Greek Orthodox Patriarchate School International - Hanina

Unit 10

Name: _____ **Lesson 10.2** **Grade 5A**

Date: _____ **Division** **Study sheet**

- Objective(s):
  1. Divide whole numbers up to 1,000 by1-digit and 2-digit divisors.
  2. How to write the answer of a division problem as a **mixed number**.
  3. Solve division questions using the **factor method**.

Part one: How to estimate

Here is a simple, step-by-step method parents can use to estimate division with numbers up to 1000 by 1-digit numbers. We'll call it the **"Friendly Neighbor"** method because we find a friendly number close to our original that is easier to work with.

The "Friendly Neighbor" Method for Estimating Division

The Core Idea: We are allowed to change the big number (the dividend) to make it something much easier to divide in our heads. We are not changing the small number (the divisor).

Step 1: Find a "Friendly Neighbor" Number

Look at the big number (e.g., in 478 ÷ 6, the big number is 478). We need to find its "friendly neighbor"—a number close to it that is easy to divide by the divisor.

How to find it:

- **Look at the first two digits** of the big number. For 478, look at '47'.
- **Ask: What is a number close to 47 that is easy to divide by the divisor?** Use the multiplication facts you know for the divisor.

Let's use 478 ÷ 6 as our example.

We know our 6-times table: 6 x 7 = 42, 6 x 8 = 48.

48 is very close to 47! So, 480 is a fantastic friendly neighbor for 478.

Step 2: Rewrite the Problem with the Friendly Number

Simply replace the tricky number with the easy one.

Original: 478 ÷ 6

Estimation: 480 ÷ 6

Step 3: Solve the Easier Problem

Now, do the simple division in your head.

480 ÷ 6 = 80

(Think: "How many 6s are in 48? 8. So, how many 6s are in 480? 80.")

Step 4: State the Estimate

You have your answer!

"So, 478 ÷ 6 is **about 80**."

Let's Practice with a Few Examples

Example 1: 319 ÷ 4

1. **Find the Friendly Neighbor:** Look at '31'. What's easy to divide by 4? We know 4 x 7 = 28 and 4 x 8 = 32. 32 is very close to 31. So, let's use **320**.
2. **Rewrite:** 320 ÷ 4
3. **Solve:** 320 ÷ 4 = 80
4. **State the Estimate:** 319 ÷ 4 is **about 80**.

Example 2: 742 ÷ 8

1. **Find the Friendly Neighbor:** Look at '74'. What's easy to divide by 8? We know 8 x 9 = 72. 72 is close to 74. So, let's use **720**.
2. **Rewrite:** 720 ÷ 8
3. **Solve:** 720 ÷ 8 = 90
4. **State the Estimate:** 742 ÷ 8 is **about 90**.

Example 3: 193 ÷ 3

1. **Find the Friendly Neighbor:** Look at '19'. What's easy to divide by 3? We know 3 x 6 = 18 and 3 x 7 = 21. Both are close! You can choose either. Let's pick **180** (it's a multiple of 10).
2. **Rewrite:** 180 ÷ 3
3. **Solve:** 180 ÷ 3 = 60
4. **State the Estimate:** 193 ÷ 3 is **about 60**.
   (If you had chosen 210, your estimate would be 70. Both are good estimates! The point is to be close.)

Estimate the answer when dividing numbers up to 1000 by 2-digit divisors.

The Goal

Find a *close* answer, not the exact one, by using numbers that are easy to work with mentally.

The Method in 2 Steps

1. **Round the divisor** (the 2-digit number) to the nearest tens.
2. **Adjust the dividend** (the number up to 1000) to a number that is a close, easy multiple of your new rounded divisor.

Examples

Example 1: 478 ÷ 23

1. Round 23 to **20**.
2. What's a number close to 478 that's easy to divide by 20? **480** is perfect.
3. Solve: 480 ÷ 20 = **24**.
4. **Estimate: About 24**

Example 2: 632 ÷ 27

1. Round 27 to **30**.
2. What's a number close to 632 that's easy to divide by 30? **630** is perfect.
3. Solve: 630 ÷ 30 = **21**.
4. **Estimate: About 21**

Example 3: 805 ÷ 38

1. Round 38 to **40**.
2. What's a number close to 805 that's easy to divide by 40? **800** is perfect.
3. Solve: 800 ÷ 40 = **20**.
4. **Estimate: About 20**

Example 4: 291 ÷ 14 (Shows you have options)

- **Method A:**
    1. Round 14 to **10**.
    2. Use **290**.
    3. Solve: 290 ÷ 10 = **29**.

Question 1 page 140 of the learner's book.

Let's estimate these using the **Compatible Numbers** method (rounding the divisor to the nearest 10 and adjusting the dividend to an easy multiple).

1. 598 ÷ 21

1. Round divisor 21 → **20**
2. Find a number close to 598 that's easy to divide by 20: **600**
3. New problem: 600 ÷ 20 = 30
   Estimate: About 30

2. 914 ÷ 34

1. Round divisor 34 → **30**
2. Find a number close to 914 that's easy to divide by 30: **900**
3. New problem: 900 ÷ 30 = 30
   Estimate: About 30

3. 564 ÷ 14

1. Round divisor 14 → **10**
2. Find a number close to 564 that's easy to divide by 10: **560**
3. New problem: 560 ÷ 10 = 56
   Estimate: About 56
   (Alternatively, round 14 → 15, then 570 ÷ 15 = 38 — but 56 is fine for a quick estimate.)

4. 342 ÷ 13

1. Round divisor 13 → **10**
2. Find a number close to 342 that's easy to divide by 10: **340**
3. New problem: 340 ÷ 10 = 34
   Estimate: About 34

Part two: **Division Answers as Mixed Numbers**

Sometimes, division problems don't come out perfectly. We have a **remainder** left over. A mixed number is a way to show that leftover amount as a fraction.

Let's solve 7 ÷ 3.

Step 1: Divide

- How many times does 3 fit into 7? It fits **2** times.
- So, the **whole number** part of our answer is **2**.

Step 2: Find the Remainder

- 2 x 3 = 6. We have 7 - 6 = 1 left over.
- This **1** is our **remainder**.

Step 3: Write the Fraction

- The remainder **(1)** becomes the **numerator** (the top number of the fraction).
- The divisor **(3)** becomes the **denominator** (the bottom number of the fraction).
- So, the fraction is $\frac{1}{3}$

Step 4: Put It Together

- The whole number **+** the fraction = the mixed number.

Final Answer: 7 ÷ 3 = **2 ⅓**

Part three: **The Factors Method**

This method breaks a tricky divisor into two smaller, easier-to-divide numbers.

The Main Idea:
If the divisor (the number you are dividing by) can be split into factors, you can divide by those factors one after the other. It's like taking two smaller steps instead of one big jump.

Example: Let's solve 192 ÷ 32

1. **Break the Divisor into Factors:**
    - Look at the divisor, **32**. What are its factors?
    - We can break **32** into **8 x 4**.
2. **Divide by the First Factor:**
    - Instead of dividing by 32 right away, first divide **192** by **8**.
    - 192 ÷ 8 = 24
3. **Divide that Answer by the Second Factor:**
    - Now, take your answer (24) and divide it by the second factor, **4**.
    - 24 ÷ 4 = 6

Final Answer: 192 ÷ 32 = **6**

Why it works: Dividing by 8 and then by 4 is the same as dividing by (8 x 4), which is 32. It makes the problem much easier because you are working with simple division facts.

Example 2: Let's solve 180 ÷ 12

1. Break the Divisor into Factors:
    - Look at the divisor, 12. What are its factors?
    - We can break 12 into 6 x 2.
2. Divide by the First Factor:
    - Instead of dividing by 12, first divide 180 by 6.
    - 180 ÷ 6 = 30
3. Divide that Answer by the Second Factor:
    - Now, take your answer (30) and divide it by the second factor, 2.
    - 30 ÷ 2 = 15

Final Answer: 180 ÷ 12 = 15

Let's check: 15 x 12 = 180. It's correct