100.

$$\begin{array}{r} 910 \\ -\ 750 \end{array} \longrightarrow \begin{array}{r} 900 \\ -\ 800 \\ \hline 100 \end{array}$$

Now you try it!

24.
$$\begin{array}{r} 823 \\ -\ 189 \end{array} \longrightarrow \begin{array}{r} 800 \\ -\ 200 \\ \hline 600 \end{array}$$

25.
$$\begin{array}{r} 612 \\ -\ 477 \end{array} \longrightarrow \begin{array}{r} 600 \\ -\ 500 \\ \hline 100 \end{array}$$

26.
$$\begin{array}{r} 952 \\ -\ 899 \end{array} \longrightarrow \begin{array}{r} 1,\!000 \\ -\ 900 \\ \hline 100 \end{array}$$

27.
$$\begin{array}{r} 215 \\ -\ 173 \end{array} \longrightarrow \begin{array}{r} 200 \\ -\ 200 \\ \hline 0 \end{array}$$

28. **Use Your Words!** Explain the process you used to solve problem 14 of this exercise.

Name _____

Multiplication Basics and Multiplication Facts Review

In your previous years of studying math, you have learned that skip counting is another way to learn the factors in a multiplication family. When you skip count by 2, you use this pattern:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20…
(1x2) (2x2) (3x2) (4x2) (5x2) (6x2) (7x2) (8x2) (9x2) (10x2)

As you can see, you are adding another group of 2 to each number to get the next number. You are probably very familiar with counting by 2s. Explain to your teacher how skip counting is related to multiplication. In the following problems, show how skip counting and multiplication go together, like I did with the 2s above.

1. Skip count by 3 to 30: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30
(1x3) (2x3) (3x3) (4x3) (5x3) (6x3) (7x3) (8x3) (9x3) (10x3)

2. Skip count by 4 to 40: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
(1x4) (2x4) (3x4) (4x4) (5x4) (6x4) (7x4) (8x4) (9x4) (10x4)

3. Skip count by 5 to 50: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
(1x5) (2x5) (3x5) (4x5) (5x5) (6x5) (7x5) (8x5) (9x5) (10x5)

4. Skip count by 6 to 60: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60
(1x6) (2x6) (3x6) (4x6) (5x6) (6x6) (7x6) (8x6) (9x6) (10x6)

5. Skip count by 7 to 70: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70
(1x7) (2x7) (3x7) (4x7) (5x7) (6x7) (7x7) (8x7) (9x7) (10x7)

6. Skip count by 8 to 80: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
(1x8) (2x8) (3x8) (4x8) (5x8) (6x8) (7x8) (8x8) (9x8) (10x8)

7. Skip count by 9 to 90: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
(1x9) (2x9) (3x9) (4x9) (5x9) (6x9) (7x9) (8x9) (9x9) (10x9)

8. Skip count by 10 to 100: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
(1x10) (2x10) (3x10) (4x10) (5x10) (6x10) (7x10) (8x10) (9x10) (10x10)

9. Review your multiplication facts. Complete your laminated multiplication drill from the appendix of this book. If there are any that you need to practice, make flashcards to drill them until you know them very well.

Exercise 6 — Day 6

Name _____

You can use rounding to estimate in multiplication by rounding each of the factors before multiplying them to find the estimated product. This example shows a multiplication problem with one large factor (303) and one smaller factor (4). You can use the same process with larger problems, simply by rounding both numbers and multiplying like usual.

Example:

$$303 \rightarrow 300$$
$$\times\ 4 \qquad \times\ 4$$
$$\overline{\qquad\quad 1{,}200}$$

You try a few! The first one is done for you.

11.
$$544 \rightarrow 500$$
$$\times\ 67 \qquad \times\ 70$$
$$\overline{\qquad\quad 35{,}000}$$

Note: I multiplied 5 x 7 and then added the number of zeros both factors had (3 zeros).

12.
$$782 \rightarrow 800$$
$$\times\ 89 \qquad \times\ 90$$
$$\overline{\qquad\quad 72{,}000}$$

13.
$$923 \rightarrow 900$$
$$\times\ 52 \qquad \times\ 50$$
$$\overline{\qquad\quad 45{,}000}$$

14. **Use Your Words!** Explain the process you worked through in problem 9 of this exercise. Answers will vary but should be sure to mention using place holder zeros when adding to solve a multiplication problem.

Exercise 6 — Day 6

Name _____

Long Multiplication

Now that we have reviewed the basics of multiplication, let's move on and really stretch our minds! Study the steps in the example:

```
   55
 × 15
  275
+ 550
  825   This zero is a place holder.
```

1. Multiply the top factor by the number in the one's place of the bottom factor.
2. Place a zero to hold the one's place and then multiply the top factor by the number in the ten's place of the bottom factor.
3. Add both partial factors together to complete the problem.

Now you try it:

1.
```
    41
  × 22
    82
+  820
   902
```

2.
```
    64
  × 12
   128
+  640
   768
```

3.
```
    88
  × 11
    88
+  880
   968
```

4.
```
   230
  × 12
   460
+ 2,300
  2,760
```

5.
```
   301
  × 15
  1,505
+ 3,010
  4,515
```

6.
```
    412
  ×  34
  1,648
+ 12,360
  14,008
```

Now let's make the numbers bigger! You will need to use carrying. Study the example:
Follow the same steps as before.

```
    245
  × 110
    000
   2450
+ 24500
  26,950
```

You will need 2 place holder zeros, one for the one's place and one for the ten's place.

Now you try it!

7.
```
     398
  ×  645
   1,990
  15,920
+ 238,800
  256,710
```

8.
```
    1,247
  ×   409
   11,223
   00,000
+ 498,800
   510,023
```

9.
```
     723
  ×  579
   6,507
  50,610
+ 361,500
   418,617
```

10.
```
     3,622
  ×  1,275
    18,110
   253,540
 1,724,400
+ 3,622,000
 4,618,050
```

Name _____

Division basics

You have learned that addition and subtraction are related. In the space below,

1. **Use Your Noodle — draw a doodle!** showing how addition and subtraction go together.

   Answers will vary.

2. Now, let's quickly review the concept of division! If you have 6 cookies, and your mom says, "That's way too many! Share half of those with your brother!" How many cookies will each of you have? **3** That's division. How did you do it? Draw a doodle below. Underneath that, draw a doodle of how multiplication and division are related.

   Answers will vary.

3. Do a quick review of your division facts! Study these multiplication facts and write the matching division facts that go with them.

   Example: $12 \times 12 = 144$ division: $144 \div 12 = 12$

   $3 \times 4 = 12$ division: $12 \div 4 = 3$ or $12 \div 3 = 4$

   $5 \times 3 = 15$ division: $15 \div 3 = 5$ or $15 \div 5 = 3$

   $9 \times 3 = 27$ division: $27 \div 3 = 9$ or $27 \div 9 = 3$

   $4 \times 4 = 16$ division: $16 \div 4 = 4$

   $5 \times 6 = 30$ division: $30 \div 6 = 5$ or $30 \div 5 = 6$

   Now you write three multiplication equations and their matching division facts.

   a. Answers will vary.

   b. Answers will vary.

   c. Answers will vary.

Name _____

What if you wanted to divide a dividend by a divisor and the quotient doesn't come out even? What if there is something remaining? Don't worry — when this happens, you have a remainder! This can happen in simple division equations, as well as long division.

Example:

```
        1   R.1
    2 | 2 3
      - 2  ↓
        0  3
           2
           1
```

2.
```
        3   R.2
    4 | 1 4
      - 1 2
        0 2
```

3.
```
        2   R.2
    5 | 1 2
      - 1 0
        0 2
```

4.
```
        3   R.2
    6 | 2 0
      - 1 8
        0 2
```

5.
```
        4   R.2
    7 | 3 0
      - 2 8
        0 2
```

6.
```
      1 3   R.2
    4 | 5 4
      - 4
        1 4
      - 1 2
        2
```

7.
```
        6   R.4
    7 | 4 6
      - 4 2
        4
```

8.
```
      1 5   R.4
    5 | 7 9
      - 5
        2 9
      - 2 4
        4
```

9.
```
        2   R.1
    4 | 9
      - 8
        1
```

Use Your Words! Explain the process you worked through in problem 5 of this exercise.

Answers will vary but should include some mention of dividing and having a remainder left over.

Exercise 8 — Day 8

Name _____

Division tricks and three ways of writing division

You may have learned in your previous years of math study that division has a few tricks up its sleeve, which make it easier to work out a division equation.

Study them below:

- A number is divisible by 2 if it is an even number.
- A number is divisible by 5 if the one's digit is 0 or 5.
- A number is divisible by 10 if the one's digit is 0.
- A number is divisible by 3 if the sum of the digits is divisible by 3.
- A number is divisible by 6 if it is divisible by 2 and 3.
- Any number is divisible by 8 if the last three digits are divisible by 8.
- A number is divisible by 9 if the sum of the digits is divisible by 9.
- A number is divisible by 4 if the last two digits are both zeros, or if they are divisible by 4.

872   231   328   90   810   33   54   765

Using the numbers above, write them on the lines below next to all the numbers they are divisible by. The first one is done for you.

1. Divisible by 2: 872 328 90 810 54
2. Divisible by 3: 231 90 810 33 765
3. Divisible by 4: 872 328 54
4. Divisible by 5: 90 810 765
5. Divisible by 6: 90 810 54
6. Divisible by 8: 872 328
7. Divisible by 9: 90 810 54 765
8. Divisible by 10: 90 810

Optional:
If you are struggling with any of the divisibility rules, take the time now to study and review them. You may want to make flash cards to keep on hand throughout your school year.
Review of the three ways of writing a division problem.

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Exercise 8 — Day 8

Name _____

30 divided by 5

$$5\overline{)3\,0} \qquad 3\,0 \div 5 \qquad \frac{3\,0}{5}$$

You try it! Write each division sentence in all three ways.

9. 65 divided by 5

$$5\overline{)6\,5} \qquad 6\,5 \div 5 \qquad \frac{6\,5}{5}$$

10. 72 divided by 8

$$8\overline{)7\,2} \qquad 7\,2 \div 8 \qquad \frac{7\,2}{8}$$

11. 56 divided 2

$$2\overline{)5\,6} \qquad 5\,6 \div 2 \qquad \frac{5\,6}{2}$$

12. 320 divided by 3

$$3\overline{)3\,2\,0} \qquad 3\,2\,0 \div 3 \qquad \frac{3\,2\,0}{3}$$

13. 90 divided by 10

$$10\overline{)9\,0} \qquad 9\,0 \div 10 \qquad \frac{9\,0}{10}$$

14. 81 divided by 9

$$9\overline{)8\,1} \qquad 8\,1 \div 9 \qquad \frac{8\,1}{9}$$

15. 40 divided by 8

$$8\overline{)4\,0} \qquad 4\,0 \div 8 \qquad \frac{4\,0}{8}$$

Math Level 6 – Lesson 1

24

Name _____

Long division
Today, we are going to tackle reviewing long division. To refresh your mind on the process, study the examples below. The first one shows a one-digit divisor, while the second one shows a two-digit divisor. **Remember: the steps of division are 1. divide 2. multiply 3. subtract 4. bring down the next number 5. repeat if needed.**

Examples:

```
        4 6 6 4  R.2              2 2 6 R.3
    7 | 3,2 6 5 0            3,0 | 2 8 7
      - 2 8                      - 2 6 6
        4 6                          0 4 8
      - 4 2                        - 4 8
          4 5                          0 4 7
        - 4 2                        - 4 4
            3 0                          3
          - 2 8
              2
```

Now you try it!

```
1.      1 5 2  R.2          2.      1 9 7  R.8          3.      1,8 0 2  R.2
    3 | 4 5 8                   9 | 1,7 8 1                 4 | 7,2 1 0
      - 3                         - 9                          - 4
        1 5                         8 8                          3 2
      - 1 5                       - 8 1                        - 3 2
          0 8                         7 1                          0 1
        - 0 6                       - 6 3                        - 0
            2                           8                            1 0
                                                                   - 8
                                                                      2
```

```
4.      5 3 4  R.4          5.      4 0 6 0            6.      1,0 7 2
    2 | 6,4 1 2                 2 | 8,1 2 0               1 2 | 1 2,8 6 4
      - 6 0                       - 8 0                         - 1 2
        4 1                         1 2                            0 8
      - 3 6                       - 1 2                          - 0
          5 2                         0 0                            8 6
        - 4 8                       - 1 2 0                       - 8 4
            4                       - 1 2 0                          2 4
                                        0                          - 2 4
                                                                      0
```

Name _____

You can use rounding to estimate the quotient of a division problem by first rounding both the dividend and the divisor before dividing.

Example:
321 ÷ 31 =
300 ÷ 30 = 10   →   Simply round each number to the nearest largest place value. In this case you are rounding the dividend to the hundred's place and the divisor to the ten's place.

Now you try it! Round the dividend and the divisor to quickly find the estimated answer of each problem.

7. 562 ÷ 12 =   8. 912 ÷ 29 =   9. 1,178 ÷ 63 =
600 ÷ 10 = 60   900 ÷ 30 = 30   1,200 ÷ 60 = 20

10. 469 ÷ 46 =   11. 382 ÷ 41 =
500 ÷ 50 = 10   400 ÷ 40 = 10

Use Your Words! Explain the process you worked through in problem 2 of this exercise.
Answers will vary but should include discussion of long division.

Exercise 10 — Day 9

Name_____

13. Rounding:

In this space, write the first problem of each of the previous sections in this exercise (problems 1, 4, 7, and 10). Use rounding to estimate the answer to each one.

1.
```
   500
   700
 + 700
 1,900
```

4.
```
  30,000
- 10,000
  20,000
```

7.
```
    800
  ×  30
 24,000
```

10. 700 ÷ 10 = 70

Oral Review:

14. The steps of rounding — Underline the digit to which you are rounding. Look at the digit in the place to the right of that place. If it is 4 or less, round to the smaller amount. If it is 5 or more, round to the larger amount.

15. The steps of adding with carrying and subtracting with borrowing — Explained on pages 20 (adding) and 22 (subtracting).

16. The steps of multiplication with carrying — Explained on page 25.

17. The divisibility rules from Exercise 8 — Explained on page 29.

18. The steps of long division, the three ways of writing a division problem — Explained on page 30.

19. The multiplication table to 12 x 12 — Correct with the completed chart in the appendix.

Math Level 6 – Lesson 1

Exercise 10 — Day 10

Name_____

Practice and Review

Please use this exercise to practice any concepts with which you may have difficulties, in preparation for your lesson quiz

Add:

1.
```
   452
   651
 + 714
 1,817
```

2.
```
   891
 + 662
 1,553
```

3.
```
 123,742
+ 723,947
 847,689
```

Subtract:

4.
```
  34,982
- 12,999
  21,983
```

5.
```
  723,174
- 412,999
  310,175
```

6.
```
 126,890,645
- 101,777,944
  25,112,701
```

Multiply:

7.
```
    823
  ×  28
  6,584
 16,460
 23,044
```

8.
```
    2,196
  ×   327
   15,372
   43,920
  658,800
  718,092
```

9.
```
    32,890
  ×    631
    32,890
   986,700
 19,734,000
 20,753,590
```

Divide:

10. 2) 126 = 54 R.4

11. 32) 874 = 27 R.10

12. 65) 9,217 = 141 R.22

Math Level 6 – Lesson 1