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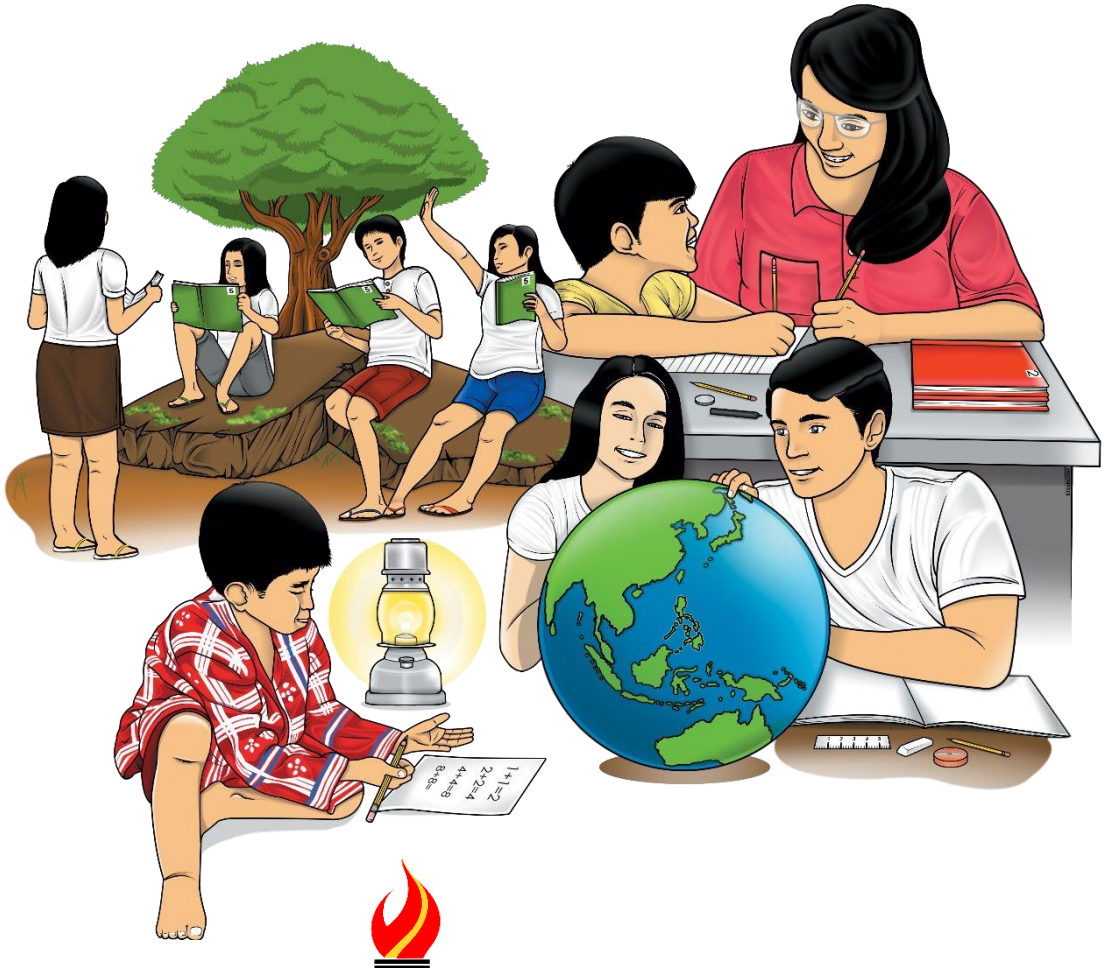
Mathematics

Quarter 2 – Module 12:
Estimating the Quotient



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Mathematics

Quarter 2 – Module 12:
Estimating the Quotient

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by- step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you master the competency in estimating the quotient of 2-to-3 digit numbers by 1-to-2-digit numbers. The scopeof this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

After going through this module, you are expected to:

- estimate the quotient of 2- to 3-digit numbers by 1- to 2-digit numbers.

Enjoy your journey. Good luck!

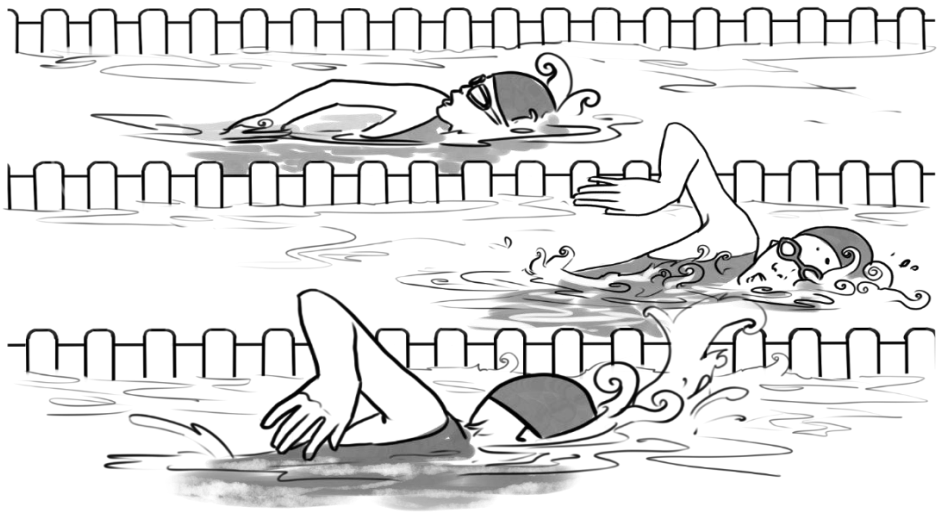
What I Know

Estimate each quotient.

	Estimated quotient
1. 44 ÷ 7	
2. 322 ÷ 12	
3. 78 ÷20	
4. 124 ÷32	
5. 555 ÷ 24	

Lesson Estimates the Quotient of2- to 3-Digit numbers by 1- to 2- Digit Numbers

Read the problem below.



A group of 116 boys have signed up for summer swimming lessons. The boys will be divided into 12 groups. About how manywill be in each group?

To answer the question in the problem, let us first review your previous lessons by answering the series of Activities in this module.

What's In

Activity 1

A. Round the following numbers to the nearest hundreds.1.
658
2. 429
3. 713
4. 947
5. 865

B. Solve for the quotient of the following numbers.1.
80 ÷10
2. 550 ÷ 10
3. 900 ÷ 100
4. 660 ÷ 10
5. 40 ÷ 10

What's New

We will now learn how to estimate an answer when dividing largenumbers.

Let us answer the previous problem.

The division operation from the problem is *116 ÷ 12.*

Making an estimate can help us think about a reasonable answer to a problem. ***Round both the dividend and the divisor to the highest place value. Then, divide to get the answer.*** Compare your estimate to the exact answer to determine if the estimated answer is reasonable.

116 ÷ 12 *Round off 116 to the nearest hundreds*

↓ ↓ *Round off 12 to the nearest tens*

100 ÷ 10 = 10 So, there will be about 10 members in each team.

Another example:

Arman arranged the books in the shelves. There are 823 books that are needed to be arranged in the 24 bookshelves. About how many books in each shelf should Arman put?

823 ÷ 24

↓ ↓

800 ÷ 20 = 40

So, there are about 40 books in each shelf.

In some cases, rounding off the dividend and divisor doesnot work if you cannot divide it evenly. It is much better to useestimating quotients using compatible numbers.

Compatible numbers are numbers that are easy to compute mentally.

Example 1:

Estimate 286 ÷ 7

In rounding, you will have 300 ÷ 7 which you cannot divide evenly. Therefore, rounding the dividend and divisor will not work on this equation.

Instead you are going to use the other way of estimating quotient which is dividing the given using *compatible numbers*.

286 ÷ 7

Change to 0

280 ÷ 7 = 40

Compatible Numbers are the multiples of 7:

7, 14, 21, *28* , 35,...

Step1: Look at the first couple of numbers of the dividend and thefirst number in the divisor.

Step 2: Find the closest basic division fact or compatible numberof these numbers.

Step 3: Use the basic fact to change the dividend and divisor tocompatible numbers, and divide.

Example 2:

Estimate 342 ÷ 5

Change the remaining digit to 0.

350 ÷ 5 = 70

Compatible numbers are the multiples of 5:

5, 10, 15, 20, 25, 30, *35*, 40

***34 is in between 30 and 35. It is 4 units away from 30 and 1unit away from 35. Therefore, it is closest to 35.

Example 3:

Estimate 331 ÷ 54

Change the remaining digit to 0.

350 ÷ 50 = 7

Compatible numbers are the multiples of 5:

5, 10, 15, 20, 25, 30, *35*, 40

***33 is in between 30 and 35. It is 3 units away from 30 and 2units away from 35. Therefore, it is closest to 35.

Activity 2

A. Use compatible numbers to estimate quotients.1.

124 ÷ 3

120 ÷ 3 = 40

2. 75 ÷ 10

___ ÷ 10 = _____

3. 37 ÷ 5

___ ÷ 5 = _____

4. 87 ÷ 9

___ ÷ 9 = _____

5. 119 ÷ 2

_____ ÷ 2 = _____

B. Circle the correct answer.

1. Rhea needs to estimate 67 ÷ 7. Which expression shows thebest choice of compatible numbers for Rhea to use?

   a. 67 ÷ 8 b. 70 ÷ 7 c. 70 ÷ 10

2. Jenny needs to estimate 122 ÷ 3. Which expression showsthe best choice of numbers for Jenny to use?

   a. 120 ÷ 3 b. 120 ÷ 5 c. 122 ÷ 4

What is It

In estimating quotients, you need to follow these steps:

- First find compatible numbers
- Next, use fact family
- Choose the answer which is closest to the actual answer.

We can estimate the quotient by using compatible numbers. To find compatible numbers, look at the first two numbers in the dividend (the larger number in your division problem).

Example: Estimate 528 ÷ 7.

You want to find two numbers that are compatible with the number 7. A compatible number is CLOSE to 52, one bigger and one is smaller than 52. It is also a multiple of 7.

Use division facts for 7 and patterns to find nearby compatible numbers for 528. The compatible numbers are multiples of 7, which make them easy to work with.

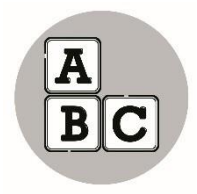
490 ÷ 7 = 70, 49 is smaller than 52

560 ÷ 7 = 80, 56 is larger than 52

7
14
21
28
35
42
49
56
63
70

***The answer is between 70 and 80. But the closest estimate is **70** since 49 is just 3 units away from 52 while 56 is 4 units away.

Answer: 490 ÷ 7 = **70**.



What's More

More examples:

Estimate the following quotient

Example 1

23 ÷ 12 =
↓ ↓
20 ÷ 10 = 2

Example 2

39 ÷ 8
↓ ↓
40 ÷ 10 = 4

***Try rounding off the numbers if it can be divided evenly, if not, use division of compatible numbers.

Example 3

427 ÷ 24
↓ ↓
400 ÷ 20 = 20

Example 4

562 ÷ 8
↓ ↓
600 ÷ 10 = 60

Activity 3

A. Write the number nearest to 38 that can be compatible if we are going to estimate with:

1. 4 _____

2. 6 _____

3. 8 _____

4. 5 _____

5. 9 _____

B. Estimate the quotients.1.

19 ÷ 6

2. 35 ÷ 4

3. 68 ÷ 8

4. 93 ÷ 5

5. 119 ÷ 23

Activity 4

Fill in the table.

Given	Round off the divisor	Think of compatible numbers	Estimate
Example: 236 ÷14	10	240 ÷ 10	24
1. 184 ÷11			
2. 338 ÷ 48			
3. 508 ÷ 21			
4. 677 ÷ 56			
5. 889 ÷ 78			

What I Have Learned

How to estimate a quotient?

To estimate a quotient, round the divisors. If it can be divided evenly then you can estimate it. But if it cannot be divided evenly think of the compatible numbers to divide and get estimated quotient.

What I Can Do

Activity 5

Solve the problems.

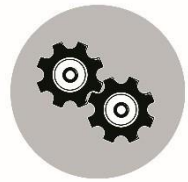
1. There are 65 pupils visiting a museum. If they are divided into eight groups, about how many pupils are in each group?

2. Your class is studying the properties of matter. The 47 pupils in your class will be divided into groups. Each group will research one of the 3 properties of matter. About how many pupils will be in each group?
3. There are 732 Grade I pupils in Baso Elementary School. If pupils will be distributed into 13 sections about how many pupils will be in each section?

Assessment

Estimate each quotient.

	Estimate
1. 64 ÷ 7	
2. 83÷ 9	
3. 130 ÷ 8	
4. 396 ÷ 4	
5. 850 ÷ 9	
6. 244 ÷ 37	
7. 300 ÷ 59	
8. 397 ÷ 4	
9. 230 ÷ 73	
10. 545 ÷ 50	



Additional Activities

Activity 6

Every day at the baseball field, a different number of baseball players show up. Estimate how many teams can be formed each day. (Hint: There are 9 players in a baseball team)

Read and complete the table.

Day	Number of Players	Number of Teams
1. Monday	73	
2. Tuesday	37	
3. Wednesday	82	
4. Thursday	55	
5. Friday	46	

Answer Key

What I Know

	Estimated quotient
1. 44 ÷ 7	6
2. 322 ÷ 12	30
3. 78 ÷ 20	4
4. 124 ÷ 32	4
5. 555 ÷ 24	30

Assessment

	Estimated quotient
1. 64 ÷ 7	9
2. 83÷ 9	9
3. 130 ÷ 8	15
4. 396 ÷ 4	100
5. 850 ÷ 9	90
6. 244 ÷ 37	6
7. 300 ÷ 59	5
8. 397 ÷ 4	100
9. 230 ÷ 73	3
10. 545 ÷ 50	11

What's In

Activity 1

A.

1. 700
2. 400
3. 700
4. 900
5.900

B.

1. 8
2. 55
3. 9
4. 66
5. 4

What's New

Activity 2

A.

1. 120 ÷ 3 = 40
2. 80 ÷ 10 = 8 or 70 ÷ 10 = 7
3. 35 ÷ 5 = 7
4. 81 ÷ 9 = 9
5. 120 ÷ 2 = 60

B.

1. b
2. a

What's More

Activity 3

A.

1. 36
2. 36
3. 40
4. 40
5. 36

B.

1. 18 ÷ 6 = 3
2. 36 ÷ 4 = 9
3. 64 ÷ 8 = 8
4. 95 ÷ 5 = 19
5. 120 ÷ 20 = 6

What I Can Do

Activity 4

1.184 ÷ 11	10	180 ÷ 10	18
2. 338 ÷ 48	50	350 ÷ 50	7
3. 508 ÷ 21	20	500 ÷ 20	25
4. 677 ÷ 56	0	660 ÷ 60	11
5. 889 ÷ 78	80	880 ÷ 80	11

Additional Activities

Activity 5

1. 64 ÷ 8 = 8, about 8 pupils
2. 48 ÷ 3 = 16, 6 in each group
3. 700 ÷ 10 = 70, about 70 pupils

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