

4

Mathematics

Learner's Material

Unit 1

This book was collaboratively developed and reviewed by educators from public and private schools, colleges, and/or universities. We encourage teachers and other education stakeholders to email their feedback, comments, and recommendations to the Department of Education at action@deped.gov.ph.

We value your feedback and recommendations.

**Department of Education
Republic of the Philippines**

Mathematics – Grade 4
Learner's Material
First Edition 2015

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Published by the Department of Education
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Printed In the Philippines by LEXICON PRESS, INC.

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Dear Pupil,

Would you like to become "GREAT" someday?

It is our dream to see you grow with a thinking mind, problem solving skills, and creative decision-making skills in dealing with your daily life activities. With this dream, we have developed this Grade 4 Learning Materials in Mathematics.

We believe that you are one of the children in today's world capable of learning creatively. For this reason, we have designed meaningful and varied activities that will develop your knowledge and skills for the 21st century in this book. They are based on the standards and competencies expected of you in the K to 12 Basic Education Program. We are sure that you will love working on them.

We hope that with the K to 12 curriculum, we will be able to produce creative thinkers, problem solvers, and functional citizens of the country.

Dear Parents,

This book, "Learner's Material for Grade 4 Mathematics," was specially designed for your children. The activities contained in this book will provide your children with the opportunities to develop the knowledge and skills expected of them in mathematics of the K to 12 curriculum for Grade 4.

We believe that you want your children to be successful someday. With this, we are hoping that you will find time to assist your children in learning the concepts and skills that they need to master so they will be able to use them when they learn higher math. By helping them with their homework, projects, and other requirements for the subject, they will realize that their education and future are being valued. Thus, make them feel that they are important to their family, community, and to nation building.

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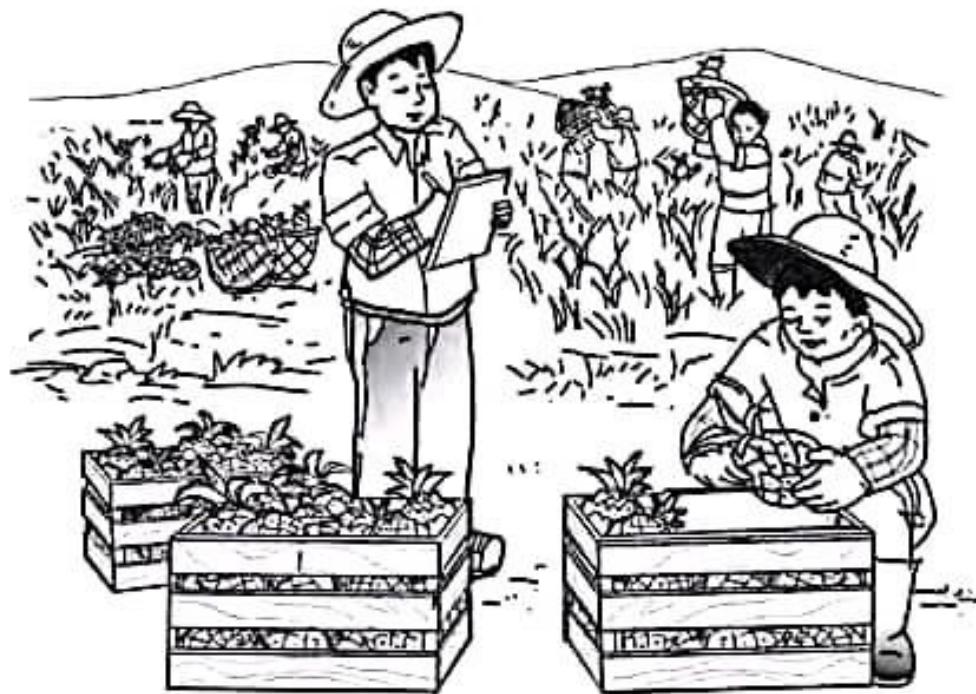
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CHAPTER 1

WHOLE NUMBERS



This chapter is an extension of the lessons on whole numbers you have learned in the previous grades. It provides you with opportunities to visualize numbers from 10 001 to 100 000. It also allows you to determine the place value and value of a digit in numbers up to 100 000, which is necessary to be able to read and write numbers in both symbols and words. Rounding numbers which will aid you in developing your skill in estimation is also included. This chapter also lets you extend your knowledge and skills in comparing and ordering whole numbers, skills which you have learned in the previous grades.

Lesson 1: Visualizing Numbers up to 100 000 with Emphasis on Numbers 10 001 to 50 000

Explore and Discover!

A group of farmers donated a total of 12 364 kilograms of rice to the typhoon victims.

Can you imagine how big the number 12 364 is?



One way you can imagine is to think of discs to represent the number as shown below.

A single large circle containing the number 10 000.	Two medium-sized circles, each containing the number 1000.	Three small circles, each containing the number 100.	Six very small circles, each containing the number 10.	Four tiny circles, each containing the number 1.
One 10 000	Two 1000s	Three 100s	Six 10s	Four 1s
10 000	2 000	300	60	4
12 364				



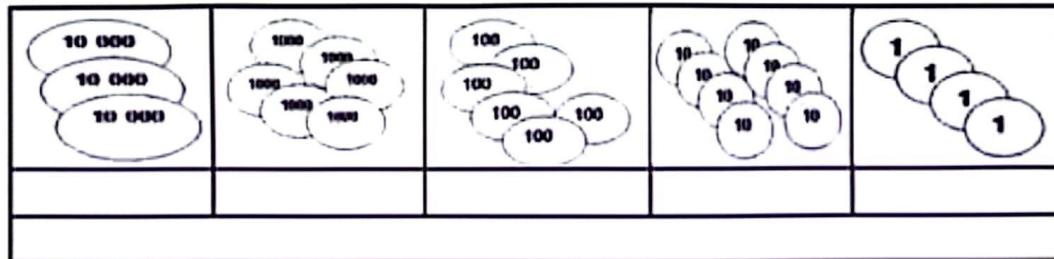
Get Moving!

What number is represented by these number discs? Write your answer in your notebook.

1.

Three large circles, each labeled '1000'.	Two medium-sized circles, each labeled '1000'.	Four small circles, each labeled '100'.	Two very small circles, each labeled '10'.	Four tiny circles, each labeled '1'.

2.



Keep Moving!

Use number discs to show the following numbers.

- | | | | |
|-----------|-----------|-----------|-----------|
| 1) 10 450 | 2) 11 468 | 3) 24 682 | 4) 31 597 |
| 5) 46 741 | 6) 28 520 | 7) 50 000 | 8) 29 569 |

Draw number discs to show the following numbers. Do this in your notebook.

- | | | | |
|------------|------------|------------|------------|
| 9) 18 902 | 10) 27 639 | 11) 48 999 | 12) 31 548 |
| 13) 26 592 | 14) 36 989 | 15) 19 679 | 16) 49 999 |



Apply Your Skills!

Read the following items. Then, write your answer to each item in your notebook.

1. A cargo ship is loaded with 35 650 kilograms of rice. Draw number discs to show the given number.
2. There were 24 893 children and adults who watched the football game. Draw number discs to show the given number.
3. Mary used 4 pieces of 10 000s discs, 8 pieces of 1000s discs, 7 pieces of 100s discs, and 6 pieces of 10s discs to represent a number. What number is shown by her number discs?
4. How will you show the number 40 090 using number discs?

Lesson 2: Visualizing Numbers up to 100 000 with Emphasis on Numbers 50 001-100 000

Explore and Discover!

A total of 54 675 teachers and students joined the "Save Mother Earth" campaign.

How will you show 54 675?



You can use number discs to show 54 675.

Five 10 000s	Four 1000s	Six 100s	Seven 10s	Five 1s
50 000	4000	600	70	5
54 675				



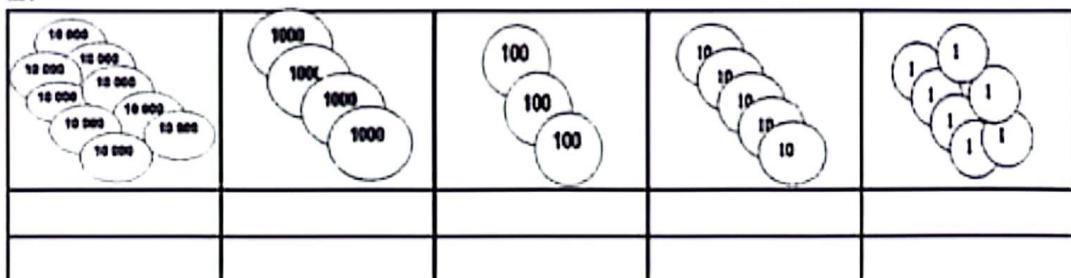
Get Moving!

What number is represented by these number discs? Write your answers in your notebook.

1.

Five 10 000s	Four 1000s	Six 100s	Seven 10s	Five 1s

2.



Keep Moving!

Draw number discs to show the following numbers. Draw your answers in your notebook.

- 1) 50 250 2) 64 986 3) 72 134 4) 80 900 5) 90 890
6) 58 982 7) 77 888 8) 89 975 9) 68 690 10) 99 999



Apply Your Skills!

Write your answer to each item in your notebook.

1. There are 68 950 tree seedlings distributed to the barangays by the Department of Environment and Natural Resources. Draw number discs to show the given number.
2. Mr. Ong bought some appliances worth Php85,675. Represent this amount using number discs.

3. Which number is 10 000 smaller than 89 990?

99 890 79 990 79 890 69 990

4. Which number is 10 000 greater than 75 650?

85 700 85 650 95 650 65 650

Lesson 3: Place Value and Value of a Digit in Numbers up to 100 000

Explore and Discover!

In 2013, Barangay San Sebastian harvested 64 789 kilograms of mangoes.

What does each digit in 64 789 mean?
Study how 64 789 is written in the place value chart.



THOUSANDS			UNITS			→ Periods
Hundred	Ten	One	Hundreds	Tens	Ones	
	6	4	7	8	9	→ Place Value → Digits

The digit 9 is in the ones place. Its value is 9.
The digit 8 is in the tens place. Its value is 80.
The digit 7 is in the hundreds place. Its value is 700.
The digit 4 is in the one thousands place. Its value is 4000.
The digit 6 is in the ten thousands place. Its value is 60 000.

The value of a digit is determined by multiplying that digit by its place value.



Get Moving!

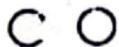
- A. In the number 91 736, what is the place value of each digit below?
Write your answers in your notebook.

9 - _____ 1 - _____ 7 - _____ 3 - _____ 6 - _____

B. Write the missing numbers in your notebook.

- 1) 74 789 means $70\ 000 + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
- 2) 34 567 means $\underline{\hspace{2cm}} + 4000 + 500 + 60 + 7$
- 3) 45 897 means $40\ 000 + \underline{\hspace{2cm}} + 800 + 90 + 7$
- 4) 45 789 means $40\ 000 + \underline{\hspace{2cm}} + 700 + 80 + 9$
- 5) 68 413 means $\underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

 **Keep Moving!**



A. Write the number represented by each of the following on your paper.

- 1) $50\ 000 + 2000 + 400 + 70 + 2 = \underline{\hspace{2cm}}$
- 2) $90\ 000 + 1000 + 700 + 0 = \underline{\hspace{2cm}}$
- 3) $80\ 000 + 500 + 20 + 4 = \underline{\hspace{2cm}}$
- 4) $20\ 000 + 3000 + 400 + 10 + 3 = \underline{\hspace{2cm}}$
- 5) $30\ 000 + 4000 + 00 + 40 + 3 = \underline{\hspace{2cm}}$

B. In the number 45 678, write in your notebook the digit in the given place value.

1. Tens place
2. Thousands place
3. Hundreds place
4. Ten thousands place
5. Ones place

C. Write the value of the underlined digit.

- 1) 78 426 $\underline{\hspace{2cm}}$
- 2) 49 673 $\underline{\hspace{2cm}}$
- 3) 86 594 $\underline{\hspace{2cm}}$
- 4) 97 428 $\underline{\hspace{2cm}}$
- 5) 100 000 $\underline{\hspace{2cm}}$



Apply Your Skills!

A. Use the digits 4, 5, 6, 7, and 8 only once for problems 1 to 4.

1. Write the greatest number possible with 8 in the ten thousands place.
2. Write the least number possible with 5 in the thousands place.
3. Write the greatest number possible with 7 in the ten thousands place.
4. Write the least number possible with 6 in the thousands place.

B. In which number does 7 have the greater value?

- | | |
|----------------------|----------------------|
| 1) 72 509 or 87 999 | 6) 67 495 or 43 756 |
| 2) 56 759 or 75 813 | 7) 75 345 or 97 345 |
| 3) 45 271 or 345 723 | 8) 23 578 or 43 745 |
| 4) 87 009 or 97 436 | 9) 67 234 or 76 345 |
| 5) 98 790 or 73 418 | 10) 89 734 or 16 879 |

Lesson 4: Reading and Writing Numbers up to 100 000 in Symbols and in Words

Explore and Discover!

The Bureau of Forest Development donated three seedlings to each pupil in Region 2. The total number of seedlings donated was 64 821.



How do you read and write the number 64 821 in words and in symbol?

The number 64 821 is read as "*sixty-four thousand eight hundred twenty-one.*" In symbol, it is 64 821.



Get Moving!

A. Write the missing number between the given numbers. Then, read these numbers.

- | | | |
|-----------|-------|--------|
| 1) 45 456 | _____ | 45 458 |
| 2) 78 890 | _____ | 78 892 |
| 3) 67 123 | _____ | 67 125 |
| 4) 89 542 | _____ | 89 544 |
| 5) 56 899 | _____ | 56 901 |

B. Write the following numbers in words.

- | | |
|-----------|-----------|
| 1) 18 980 | 4) 67 924 |
| 2) 24 650 | 5) 79 346 |
| 3) 56 087 | 6) 90 542 |

- C. Rewrite the numbers correctly by putting a space in the correct places in column A. In column B write the number in words.

Number	Column A	Column B
23500		
20078		
56480		
75369		
89146		
87000		

  **Keep Moving!**
C O Write the numbers in symbols.

1. Fifty-five thousand sixteen
2. Sixty-seven thousand two hundred three
3. Eighty-four thousand nine
4. Fifty-seven thousand two
5. Forty-one thousand seventy

Write the following numbers in words.

- 1) 79 456 _____
- 2) 99 101 _____
- 3) 45 900 _____
- 4) 78 008 _____
- 5) 80 009 _____



Apply Your Skills!

A. 1. What is the largest 5-digit number having different digits?

Write it in symbols and in words. _____

2. What is the number next to 76 368? Write it in symbol and in words _____

B. Complete the table by writing the missing symbols and words.

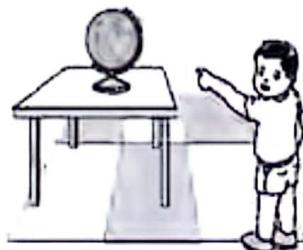
SYMBOL	WORDS
36 008	
	Seventy-six thousand three
	Forty-five thousand twenty-one
78 703	
68 234	
	Fifty-seven thousand fifty
	Thirty thousand two hundred thirty-eight
70 001	
	Eighty-eight thousand ten
68 234	
100 000	
	Sixty-seven thousand two hundred three
	Ninety-eight thousand
23 008	
89 234	
	Eleven thousand six hundred fifty-nine
	Seventy-seven thousand forty-nine
91 765	
35 127	

Lesson 5: Rounding Numbers to the Nearest Thousands and Ten Thousands

Explore and Discover!

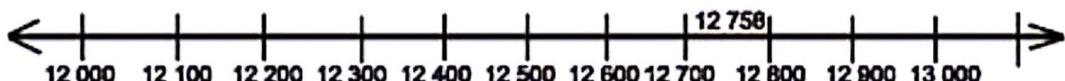
The diameter of the Earth at the equator is about 12 756 kilometers.

About how many thousand kilometers is the diameter of the Earth at the equator?



You can find the answer by rounding 12 756 to the nearest thousands.

Study the number line below.



To which number is 12 756 closer, 12 000 or 13 000?

Since 12 756 is closer to 13 000, you can say that 12 756 becomes 13 000 when rounded to the nearest thousands. Hence, the diameter of the Earth at the equator is about 13 000 kilometers.

Study these examples.

Number	Rounded to	
	Thousands	Ten Thousands
24 278	24 000	20 000
38 642	39 000	40 000
42 752	43 000	40 000
95 245	95 000	100 000
78 500	79 000	80 000
50 000	50 000	50 000

In rounding numbers, identify the rounding place first. If the digit to the right of the rounding place is below 5, round the number down by changing the rest of the digits to the right into zero. If the digit to the right of the rounding place is 5 or greater, round the number up by changing the rest of the digits to the right into zero and adding 1 to the digit in the rounding place.



Get Moving!

Round each number to the place value of the underlined digit.

- 1) 67 436 _____
- 2) 34 673 _____
- 3) 87 567 _____
- 4) 82 562 _____
- 5) 34 982 _____

Complete the table.

Number	Round to the Nearest	
	Thousands	Ten Thousands
1) 25 734		
2) 54 234		
3) 4567		
4) 67 456		
5) 95 346		
6) 46 789		
7) 98 654		
8) 34 675		
9) 97 456		
10) 69 256		

2. A number rounds off to 4000. The digit in the hundreds place is twice the digit in the tens place. The sum of the digits is 12. The number uses only two different digits. Find the number.

B. Complete the table.

Greatest Number	Rounded Number	Least Number
	30 000	
	45 000	
	50 000	
	70 000	
	8000	

C. Read the problem and complete the table below.

Mrs. Go bought the following items for her new house in Isabela:

Php48,645 Php8,634 Php24,567 Php27,345 Php6,452
Television Cabinet Refrigerator Sala Set Dining Set

Copy the price of each item. Then, round each to the nearest thousands and ten thousands.

Item	Price	Thousands	Ten Thousands
Television			
Cabinet			
Refrigerator			
Sala Set			
Dining Set			



Keep Moving!

Encircle the numbers that can be rounded to the given number.

1) 78 000

78 124	77 473	77 678	78 439	77 342
--------	--------	--------	--------	--------

2) 20 000

19 345	21 234	16 732	24 782	14 375
--------	--------	--------	--------	--------

3) 100 000

98 324	94 967	96 972	93 896	94 567
--------	--------	--------	--------	--------

4) 92 000

92 765	91 876	92 657	92 314	91 786
--------	--------	--------	--------	--------

5) 65 000

64 534	65 871	64 832	64 835	65 356
--------	--------	--------	--------	--------

Round to the highest place value.

- | | |
|-------------------|--------------------|
| 1) 4567 - _____ | 6) 45 123 - _____ |
| 2) 67 452 - _____ | 7) 95 678 - _____ |
| 3) 98 456 - _____ | 8) 23 409 - _____ |
| 4) 36 234 - _____ | 9) 82 456 - _____ |
| 5) 36 784 - _____ | 10) 98 123 - _____ |



Apply Your Skills!

A. Read and write the answers in your notebook.

1. What number, whose sum of its digits is 26, becomes 6000 when rounded to the nearest thousands? List 3 possible answers.

A. Write the column with the correct comparison.

A	B	C
100 000 < 90 000	76 000 < 80 000	90 100 > 91 000
90 785 > 78 785	84 359 < 74 359	71 450 < 81 450
76 500 > 79 500	95 000 < 98 000	80 000 < 79 000
90 000 > 92 000	92 500 < 95 500	81 000 > 89 000
83 000 < 75 000	87 400 > 84 400	82 000 < 79 500
78 600 < 88 600	79 500 > 80 000	79 200 > 71 900
76 556 > 85 556	88 100 > 86 100	79 400 > 81 000

B. Which number is greater? Write your answers in your notebook.

- | | |
|---------------------|---------------------|
| 1) 23 456 32 345 | 5) 34 567 89 456 |
| 2) 78 675 78 765 | 6) 87 345 87 099 |
| 3) 45 897 45 987 | 7) 99 781 99 824 |
| 4) 87 324 78 456 | |

C. Which number is less? Write your answers in your notebook.

- | | |
|---------------------|---------------------|
| 1) 67 890 67 089 | 5) 87 672 90 009 |
| 2) 21 456 31 567 | 6) 35 609 35 435 |
| 3) 56 789 56 567 | 7) 89 123 89 765 |
| 4) 98 456 98 654 | 8) 59 234 68 213 |

Keep Moving!

C O

Write C if the number sentence is correct and W if it is wrong.

- 1) 5 thousand, 4 hundred two = 5402
- 2) $11\ 389 > 11\ 000 + 300 + 90 + 8$
- 3) $9749 = 9000 + 700 + 90 + 4$
- 4) $24\ 567 < 24\ 567$
- 5) 78 thousand, one = 78 001

Lesson 6: Comparing Numbers up to 100 000 Using Relational Symbols

Explore and Discover!

Mang Mario is a farmer. Last year, he harvested 13 656 kilograms of *palay*. This year, he harvested 13 465 kilograms of *palay*.

Which year did he harvest more?



How many kilograms of *palay* did Mang Mario harvest last year? This year? Which year did he harvest more? How will you compare the given numbers?

When comparing two digit numbers, you can follow these steps:

1. Align the digits with the same place value.
2. Starting from the left, compare the digits in each place value.
3. The first pair of digits that are of different values will determine which number is greater or less.

Step 1	Step 2	Step 3
Compare the digits in the ten thousands place. $\begin{array}{r} 13\ 656 \\ 13\ 465 \end{array}$ same digits in the ten thousands place	Compare the digits in the thousands place. $\begin{array}{r} 13\ 656 \\ 13\ 465 \end{array}$ same digits in the thousands place	Compare the digits in the hundreds place. $\begin{array}{r} 13\ 656 \\ 13\ 465 \end{array}$ Since $6 > 4$, $13\ 656 > 13\ 465$

Therefore, $13\ 656 > 13\ 465$.

So, Mang Mario harvested more *palay* last year than this year.

- 6) $17\ 000 + 800 + 50 + 9 = 17\ 859$
- 7) $23\ 999 > 32\ 999$
- 8) $30\ 100 < 30\ 001$
- 9) $48\ 675 = 47\ 675 + 1\ 000$
- 10) $56\ 678 = 56\ 678$



Apply Your Skills!

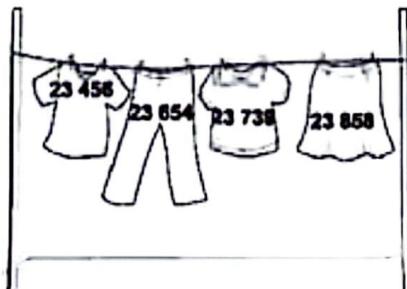
Solve and check. It is possible that your answer is not a number.

1. There were 30 123 people at the PBA Championship Games at the Araneta Coliseum on Friday and 32 450 on Sunday. On which day were there more people?
2. At a certain game show, contestant A won Php40,000 while contestant B won Php50,000. Who won the lesser amount of money?
3. Write all the 5-digit numbers that you can form using the digits 1, 2, 3, 4, and 5 only once. Which of these numbers are greater than 50 000?

Lesson 7: Ordering Numbers up to 100 000

Explore and Discover!

Look at the numbers in the clothesline. How are they arranged, in increasing or decreasing order?



How do we arrange numbers in increasing order? How about in decreasing order?

To arrange numbers in increasing or decreasing order, first pick any two numbers and compare them starting from left to right. Find out which one is greater or less, then put them in correct order. Then, pick another number and compare it with the one of the first two numbers you picked. Then, put them in order accordingly. Do the same with the other numbers.



Get Moving!

Arrange the following in increasing order.

23 456	23 145	23 523	23 034	_____	_____	_____	_____
99 000	93 000	100 000	95 000	_____	_____	_____	_____
65 345	65 978	65 234	65 785	_____	_____	_____	_____
34 001	34 100	34 010	34 000	_____	_____	_____	_____
58 345	58 734	58 293	58 456	_____	_____	_____	_____

Arrange in decreasing order.

98 000	95 000	100 000	99 000	_____
32 000	39 000	34 000	35 000	_____
2345	2373	2323	2357	_____
51 023	51 203	51 320	51 401	_____
45 089	45 723	45 204	45 652	_____



Keep Moving!

Below are the number of registered voters in the five barangays of Alicia, Isabela.

Barangay Paddad	=	17 356
Barangay Sto. Tomas	=	13 008
Barangay Rizal	=	19 034
Barangay Sta. Cruz	=	11 345
Barangay Calaocan	=	15 456

Which barangay has the most number of voters? _____

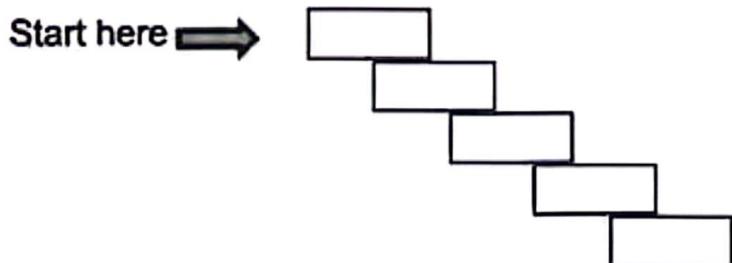
Which barangay has the least number of voters? _____

Arrange the number of registered voters in decreasing order.

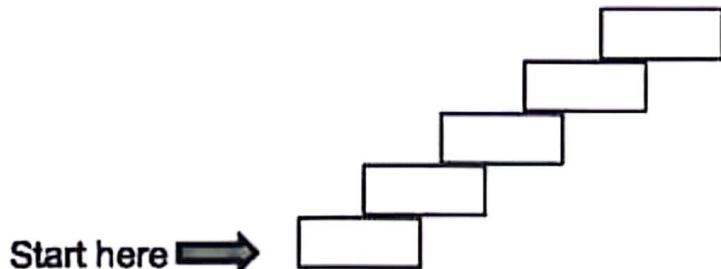


Apply Your Skills!

- A. Write the following numbers in the ladder box (67 567; 67 123; 67 745; 67 345; 67 452). Start with the number with the greatest value.



- B. Write the following numbers in the ladder box (89 234; 82 345; 87 543; 84 945; 88 654). Start with the number with the least value.



- C. Read and answer the following.

1. A municipality is implementing a tree-planting activity. It has 4678 Narra seedlings, 12 794 Mahogany seedlings, and 14 067 Acacia seedlings. Arrange the number of seedlings in increasing order.
2. A subdivision has some residential lots available for sale. The lots measure 1250 square meters, 2560 square meters, 2400 square meters, and 3480 square meters. Arrange the numbers in decreasing order.
3. Using the digits 1, 7, 9, 4, 0, and 5 once, what is the
 - a. greatest number that can be formed?
 - b. least number that can be formed?

Lesson 8: Multiplying Numbers up to Three Digits by Numbers up to Two Digits without Regrouping

Explore and Discover!

There are 323 bananas in a basket.
How many bananas are there in 32 baskets?

What is asked for in the problem?
What operation are you going to use?
How will you solve the given problem?



To solve the problem, you need to multiply 323 by 32.
The number sentence is $32 \times 323 = n$
Study the solution below using the place value chart.

Step 1: Multiply 3 hundreds, 2 tens, and 3 ones by 2 ones.

Th	H	T	O
	3	2	3
x		3	2
	6	4	6

$\leftarrow 2 \times 323$

Step 2: Multiply 3 hundreds, 2 tens and 3 ones by 3 tens.

Th	H	T	O
	3	2	3
x		3	2
	6	4	6
9	6	9	0

$\leftarrow 30 \times 323$

CHAPTER 2

MULTIPLICATION AND DIVISION OF WHOLE NUMBERS



This chapter provides you with more opportunities to multiply and divide whole numbers which you learned in the previous grades. It also provides you with varied activities on estimating products and quotients, as well as multiplying and dividing whole numbers mentally. This chapter also allows you to apply your problem-solving skills in solving one-step and multi-steps routine and nonroutine problems involving multiplication and division, including addition and subtraction of whole numbers. Aside from applying your skills in solving problems, you will also create your own problems involving multiplication and division of whole numbers including money.

Step 3: Add the partial products.

T Th	T	H	T	O
		3	2	3
+		x	3	2
		6	4	6
	9	6	9	0
	1	0	3	6

↔ Partial Product
↔ Partial Product
↔ Final Product

So, there are 10 336 bananas in 32 baskets.

Study the short method:

$$\begin{array}{r} 323 \\ \times 32 \\ \hline 646 & \leftarrow \text{multiply } 323 \times 2 \\ +969 & \leftarrow \text{multiply } 323 \times 3 \quad \text{Add the partial products} \\ \hline 10\ 336 & \leftarrow \text{Final product} \quad \text{Leave the ones place blank} \end{array}$$



Get Moving!

A. Complete the table.

X	3	33	13
34			
22		726	
32			
133			
213			2 769
323	7 429		
113			1 469
233		7 689	

B. Multiply:

1) 34 2) 422
x 12 x 2

3) 123
x 33

4) 324
x 23

5) 233
x 13



Keep Moving!

A. Match the product in column A with the multiplication sentence in column B. Write the letter of the answer in your notebook.

A

- 1) 9072
- 2) 5082
- 3) 7424
- 4) 4389
- 5) 1608

B

- A. 133×33
- B. 432×21
- C. 134×12
- D. 232×32
- E. 231×22

B. Multiply, then use the code below to answer this riddle.

"I have two hands, but no arms."

1) 322 2) 342 3) 894 4) 144 5) 211 6) 231
x 32 x 22 x 11 x 22 x 33 x 32

7) 214 8) 321 9) 311 10) 2321 11) 2354 12) 222
x 12 x 22 x 23 x 3 x 3 x 24

Code:

A	C	I	K	L	M	O	R	U	Y
7524	7062	10 304	5328	7153	9834	6963	2568	7392	3168

1 2 3 4 5 6 7 8 9 10 11 12

C. Use the poster to compute the cost of each order.



A pair of pants	-----	Php312
Jacket	-----	Php1,232
Polo shirt	-----	Php214
T-shirt	-----	Php132
Cap	-----	Php112

Order Slip		
Item	Quantity	Cost
Polo shirt	23	
T-shirt	33	
Pants	12	
Jacket	11	
Cap	32	

D. You can do better. Get the products.

$$\begin{array}{lllll} 1) & 234 & 2) & 321 & 3) & 434 & 4) & 112 & 5) & 322 \\ & \times 23 & & \times 32 & & \times 22 & & \times 34 & & \times 21 \end{array}$$



Apply Your Skills!

Read and solve:

1. Mr. Cruz has a coconut plantation. There are 323 coconut trees in a row. If there are 32 rows, how many coconut trees are there in all?
2. Mr. Basabica sold 13 boxes of buttons. If each box contained 23 buttons, how many buttons did he sell?

3. Ingrid spends Php800 a week. How much does she spend in five months or 20 weeks?
4. Mario pays Php1,250 a month for his room rental. How much does he pay in 11 months?
5. Mrs. Guillermo buys 22 kilograms of chicken for the 17th birthday party of her daughter. If a kilogram of chicken costs Php134, how much does Mrs. Guillermo pay for the chicken?

Lesson 9: Multiplying Numbers up to Three Digits by Numbers up to Two Digits with Regrouping

Explore and Discover!

There are 945 members from Barangay Masikap. If each member contributed 35 packs of noodles for the victims of typhoon Glenda, how many packs of noodles were collected?



How do we solve the problem?
To solve the problem, you need to multiply 945 by 35.
The number sentence is $35 \times 945 = N$

a. Using the place value chart

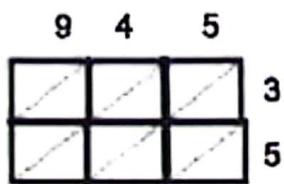
T	Th	H	T	O
	2	1	1	
	4	2	2	
1		9	4	5
	↓	x	3	5
	4	7	2	5
2	8	3	5	0
3	3	0	7	5

← 5 × 945 Partial product
← 30 × 945 Partial product
← Final product

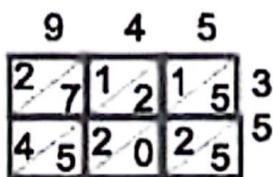
b. Using the short method

$$\begin{array}{r} & & 11 \\ & & 22 \\ 945 & \text{Multiply 945 by} & 945 & \text{Multiply 945 by} & 945 \\ \times 35 & \text{5 and regroup if} & \times 35 & \text{3 and regroup if} & \times 35 \\ 4725 & \text{the product is 10} & 4725 & \text{the product is 10} & 4725 \\ & \text{or more.} & & \text{or more.} & + 2835 \\ & & 28350 & & \\ & & & & \text{Add the partial} \\ & & & & \text{products.} \\ & & & & 33075 \end{array}$$

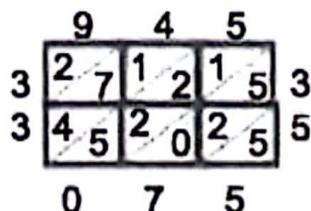
- c. Using the lattice method, draw a 3 by 2 rectangle and position the factors as shown below.



Multiply each digit above by each digit on the side. Write the digits' product as shown:



Add down the numbers along the diagonals. Regroup if necessary.



The answer, read counter clockwise, is 33 075.

Here are other examples using the long and short methods.

$$\begin{array}{r}
 48 = 40 + 8 \\
 \times 9 = \quad 9 \\
 \hline
 360 + 72 = 432
 \end{array}
 \qquad
 \begin{array}{r}
 7 \\
 48 \\
 \times 9 \\
 \hline
 432
 \end{array}
 \qquad
 \begin{array}{r}
 146 = 100 + 40 + 6 \\
 \times 64 = \quad 60 + 4 \\
 \hline
 400 + 160 + 24 \\
 + 6000 + 2400 + 360 \\
 \hline
 6000 + 2800 + 520 + 24 = 9344
 \end{array}$$



Get Moving!

A. Multiply using the lattice method.

1) 345×42



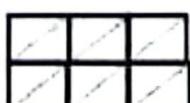
4) 624×24



2) 234×19



5) 378×46



3) 746×5



B. Find the products using the short method.

1) 234
 $\times 4$

2) 519
 $\times 8$

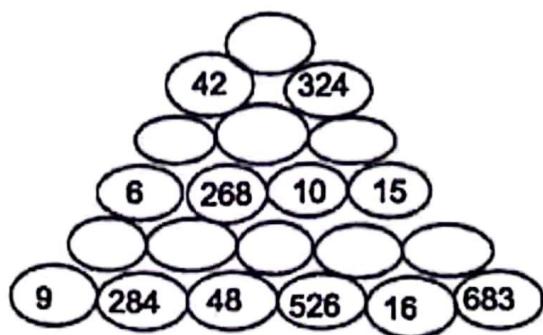
3) 672
 $\times 23$

4) 754
 $\times 45$



Keep Moving!

In each blank egg, write the product of the numbers shown in the two eggs below it.



Lesson 11: Multiplying Mentally 2-Digit by 1-Digit Numbers with Products up to 200

Explore and Discover!

How will you mentally multiply 2-digit by 1-digit numbers?

Study the example. Multiply 3×48 mentally.

Here's how to do it.

Solution 1:

Mentally multiply the ones. $3 \times 8 = 24$
Mentally multiply the tens by ones. $3 \times 40 = 120$
Mentally add the partial products. $24 + 120 = 144$

Solution 2:

By using the Distributive Property mentally

$$\begin{aligned}3 \times 48 &= (3 \times 40) + (3 \times 8) \\&= 120 + 24 \\&= 144\end{aligned}$$

Study these:

What number do you need to complete each product?

$$\begin{array}{r} 45 \\ \times 4 \\ \hline 0 \end{array} \quad \begin{array}{r} 58 \\ \times 3 \\ \hline 4 \end{array} \quad \begin{array}{r} 35 \\ \times 2 \\ \hline 0 \end{array} \quad \begin{array}{r} 19 \\ \times 5 \\ \hline 5 \end{array}$$



Get Moving!

Mentally solve the products of the following:

$$1) \begin{array}{r} 36 \\ \times 5 \\ \hline \end{array}$$

$$2) \begin{array}{r} 43 \\ \times 4 \\ \hline \end{array}$$

$$3) \begin{array}{r} 59 \\ \times 3 \\ \hline \end{array}$$

$$4) \begin{array}{r} 25 \\ \times 7 \\ \hline \end{array}$$

$$5) \begin{array}{r} 33 \\ \times 6 \\ \hline \end{array}$$



Keep Moving!

With the use of activity sheets, give the products of the following:

$$1) \begin{array}{r} 26 \\ \times 7 \\ \hline \end{array}$$

$$2) \begin{array}{r} 34 \\ \times 5 \\ \hline \end{array}$$

$$3) \begin{array}{r} 76 \\ \times 2 \\ \hline \end{array}$$

$$4) \begin{array}{r} 58 \\ \times 3 \\ \hline \end{array}$$

$$5) \begin{array}{r} 19 \\ \times 7 \\ \hline \end{array}$$



Apply Your Skills!

Read the problems and mentally solve for the answers.

1. There are 34 raisins in every bowl of cereal. How many raisins are there in 3 bowls? How about in 4 bowls?
2. A zebra has 78 stripes. How many stripes are there on 2 zebras? How about on 3 zebras?

Lesson 12: Multiplying Mentally 2-Digit by 2-Digit Numbers with Products up to 200

Explore and Discover!

How do you get the product of 2-digit by 2-digit numbers mentally? For example: 12×14 .
Here's how to do it.

Do these steps in your mind.

$$\begin{array}{r} 14 \\ \times 12 \\ \hline 28 \\ + 140 \\ \hline 168 \end{array}$$

Step 1: Multiply the multiplicand by the ones in the multiplier.
 $2 \times 14 = 28$

Step 2: Multiply the multiplicand by the tens in the multiplier.
 $10 \times 14 = 140$

Step 3: Add the partial products.
 $28 + 140 = 168$

You can use the distributive property to get the product mentally.

$$\begin{aligned} 12 \times 14 &= 12 \times (10 + 4) \\ &= (12 \times 10) + (12 \times 4) \\ &= 120 + 48 \\ &= 168 \end{aligned}$$



Get Moving!

Mentally solve the following:

$$\begin{array}{r} 14 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 11 \\ \hline \end{array}$$



Keep Moving!

Mentally find the products of the following:

$$\begin{array}{r} 18 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \times 17 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ \times 13 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \times 13 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 12 \\ \hline \end{array}$$



Apply Your Skills!

Read the problems, then solve them mentally.

1. Each class in a school has 14 reading books. If there are 12 classes in the school, how many reading books are there in all?
2. There are 15 seats in each row of the concert hall. How many seats are there if there are 12 rows?
3. A pile contains 16 books. How many books are there in 11 piles?
4. A box contains 12 pieces of chocolates. Mother bought 13 boxes. How many pieces of chocolates were bought in all?
5. Alvin shared his guavas with his 12 friends. If each of his friends received 14 guavas, how many guavas did Alvin share in all?

Lesson 13: Solving Routine and Nonroutine Word Problems Involving Multiplication of Whole Numbers Including Money

Explore and Discover!

A group of factory workers can wrap 830 candies an hour. How many candies can they wrap in 72 hours?

To analyze and solve the problem, you can use these steps:

A. Understand

1. Read and understand the problem.

2. Know what is asked for in the problem.

The number of candies that a group of factory workers can wrap in 72 hours

3. Find the necessary information.

The given facts are: 830 candies an hour; 72 hours

B. Plan

Determine the operation to be used. *Multiplication*

Write the number sentence. $72 \times 830 = n$

C. Solve

Solve using the operation.

D. Check and Look Back

See if your answer makes sense.

State the complete answer.

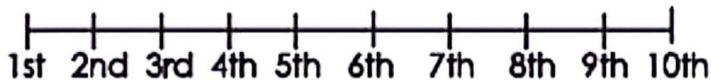
A group of workers can wrap 59 760 candies in 72 hours.

$$\begin{array}{r} 830 \\ \times 72 \\ \hline 1660 \\ + 5810 \\ \hline 59760 \end{array}$$

Study this problem.

The street lights are 25 meters apart. If there are 10 street lights, what is the distance from the first street light to the last street light?

You can solve by drawing an illustration first.



Since there are 9 spaces between the lights, you multiply
 $9 \times 25 = 225$ m.

So, the distance between the first and last street lights is 225 m.



Get Moving!

Solve the following problems. Show your solutions.

1. The Vera's flower farm produces 256 roses a day. If a flower costs Php25, how much is the sale of Vera's flower farm in a day?
2. Tiles cost Php45 each. Find the cost to tile the word below.



3. Tiles are sold by the box of 10 pieces. A box of tiles costs Php480. If Mr. Cruz needs 547 pieces of tiles for his apartment, how much will he spend?



Keep Moving!

A. Use the table to answer the following questions:

1. How much are two orders of spaghetti?
2. How much are three orders of lasagna?
3. How much will Ana pay for four orders of *pancit*?
4. How much will Jane pay for three orders of cheeseburger?
5. How much will you pay for two orders of hamburger, two glasses of *buko* juice, and five orders of *puto*?

ROD'S CANTEEN MENU	
Spaghetti	Php25
Pancit	Php20
Lasagna	Php30
Puto	Php 8
Hamburger	Php12
Cheeseburger	Php14
Pineapple Juice	Php10
Buko Juice	Php12

B. Solve the following problems. Show your solutions.

1. A *sari-sari* store sells 1525 bottles of soda in a month. If a bottle costs Php15, how much is the sale of the *sari-sari* store in a month?
2. The Department of Health distributes 1255 medicine kits to every town in a certain region. How many medicine kits will be distributed, if there are 16 towns in that region?
3. Use a graphing paper to write your name in block letters like in # 2 under Get Moving. Find out how much it would cost to tile your name using the same unit cost.
4. T-shirts are sold on a "Buy 1-Take 1" basis. If a shirt costs Php120, how much will you pay for 10 T-shirts?



Apply Your Skills!

Challenge yourself with more problems

Read each problem, and solve for the answer .

1. In a mini concert, the ticket booth sold 585 booklets. Each booklet has 100 tickets. If a ticket costs Php20.00, how much is the total sale of the booth?
2. Write the words LITER and GRAM on graphing paper. Let a classmate guess the value of the each word if it is tiled at Php45 per tile.

Lesson 14: Solving Multistep Routine and Nonroutine Word Problems Involving Multiplication and Addition or Subtraction

Explore and Discover!

Mang Tony harvested 12 500 ears of corn from each of the 12 plots of his farm, while Mang Ambo harvested 8540 ears of corn from each of the 18 plots of his farm. Who harvested more ears of corn?

To analyze and solve the problem, you can do these steps:

A. Understand

1. Read and understand the problem
2. Know what is asked for in the problem. *The farmer who harvested more ears of corn*
3. Know the hidden information.
The number of ears of corn Mang Tony harvested. The number of ears of corn Mang Ambo harvested.
4. Find the necessary information.
The given facts are: 12 500 ears of corn from each of the 12 plots; 8540 ears of corn from each of the 18 plots

B. Plan

1. Determine the operations to be used. *Multiplication and Subtraction*
2. Write the number sentences for the hidden questions.
 $12 \times 12\,500 = n$, $18 \times 8540 = n$.

C. Solve

Solve using the operations, then compare the harvests of the 2 farmers.

D. Check and Look back

See if your answer makes sense. 153 720 is bigger than 150 000. State the complete answer.

Mang Ambo harvested more ears of corn than Mang Tony.

$$\begin{array}{r} 12\,500 \\ \times 12 \\ \hline 25\,000 \\ +125\,000 \\ \hline 150\,000 \end{array}$$

Mang Tony's harvest

$$\begin{array}{r} 8540 \\ \times 18 \\ \hline 68\,320 \\ +85\,400 \\ \hline 153\,720 \end{array}$$

Mang Ambo's harvest



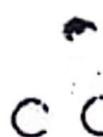
Get Moving!

Use the table to answer these questions.

- How much will two TV sets cost?
- Mr. Limos bought two wall fans and a DVD player. How much did he spend?
- Aling Tina bought a washing machine and two DVD players. How much change did she receive from her Php20,000?

Appliances SALE!

TV	: Php12,150
Refrigerator	: Php13,999
Washing Machine	: Php11,650
Wall Fan	: Php1,895
DVD Player	: Php3,875



Keep Moving!



Solve the following problems. Use any strategy to solve.

- Ariel can make 123 hangers in 5 days, while Lito can make 210 hangers in 10 days. Who makes more hangers in 10 days?

2. Beth's mother can sew 235 pairs of short pants in 6 days, while Lourdes can sew 187 pairs in 8 days. How many more pairs of short pants can Beth's mother sew?
3. In a parking lot for motorcycles and automobiles, Arthur counted 160 wheels in all. How many motorcycles and automobiles could Arthur have seen in all? (List at least 2 possible answers.)
4. Eight persons can be seated at a rectangular table. How many persons can sit in two rectangular tables that were placed side by side?
5. Nelson can plant 143 pechay seedlings in 8 plots in a day. Alex can plant 96 pechay seedlings in 13 plots in a day. Who can plant more pechay seedlings?
6. Rose can finish 18 pieces of embroidery in four days. Andrea can embroider 22 pieces in two days. How many more pieces of embroidery can Andrea make than Rose in four days?



Apply Your Skills!

Challenge yourself with more problems.

Solve the following problems. Show your solutions.

1. Find the value of the word MATHEMATICS by using the letter values below.

AEIOU	BCD	FGH	JKLMN	PQRST	VWXYZ
100	10	20	30	40	50

2. There are 86 400 seconds in a day. How many seconds are there in 20 days?

Lesson 15: Creating Problems Involving Multiplication and Addition or Subtraction of Whole Numbers Including Money

Explore and Discover!

Alex and his friend sold these numbers of bottles: 106 large bottles at three pesos each and 157 small bottles at two pesos each. They spent Php350 for their school supplies.

How will you create a problem given the information above? You can create a problem using the following guide.

1. Familiarize yourself with the concept of addition, subtraction, and multiplication.
2. Think of the problem you want to create and the operations to be used in solving the problem.
3. Read other examples of problems. Study them and their solutions.

Study the following problem created with the information above.

Alex and his friends sold 106 large bottles at Php3 each and 157 small bottles at Php2 each. They spent Php350 for their school supplies. How much money was left with them?

Can you create a word problem for the given information below?

5 big baskets with 145 atises in a basket
8 small baskets with 75 atises in a basket
200 atises were sold



Get Moving!

Create a word problem based on each situation below. Write your answers in your notebook.

1. 4800 bottles manufactured each day
6 days a week, Php15 per bottle

2. 365 cookies baked in the morning
373 cookies baked in the afternoon
526 cookies sold at Php5 each



Keep Moving!

Create a word problem using the following information.

1. 3200 newspapers published per hour; 12 hours a day; newspapers produced in a week

2. Php8,500 per square meter; 125 square meters



Apply Your Skills!

Challenge yourself with more exercises.

Create a word problem using the following information.

1. 3250 customers are served every day, average of Php 125 paid per customer; total sale for a month

2. Monthly salary of Php19,640; Php8,570 deduction per month; income per year after the deduction

Lesson 16: Dividing a 3- to 4-Digit Number by a 1-Digit Number without and with Remainder

Explore and Discover!

The Municipal Mayor received a donation of 7637 kilograms of rice distributed equally to 7 barangays affected by typhoon Glenda. How many kilograms of rice did each barangay receive?

How will you solve for the answer to the problem?

To solve for the answer, you divide: $7637 \div 7$

Study the following solution.

Step 1

$$\begin{array}{r} 1091 \\ 7)7637 \\ -7 \\ \hline 63 \\ -63 \\ \hline 7 \\ -7 \\ \hline 0 \end{array}$$

- Divide: $7 \div 7 = 1$. Write 1 in the thousands place of the quotient
- Multiply: $1 \times 7 = 7$
- Subtract: $7 - 7 = 0$

Step 2

- Bring down the hundreds digit in the dividend: 6
- Divide: $6 \div 7$ (We cannot divide since 7 is bigger than 6.)
- Write 0 in the hundreds place of the quotient.
- Bring down the tens digit in the dividend: 3
- Divide: $63 \div 7 = 9$. Write 9 in the tens place of the quotient.
- Subtract: $63 - 63 = 0$

Step 3

- Bring down the ones digit in the dividend: 7
- Divide: $7 \div 7 = 1$. Write 1 in the ones place of the quotient
- Multiply: $1 \times 7 = 7$
- Subtract: $7 - 7 = 0$

Answer: Each barangay received 1091 kilograms of rice.

If there are 8 barangays to be given rice, how many kilograms of rice will each barangay receive?

Step 1

$$\begin{array}{r} 954 \text{ r. } 5 \\ 8 \overline{)7637} \\ -72 \\ \hline 43 \\ -40 \\ \hline 37 \\ -37 \\ \hline 0 \end{array}$$

Step 2

- Divide: $76 \div 8 = 9$. Write 9 in the hundreds place of the quotient.
 - Multiply: $9 \times 8 = 72$
 - Subtract: $76 - 72 = 4$
- Bring down the tens digit in the dividend: 3
 - Divide: $43 \div 8 = 5$. Write 5 in the tens place of the quotient.
 - Multiply: $5 \times 8 = 40$
 - Subtract: $43 - 40 = 3$

Step 3

- Bring down the ones digit in the dividend: 7
- Divide: $37 \div 8 = 4$. Write 4 in the ones place of the quotient.
- Multiply: $4 \times 8 = 32$
- Subtract: $37 - 32 = 5$

Write 5 in the quotient as the remainder.

Step 4

- Check your answer. You can use a calculator.
- Multiply: $954 \times 8 = 7632$
- Add: $7632 + 5$ (remainder) = 7637

Answer: Each barangay will receive 954 kilograms of rice. There will be 5 kilograms of rice left.



Get Moving!

Divide the following:

- | | |
|------------------|-------------------|
| 1) $847 \div 7$ | 6) $4369 \div 5$ |
| 2) $968 \div 8$ | 7) $6788 \div 9$ |
| 3) $6884 \div 4$ | 8) $5263 \div 7$ |
| 4) $846 \div 6$ | 9) $5098 \div 6$ |
| 5) $7208 \div 4$ | 10) $5258 \div 8$ |



Keep Moving!

Find the quotient of the following. You can use a calculator to check.

- | | |
|------------------|-------------------|
| 1) $806 \div 6$ | 9) $875 \div 7$ |
| 2) $972 \div 3$ | 10) $4125 \div 9$ |
| 3) $6305 \div 5$ | 11) $1340 \div 9$ |
| 4) $968 \div 4$ | 12) $4328 \div 5$ |
| 5) $9092 \div 3$ | 13) $4832 \div 7$ |
| 6) $789 \div 6$ | 14) $5276 \div 4$ |
| 7) $2056 \div 8$ | 15) $6180 \div 8$ |
| 8) $3462 \div 9$ | 16) $7912 \div 6$ |



Apply Your Skills!

Solve the following problems.

1. A religious organization donated 378 canned goods for the victims of typhoon Glenda. If there were 9 families, how many canned goods did each family receive?
2. There are 1032 Mathematics books delivered to the library. How many books will be placed in one bookshelf if there are 8 bookshelves?
3. Abdul paid Php1,240 for 8 T-shirts. How much did each shirt cost?
4. Alexandra used 180 beads for making 6 bracelets. How many beads were used for each bracelet?
5. Jack has a collection of 438 marbles. If he will place the marbles equally in 6 bottles, how many marbles will be in each bottle?
6. Alice received Php3,456 for working 8 days in a factory. How much was she paid per day?

Lesson 17 Dividing 3- to 4-Digit Numbers by 2-Digit Numbers without and with Remainder

Explore and Discover!

The Rotary Club of Cavite distributed 7380 packages of groceries for families in some barangays. Each barangay received 36 packages. How many barangays were served?

How will you solve this problem?

You can find its answer by using this solution.

Step 1

- Determine where to place the first digit in the quotient.
- Divide: $73 \div 36 = 2$. Write the first digit in the hundreds place.
- Multiply: $2 \times 36 = 72$
- Subtract: $73 - 72 = 1$

$$\begin{array}{r} 205 \\ 36)7380 \\ -72 \\ \hline 180 \\ -180 \\ \hline 0 \end{array}$$

Step 2

- Bring down the tens digit in the dividend: 8
- Divide: $18 \div 36$ (We cannot divide since divisor is bigger than the dividend.)
- Put 0 in the quotient next to 2.

Step 3

- Bring down the ones digit in the dividend: 0
- Divide: $180 \div 36 = 5$
- Write 5 next to 0 in the quotient.
- Multiply: $5 \times 36 = 180$
- Subtract: $180 - 180 = 0$

Answer: There were 205 barangays served.

How will you solve this problem?

Within a period of five years, 4224 hectares of denuded areas were reforested by 75 volunteer agencies. If the volunteer agencies reforested equal number of hectares, how many hectares were reforested by each volunteer agency? How many hectares were not reforested?

You can solve this by using this solution.

Solution:

$$\begin{array}{r} 56 \text{ r. 24} \\ 75 \overline{)4224} \\ -375 \\ \hline 474 \\ -450 \\ \hline 24 \rightarrow \text{remainder} \end{array}$$

($5 \times 75 = 375$)
($6 \times 75 = 450$)

Step 1

- Divide: $422 \div 75 = 5$
- Multiply: $5 \times 75 = 375$
- Subtract: $422 - 375 = 47$

Step 2

- Bring down the ones digit of the dividend: 4
- Divide: $474 \div 75 = 6$
- Multiply: $6 \times 75 = 450$
- Subtract: $474 - 450 = 24$ (remainder)

Answers: Each volunteer agency reforested 56 hectares.

There were 24 hectares that were not reforested.



Get Moving!

Find the quotient.

- | | |
|-------------------|--------------------|
| 1) $5628 \div 28$ | 6) $1879 \div 75$ |
| 2) $5725 \div 27$ | 7) $5236 \div 18$ |
| 3) $4593 \div 45$ | 8) $2652 \div 26$ |
| 4) $7650 \div 75$ | 9) $6440 \div 32$ |
| 5) $6738 \div 32$ | 10) $9084 \div 45$ |



Keep Moving!

Find the quotient. You can use a calculator to check if your answers are correct.

- | | |
|-------------------|--------------------|
| 1) $2396 \div 51$ | 6) $2124 \div 12$ |
| 2) $8688 \div 12$ | 7) $1593 \div 15$ |
| 3) $1254 \div 52$ | 8) $9140 \div 35$ |
| 4) $1032 \div 86$ | 9) $5784 \div 46$ |
| 5) $3115 \div 62$ | 10) $6592 \div 32$ |



Apply Your Skills!

Read each problem, then solve.

1. The 1430 chickens in Oasis farm can consume 22 kilograms of feeds a day. How many chickens can consume a kilogram of feeds a day?
2. The 1248 pupils and teachers of Sandiat Elementary School will go on a field trip. Buses to be hired have 52 seats each. How many buses will they hire?
3. Cynthia and her mother packed 1560 kilograms of rice in small plastic bags. How many plastic bags were used if each bag contained 15 kilograms?
4. Mrs. Acio receives Php3,500 for 25 hours of tutorial service. How much does she charge her student per hour?
5. Mr. Karim ordered 375 kilograms of dried fish packed in bags of 25 kilograms each. How many bags of dried fish were delivered to Mr. Karim?

Lesson 18: Dividing 3- to 4-Digit Numbers by 10, 100, or 1000 without Remainder

Explore and Discover!

A stadium that needs 5000 chairs is being constructed for a city. If the chairs will be arranged in 10 rows, how many chairs are there in a row? If the chairs are to be arranged in 100 rows, how many chairs will there be in a row? How about arranging the chairs in 1000 rows that are grouped by section, how many chairs will there be in a row?

Study the solution below.

$$\begin{array}{r} 1) \quad 500 \\ 10 \overline{) 5000} \\ -500 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 2) \quad 50 \\ 100 \overline{) 5000} \\ -50 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 3) \quad 5 \\ 1000 \overline{) 5000} \\ -5 \\ \hline 0 \end{array}$$

Therefore: $5000 \div 10 = 500$
 $5000 \div 100 = 50$
 $5000 \div 1000 = 5$

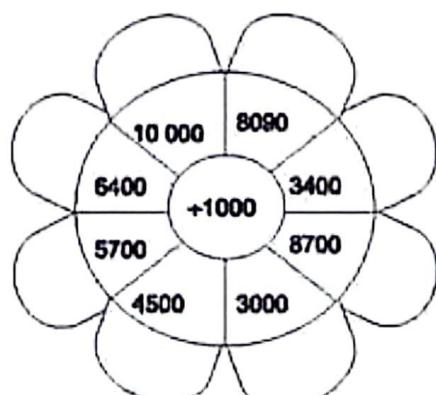
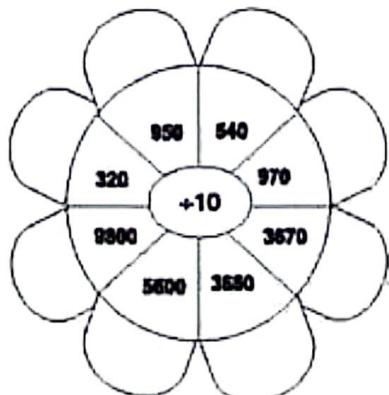
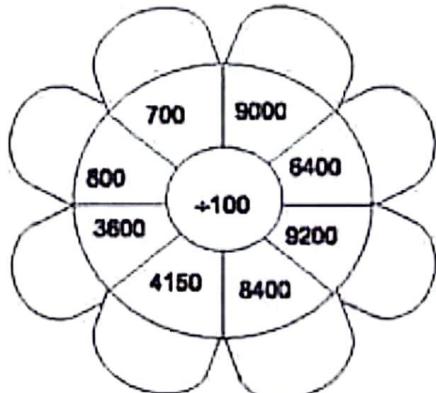
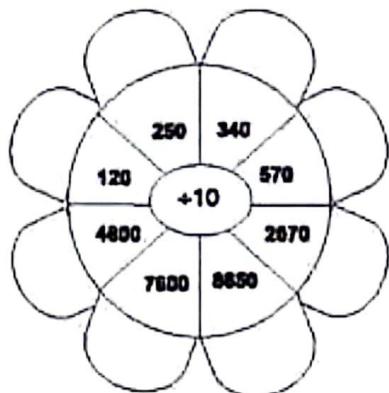
Compare the number of zeros in the dividend and divisor. Then, look at the number of zeros in the quotient. Also compare the dividend and the quotient. What pattern can you find?

When dividing a number by 10, 100, or 1000, you cancel or remove as many zeros in the dividend as there are in the divisor. The remaining digits in the dividend is the quotient.



Get Moving!

A. Complete the spaces with the correct quotient.



Keep Moving!

Complete the table.

Dividend	Divisor	Quotient	Dividend	Divisor	Quotient
5670	10	_____	8000	100	25
7600	100	_____	9040	10	8
1000	1000	_____	7000	100	7
5000	1000	_____	_____	_____	26
2000	1000	_____			



Apply Your Skills!

Answer each question correctly.

1. How many 10s are there in 5520?
2. How many 100s are there in 1100?
3. How many 1000s are there in 39 000?
4. How many 100-peso bills will you need to change a 1000-peso bill?
5. The pencil factory has rush orders from 10 stores. The factory has a stock of 55 000 pencils. If the stores will be given equal number of pencils, how many pencils will each store get? Will all the pencils be given? Why?
6. If a pair of slippers costs Php100, how many pairs of slippers can one buy with Php800?
7. I want to change my two 1000-peso bills to 25 pieces of 20 peso bills and the rest will be 100-peso bills. How many 100-peso bills will I have?
8. How many 1000-peso bills will make Php1,000,000?
9. How many 100-peso bills will make Php1,000,000?
10. How many 10-peso coins will make Php1,000,000?

Lesson 19: Dividing 3- to 4-Digit Numbers by 10, 100, or 1000 with Remainder

Explore and Discover!

Study the following number sentences.

A

$$2475 \div 10 = 247 \text{ r. } 5$$

$$2475 \div 100 = 24 \text{ r. } 75$$

$$2475 \div 1000 = 2 \text{ r. } 475$$

B

$$8932 \div 10 = 893 \text{ r. } 2$$

$$8932 \div 100 = 89 \text{ r. } 32$$

$$8932 \div 1000 = 8 \text{ r. } 932$$

Can you tell the pattern?

Look at the divisors in set A.

Compare the number of zeros in the divisors and the number of digits in the remainder. What have you noticed?

Look at set B.

Compare the divisor and the quotient especially the remainder of each division sentence. Have you discovered some patterns?

Can you try this?

What pattern did you discover?

a) $3087 \div 10 = n$ b) $3087 \div 100 = n$ c) $3087 \div 1000 = n$



Get Moving!

Copy the following in your notebook. Then, find the quotient.

- | | | | |
|----|------------------------|-----|--------------------------|
| 1) | $234 \div 10 =$ _____ | 6) | $4054 \div 10 =$ _____ |
| 2) | $591 \div 100 =$ _____ | 7) | $6205 \div 1000 =$ _____ |
| 3) | $642 \div 10 =$ _____ | 8) | $3120 \div 100 =$ _____ |
| 4) | $209 \div 100 =$ _____ | 9) | $5895 \div 1000 =$ _____ |
| 5) | $169 \div 100 =$ _____ | 10) | $9999 \div 1000 =$ _____ |



Keep Moving!

Copy the following in your notebook. Write the missing digits in the box.

$$1. \quad 100 \overline{)367} \quad \square \text{ r. } \square \square$$

$$2. \quad 10 \overline{)852} \quad \square \square \text{ r. } \square$$

$$3. \quad 10 \overline{)2514} \quad \square \square \square \text{ r. } \square$$

$$4. \quad 100 \overline{)7935} \quad \square \square \text{ r. } \square \square$$

$$5. \quad 1000 \overline{)5463} \quad \square \text{ r. } \square \square \square$$

$$6. \quad 100 \overline{)\square \square \square} \quad 23 \text{ r. } 7$$

$$7. \quad 1000 \overline{)\square \square \square} \quad 7 \text{ r. } 123$$

$$8. \quad 100 \overline{)\square \square \square} \quad 3 \text{ r. } 54$$

$$9. \quad 1000 \overline{)\square \square \square} \quad 4 \text{ r. } 143$$

$$10. \quad 1000 \overline{)\square \square \square} \quad 2 \text{ r. } 120$$



Apply Your Skills!

A. Complete the table.

Dividend	+ 10	+ 100	+ 1000
1. 148			
2. 2763			
3. 1297			
4. 376			
5. 8829			
6. 3841			
7. 2127			
8. 148			
9. 3847			
10. 4389			

B. Replace the letter N with the correct number.

- | | |
|---------------------------|-----------------------------|
| 1) $333 \div N = 33$ r. 3 | 6) $2879 \div 10 = N$ |
| 2) $N + 100 = 5$ r. 99 | 7) $5602 \div N = 56$ r. 2 |
| 3) $822 \div 10 = N$ | 8) $N + 100 = 75$ r. 5 |
| 4) $N + 100 = 23$ r. 67 | 9) $7407 \div N = 74$ r. 7 |
| 5) $467 \div N = 46$ r. 7 | 10) $10\ 567 \div 1000 = N$ |

C. Solve the following problems.

1. Mrs. Malonzo withdrew Php9,850 from a bank. The cashier gave the money in Php1,000-bills, Php100-bills, and the rest in coins. How much money was given in coins?
2. How many 1000-peso bills will there be in Php98,750? How much will the remainder be?
3. If the divisor is 1000 and the quotient is 2 with a remainder of 346, what is the dividend?
4. The dividend is 3675 and the quotient is 367 with a remainder of 5. What is the divisor?
5. The dividend is 3962 and the divisor is 100. What is the quotient?
6. Mr. San Juan has Php33,457. He wants to give it to the orphans in one of the many orphanages in the country. How much will each child receive if he decides to give it to 10 orphans? How much money will be left? How about to 100 orphans? How much money will be left? How about to 1000 orphans? How much money will be left?

Lesson 20: Estimating the Quotient of 3- to 4-Digit Dividends by 1- to 2-Digit Divisors

Explore and Discover!

In an orchard, Mr. Larry harvested 1694 mangoes. He plans to place 24 mangoes in a basket. About how many baskets does he need?

Do you know how to estimate?

Study the solutions below:

Rounding Method	Compatible Number Method	Actual Answer
A $\overline{24)}\overline{1694}$ ↓ ↓ $\overline{20)}\overline{2000}$	B $\overline{24)}\overline{1694}$ ↓ ↓ $\overline{20)}\overline{1600}$	$\overline{24)}\overline{1694}$ - 168 14
100 $\overline{20)}\overline{2000}$	80 $\overline{20)}\overline{1600}$	- 0 14
- 2 0 - 0 0	- 16 0 - 0 0	

Answer: He needs 70 baskets with 24 pieces each and one basket with 14 mangoes. If the compatible method is used, he needs about 80 baskets. If the rounding method is used, he needs about 100 baskets.

Which of the two estimates is closer to the actual answer? About 80 baskets is the closer estimate to the actual answer.

How is estimation done in set A? What is done to the divisor and dividend? What about in set B?

Can you explain how estimation is done in set B?



Get Moving!

A. In your notebook, estimate the following using the Rounding Method:

$$1) \ 573 \div 6 =$$

$$4) \ 2926 \div 47 =$$

$$2) \ 8501 \div 9 =$$

$$5) \ 4108 \div 82 =$$

$$3) \ 8645 \div 32 =$$

B. Estimate the following using the Compatible Number Method:

$$1) \ 36 \ 200 \div 56 =$$

$$4) \ 7331 \div 34 =$$

$$2) \ 3209 \div 18 =$$

$$5) \ 9536 \div 16 =$$

$$3) \ 4567 \div 93 =$$



Keep Moving!

Estimate then, choose the most appropriate answer.

1. $11 \overline{)4432}$ a. 400 b. 40 c. 4 d. 4000

2. $13 \overline{)6347}$ a. 6 b. 60 c. 600 d. 6000

3. $17 \overline{)4349}$ a. 200 b. 20 c. 2 d. 2000

4. $21 \overline{)5136}$ a. 250 b. 25 c. 2500 d. 25 000

5. $47 \overline{)6789}$ a. 1400 b. 140 c. 14 d. 400



Apply Your Skills!

A. Estimate the answers to the following:

1. About how many 23s are there in 4323?
2. About how many 52s are there in 1322?
3. About how many dozens are there in 105 pieces?
4. About how many minutes are there in 3578 seconds?
5. About how many 26s are there in 5889?

B. Use estimation to tell whether the exact quotient is less than or is greater than the given number.

- 1) $6 \overline{)1920}$ < 300 or > 300?
- 2) $5 \overline{)2040}$ < 300 or > 300?
- 3) $5 \overline{)3473}$ < 400 or > 400?
- 4) $7 \overline{)367}$ < 50 or > 50?
- 5) $8 \overline{)6575}$ < 800 or > 800?

C. Answer the following problems.

1. Which is a better buy, one box of 6 pencils at Php27 or one pencil at Php5 each? Why?
2. If a kilogram of siniguelas costs Php60, about how many kilograms can you buy with Php200?
3. Which would you buy, one kilogram of powdered detergent at Php280 or 8 small packs of 54 grams each of the same detergent at Php94? Why?

Lesson 21: Dividing Mentally 2- to 3-Digit Numbers by 1-Digit Numbers without Remainder

Explore and Discover!

Read the problem.

Camille placed 630 mangoes equally in 7 baskets.
How many mangoes should each basket have?

Can you solve the problem mentally?

Think of basic division facts to do mental division.

$$\begin{array}{r} 90 \\ \overline{)630} \\ 63 + 7 = 9 \end{array}$$

- Think of basic division facts if the dividend and the divisor are compatible numbers.
- Then, annex the zero in the dividend to the quotient.

Thus, $630 \div 7 = 90$

Answer: There will be 90 mangoes in each basket.

Now, let us try another one.

Divide 231 by 7.

Study the solution.

$$231 \div 7 = \frac{(210 \div 7) + (21 \div 7)}{30 + 3} = 33$$

- Since we cannot see easily basic division facts, we can rename the dividend in such a way that the renamed dividend is compatible with 7.

Thus, $231 \div 7 = 33$

Now, can you try these? How many can you do orally?

Divide mentally either by basic division facts or renaming.

- 1) $216 \div 3$
- 2) $258 \div 6$
- 3) $7976 \div 8$



Get Moving!

A. Copy the exercises in your notebook. Think of the basic facts you should remember to find each quotient. Give the answers orally.

- | | |
|------------------|-------------------|
| 1) $270 \div 9$ | 6) $546 \div 6$ |
| 2) $480 \div 6$ | 7) $427 \div 7$ |
| 3) $150 \div 5$ | 8) $248 \div 8$ |
| 4) $2400 \div 6$ | 9) $3639 \div 3$ |
| 5) $4900 \div 7$ | 10) $8462 \div 2$ |

B. Divide mentally by renaming the dividend to make division easy. How many can you do orally?

- | | |
|-----------------|-------------------|
| 1) $161 \div 7$ | 6) $5984 \div 8$ |
| 2) $378 \div 9$ | 7) $1431 \div 3$ |
| 3) $195 \div 5$ | 8) $1052 \div 4$ |
| 4) $258 \div 6$ | 9) $3255 \div 7$ |
| 5) $448 \div 7$ | 10) $4986 \div 9$ |



Keep Moving!

A. Copy the table in your notebook. Complete the table by dividing mentally. Write BDF if you use the basic division facts and CN if compatible numbers are used in division. Then, write the quotient.

	Basic Division Facts/ Compatible Numbers	Quotient
1. $568 \div 8$		
2. $420 \div 6$		
3. $238 \div 7$		
4. $1926 \div 9$		
5. $2715 \div 5$		

B. Solve the following problems mentally:

1. How many fours are there in 8448?
2. How many nines are there in 1116?
3. If the dividend is 1638 and the divisor is 7, what is the quotient?



Apply Your Skills!

A. Divide mentally. Give the quotients orally.

- | | |
|-----------------|-------------------|
| 1) $160 \div 4$ | 6) $8000 \div 8$ |
| 2) $318 \div 6$ | 7) $3683 \div 3$ |
| 3) $210 \div 3$ | 8) $4936 \div 4$ |
| 4) $400 \div 8$ | 9) $2947 \div 7$ |
| 5) $468 \div 9$ | 10) $9999 \div 9$ |

B. Solve mentally. Give the answers orally.

1. A scoutmaster has a 174-meter piece of rope. How many 6-meter long pieces can be cut from it?
2. There are 360 books to be distributed equally among 4 classes. How many books will be given to each class?
3. The 342 Grade Four pupils were divided into 9 equal groups to participate in a dance contest. How many pupils were there in each group?
4. A total of 1035 pupil-volunteers was divided into 3 equal groups to participate in different activities for the "Clean and Green" project of their barangay. How many pupil-volunteers were in each group?
5. Ben and Louie harvested 1072 caimito fruits. They placed them equally in 8 baskets. How many caimito fruits were in each basket?

Lesson 22: Solving Routine and Nonroutine Word Problems Involving Division

Explore and Discover!

Read the problems below.

Mang Tomas has 1848 eggs to be delivered to a market. If the eggs are to be placed in small trays with 6 eggs each, how many trays will be needed?

Kathleen opened her math book and found that the sum of the pages facing her was 243. What pages did she open to?

Can you solve the problems?

Here are the steps in analyzing and solving word problems.

Study the solution below.

Problem 1

- Understand

Know what is asked: *The number of trays needed*

Know the given facts: *1848 eggs; 6 eggs in a tray*

- Plan

Determine the operation to be used: *Division*

Write the number sentence: $1848 \div 6 = n$

- Solve

Show your solution: $1848 \div 6 = 308$

- Check and Look back

Review and recheck your answer: *You can use a calculator to divide 1848 by 6, or multiply 308 by 6.*

Problem 2

- Understand

Know what is asked: *The pages of the book*

Know the given facts: The sum of the two pages was 243

- Plan

Determine the operation to be used: *Division*

Write the number sentence: $243 \div 2 = n$

- Solve

Show your solution: $243 \div 2 = 121$ r. 1

- Check and Look back

Review and recheck your answer: *You cannot have a page that is 121 r. 1.*

Answer: *Since pages of a book are consecutively numbered, Kathleen opened pages 121 and 122.*

Which of the problems do you think is easier to solve? Why?

Can you try solving the following problems?

Do this with your partner.

1. Camille went to a bank and requested the cashier to change her three 1000 bills. How many bills will she receive if she asks for:
 - a) Php20-bills?
 - b) Php50-bills?
 - c) Php200-bills?
 - d) Php500-bills?
2. Eight telephone poles in a row are equal in distances from each other. If the distance from the first to the last pole is 140 meters, what is the distance between each pole? Make a diagram or drawing as your solution.



Get Moving!

Solve the following problems:

1. Kristine's round trip jeepney fare to school is Php16 a day. If she has Php200 for jeepney fares to school, how many round trips to school would that be?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Check and Look back : _____

2. How many ten thousands are there in 1 000 000?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Check and Look back : _____

3. The product of two numbers is 132. If one factor is 6, what is the other factor?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Check and Look back : _____

4. When the eggs in a basket are grouped into 2, 3, or 5, there is always one extra. What is the least number of eggs for this grouping to be done?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Check and Look back : _____



Keep Moving!

Solve the following problems:

1. What is the remainder when 6587 is divided by 27?

Solution and Answer:

2. A book is opened to pages where the sum of the two page numbers facing the reader is 313. Which is the bigger of the two-page numbers?

Solution and Answer:

3. A farmer gathered 760 mangoes from his farm. He placed 60 mangoes in each basket and sold them. How many mangoes were not in a full basket?

Solution and Answer:

4. A farmer planted 1680 pineapples equally in 24 rows. How many pineapples were planted in each row?

Solution and Answer:

5. Alex, Rica, and Manuel shared the amount of Php480 to buy a birthday gift for their teacher. How much did each of them share?

Solution and Answer:

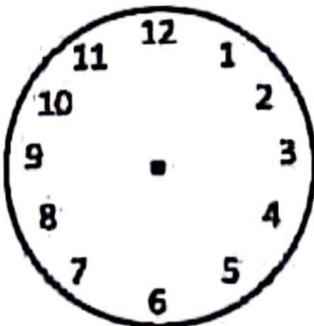


Apply Your Skills!

Try solving more problems!

Read and analyze the following problems. Then, write your solutions and answers in your notebook.

1. The distance between two towns is 420 km. If it takes a bus 7 hours to cover the distance, what is its average speed?
2. Rose earns Php195,000 a year. How much does Rose earn each month?
3. There are some dalandan fruits on the table and some in a small basket. If there are 50 dalandan fruits altogether, how many are on the table? List at least 3 possible answers.
4. Divide the face of the clock into three parts with two lines so that the sums of the numbers in the three parts are equal.



Lesson 23: Solving Multistep Routine & Nonroutine Word Problems Involving Division and Other Operations of Whole Numbers

Explore and Discover!

Read the problems below.

The average of 6 numbers is 66. If 75 and 89 are added to the 6 numbers, what is the new average?

Ben has some goats and chickens in his backyard. All in all there are 15 heads and 46 legs. How many goats and chickens are there?

You can solve the problem using the steps below:

Problem 1

• **Understand**

Know what is asked: The new average

Know the given facts: 6 numbers; the average of 6 numbers is 66; 75 and 89 are new numbers to be added

• **Plan**

Determine the operations to be used: Multiplication, Addition, and Division

Know the hidden questions: What is the sum of 6 numbers with an average of 66?

What is the new sum if you add 75 and 89 to it?

How many addends are there now?

Write the number sentence:

$$[(66 \times 6) + (75 + 89)] \div (6 + 2) = N$$

• **Solve: Show your solution:**

$$[(66 \times 6) + (75 + 89)] \div (6 + 2) = N$$

$$[396 + 164] \div 8 = N$$

$$560 \div 8 = N$$

$$70 = N$$

So, the new average is 70.

- Check and look back: Did I do the operations correctly? Is my answer reasonable? Did I write my answer in a complete sentence?

Problem 2

- Understand

Know what is asked: The number of goats and chickens
Know the given facts: 15 heads, 46 legs

- Plan: Make a diagram or drawing.
- Draw 15 heads first.



Draw 2 legs in each head.



$15 \times 2 = 30$ legs. Subtract 30 legs from the given 46 legs.

- Solve: $46 - 30 = 16$ legs left. Divide 16 by 2. $16 \div 2 = 8$.
So, we add 2 legs to 8 more heads.
So, there are 8 goats and 7 chickens.
- Look back: To check, 8 goats and 7 chickens give 15 heads of animals.



$$8 \text{ goats} \times 4 \text{ legs} = 32 \text{ legs}$$

$$7 \text{ chickens} \times 2 \text{ legs} = \underline{14 \text{ legs}}$$

$$46 \text{ legs}$$

- Answer: There are 8 goats and 7 chickens in Ben's back-yard.

Can you try solving the following problems?

Do this with your partner.

1. I am thinking of a number. Thrice my number minus 6 equals 66. What is my number?
2. Five mangoes and one apple cost Php75. One mango and 5 apples cost Php111. How much does each mango cost?



Get Moving!

Solve the following problems:

1. The sum of three numbers is 264. One of the numbers is 84. What is the average of the two numbers?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Look back : _____
2. Larry collected 175 eggs from one poultry house and 215 eggs from a second poultry house. If Larry put 12 eggs to a carton, how many cartons did he fill?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Look back : _____
3. A farmer bought 85 kg of fertilizer in 12 bags. Some are 5-kg bags. The rest are 10-kg bags. How many 5-kg bags did he buy?
 - Understand : _____
 - Plan : _____
 - Solve : _____
 - Look back : _____

4. If seven men can do a job in 6 days, how many men can do the work in 3 days?

- Understand : _____
- Plan : _____
- Solve : _____
- Look back : _____



Solve the following problems. Write your solutions and answers in your notebook.

1. The average of 5 even consecutive numbers is 112. What is the largest number?

Solution and Answer:

2. Noemi and Kathleen have Php647 together. If Kathleen has Php133 more than Noemi, how much money does each girl have?

Solution and Answer:

3. There are bicycles and tricycles parked along a road. There are 29 wheels and 11 riders. How many bicycles are there?

Solution and Answer:

4. Liza arranged 66 roses in 7 vases. Some vases had only 6 red roses and the others had only 12 pink roses. How many vases had red roses only?

Solution and Answer:

5. In a farm, the farmer counted 78 legs and 35 heads consisting of cows and hens. How many hens does he have?

Solution and Answer:



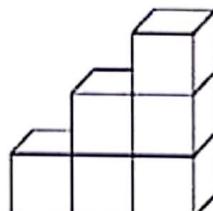
Apply Your Skills!

Try solving more problems!

Read and analyze the following problems. Solve them in any method you like.

$$- 13 \quad + 9 \quad + 7 \quad \times 5$$

1. What is N in [N] → [] → [] → [] → [60]?
2. Kim's rectangular garden is 24 m long and 18 m wide. If his fence needs posts that are 2 m apart, how many posts does he need?
3. The average of five consecutive odd numbers is 59. What are the five odd numbers?
4. In a car park, there are motorcycles, 4-wheeled cars, and 6-wheeled trucks. There are 20 cars and 15 trucks. If there are 250 wheels altogether, how many motorcycles are there in the car park?
5. How many squares are there on an 8-by-8 checkerboard?
6. I am thinking of a number. Twice the number plus 8 equals 52. What is my number?
7. Kate Anne was in a 65-storey building. She had to follow up her business transaction on the twelfth floor. Then, she went four floors down for the processing of the papers. Later, she went 30 floors up. Finally, she went 32 floors down. At what floor was she then?
8. This stairway is made of cubes. How many cubes would be needed to make the stairway 9 steps high?



Lesson 24: Creating Word Problems Involving Division without or with Other Operations of whole Numbers

Explore and Discover!



Can you make a word problem out of the picture?
Is the given picture enough to make a word problem?
What are the things/data you see for you to create a word problem?

Look at the given data below.

- Mother and Ben
- market
- cost of fish per kilogram

What other data do you need? You can consider the following data in creating a word problem.

- Php560 → 5 kilograms of fish

Can you now complete the word problem below and solve for the correct answer, too? Do this in your notebook.

Mother and Ben went to the [] . She bought [] []. What was the [] ?



Get Moving!

Use the data inside the box to complete the problems below.
Solve the problem in your notebook.

360 pupils
405 books
Php13,560
9 books

384 canned goods
1000 Mathematics books
8 sections
12 Indigents

two years

8 bookshelves

1. An elementary school has in Grade four with . How many pupils are there in one section?
2. Mrs. Bernesto borrowed for her class. If of different titles were given to each of her pupils, how many pupils are there in her class?
3. A Non-Government Organization donated for the indigent pupils. If there were , how many canned goods did each child receive?
4. There were delivered to a library. How many books will be placed in a bookshelf if there were ?
5. Mrs. Ruby bought a refrigerator by installment. How much will she pay monthly if in time, she will have to pay ?



Keep Moving!

Study the story problems given below. Complete each problem by creating a question for what is asked. Then, solve the problem.

1. Camille sells flowers. She buys 300 flowers and arranges 12 flowers per bouquet.

Question: _____?

Solution and Answer:

2. Cindy and her mother packed 1560 kilograms of rice in small plastic bags. Each small plastic bag has 5 kilograms of rice.

Question: _____?

Solution and Answer:

3. Mang Laloy is a driver. He earns Php8,250 monthly.

Question: _____?

Solution and Answer:

4. There were 7380 cans of milk to be equally shared among families of the fire victims. Each family will be given 3 dozens.

Question: _____?

Solution and Answer:



Apply Your Skills!

- A. Create a problem using the given data. Then, solve the problem.

1. Given: Php2,400 – gross sales in selling sweet corn
Php12 – cost of a sweet corn

Asked: number of sweet corns sold

Problem: _____?

Solution and Answer:

2. Given: Php1,250 – total sales in selling newspaper
Php25 – cost of a newspaper
Asked: number of newspapers sold
Problem: _____ ?
- Solution and Answer:
3. Given: 2520 mangoes harvested from an orchard
36 mangoes in a basket
Asked: total number of baskets used
Problem: _____ ?
- Solution and Answer:
4. Given: 1945 total number of guavas gathered
43 guavas in a basket
Asked: number of guavas not placed in the basket
Problem: _____ ?
- Solution and Answer:
5. Given: 4180 marbles collected
24 marbles in a set
Asked: number of excess marbles
Problem: _____ ?
- Solution and Answer:
6. Given: 12 048 strawberries harvested
24 strawberries in a basket
Asked: total number of baskets used
Problem: _____ ?
- Solution and Answer:

Lesson 25: Performing Series of Operations (MDAS)

Explore and Discover!

Look at the number sentences below.

$$2 \times 3 + 4 = N$$

$$35 - 6 \times 3 = N$$

$$7 \times 9 - 3 + 8 = N$$

$$18 - 12 \div 6 + 7 = N$$

$$12 - 3 + 18 \div 6 \times 7 = N$$

Have you encountered problems like these?

How did you get the answers?

How many operations are there in each problem?

Study the following:

$$2 \times 3 + 4 = \text{Rule 1}$$



$$6 + 4 = \text{Rule 2}$$



$$10$$

$$\text{Thus, } 2 \times 3 + 4 = 10$$

$$35 - 6 \times 3 = \text{Rule 1}$$



$$35 - 18 = \text{Rule 2}$$



$$17$$

$$\text{Thus, } 35 - 6 \times 3 = 17$$

To solve these problems, you must use a rule to arrive at the correct answer. Here, the MDAS rule must be followed strictly to get the correct answer. The MDAS stands for the 4 basic operations – Multiplication, Division, Addition, and Subtraction. The rules say that: multiply or divide first in the order as they come from left to right, then, add or subtract in the order as they come from left to right.

Remember: Do Multiplication or Division first before you do Addition or Subtraction.

Can you find N in the three number sentences above?



Get Moving!

Copy and evaluate the following expressions in your notebook.
Fill in the blank with the number to arrive at the correct answer.

$$1) \underline{8 + 4 + 2} \text{ Rule } \underline{\quad}$$

$$\underline{8 + } \underline{\quad} \text{ Rule } \underline{\quad}$$

$$N = \underline{\quad}$$

$$2) \underline{5 \times 8 + 10} \text{ Rule } \underline{\quad}$$

$$\underline{\quad + 10} \text{ Rule } \underline{\quad}$$

$$N = \underline{\quad}$$

$$\text{Thus, } 8 + 4 + 2 = \underline{\quad}$$

$$\text{Thus, } 5 \times 8 + 10 = \underline{\quad}$$

$$3) \underline{91 - 65 + 7} \text{ Rule } \underline{\quad}$$

$$\underline{- } \underline{+ 7} \text{ Rule } \underline{\quad}$$

$$N = \underline{\quad}$$

$$4) \underline{72 + 3 \times 8} \text{ Rule } \underline{\quad}$$

$$\underline{\quad \times 8} \text{ Rule } \underline{\quad}$$

$$N = \underline{\quad}$$

$$\text{Thus, } 91 - 65 + 7 = \underline{\quad}$$

$$\text{Thus, } 72 + 3 \times 8 = \underline{\quad}$$

$$5) \underline{18 - 12 + 6 + 7} \text{ Rule } \underline{\quad}$$

$$\underline{18 - } \underline{+ 7} \text{ Rule } \underline{\quad}$$

$$\underline{- } \underline{+ 7} \text{ Rule } \underline{\quad}$$

$$N = \underline{\quad}$$

$$6) \underline{16 + 4 \times 5 - 7 + 8} \text{ Rule } \underline{\quad}$$

$$\underline{\quad \times 5 - 7 + 8} \text{ Rule } \underline{\quad}$$

$$\underline{- } \underline{- 7 + 8} \text{ Rule } \underline{\quad}$$

$$\underline{- } \underline{+ 8} \text{ Rule } \underline{\quad}$$

$$\text{Thus, } 18 - 12 + 6 + 7 = \underline{\quad}$$

$$N = \underline{\quad}$$

$$\text{Thus, } 16 + 4 \times 5 - 7 + 8 = \underline{\quad}$$



Keep Moving!

Evaluate the following expressions. Show your solutions in your notebook and encircle your final answers.

- | | |
|-----------------------|------------------------------------|
| 1) $7 \times 8 + 130$ | 6) $60 + 48 \div 2 \times 4$ |
| 2) $15 + 3 \times 20$ | 7) $30 + 2 \times 4 - 8 + 9$ |
| 3) $3 + 83 - 73$ | 8) $12 + 5 \times 16 + 4 - 7$ |
| 4) $76 - 8 \times 9$ | 9) $35 + 5 \times 8 - 7 + 9$ |
| 5) $9 \times 6 + 3$ | 10) $6 \times 7 - 48 \div 12 + 75$ |



Apply Your Skills!

A. Solve the following problems:

1. The sum of four numbers is 24. When another number is added, their average becomes 7. Find the number.
2. Mae's age is twice less 5 the age of Mar. If Mar is 17 years old, how old is Mae?
3. Use the digits 3, 7, and 6 once to make the statement true.

$$\square \times \square - \square = 39$$

4. Insert the operation in the box to make a whole number that is:
 - a. highest possible answer
 - b. least possible answer

5 \square 6 \square 7 \square 8 \square 9

B. Let's Create!

Make five expressions on the series of operations and ask your classmates to evaluate them. Ask your teacher to re-check the solutions and answers given by your classmates.

CHAPTER 3

NUMBER THEORY AND FRACTIONS



This chapter provides you more opportunities to study further topics in number theory and fractions. Your knowledge on fractions which you gained in the previous grades will help you learn addition and subtraction of similar and dissimilar fractions. Varied activities on number theory and fractions are provided to you for meaningful learning. Problem-solving lessons are also included as application of your knowledge and skills on number theory and fractions.

Lesson 26: Prime and Composite Numbers



Explore and Discover!

How do you determine the number of factors of a given number?

40	17
18	11

Here's how you do it:

- Think of each number as a product of 2 factors.
Factors are numbers multiplied to get a product.
- Write the number as a product of 2 factors.
- List down the factors of that number.

Study this table.

Number	Product of 2 numbers	Factors
17	1 x 17	1 and 17
11	1 x 11	1 and 11
40	1 x 40 2 x 20 4 x 10 5 x 8	1, 2, 4, 5, 8, 10, 20, and 40
18	1 x 18 2 x 9 3 x 6	1, 2, 3, 6, 9, and 18

Notice that 17 and 11 have two factors each. The factors of 17 are 1 and 17. 17 can be divided exactly by itself and 1. The factors of 11 are 1 and 11. 11 can be divided exactly by itself and 1.

Notice that 40 and 18 have more than 2 factors each. The factors of 40 are 1, 2, 4, 5, 8, 10, 20, and 40. The factors of 18 are 1, 2, 3, 6, 9, and 18.

A number greater than 1 which can be divided exactly by 1 and itself is a prime number. 17 and 11 are examples of prime numbers.

A number with more than 2 factors is a composite number. 40 and 18 are examples of composite numbers. Can you name other prime numbers? Composite numbers?



Get Moving!

A. Copy and complete the table in your notebook.

Number	Factors	Number of Factors	Prime or Composite?
9			
23			
31			
45			
57			
96			
73			

B. Write P if the number is prime and C if it is composite. Write your answers in your notebook.

- | | | | |
|-------|-------|-------|--------|
| 1) 23 | 4) 21 | 7) 37 | 10) 59 |
| 2) 20 | 5) 29 | 8) 45 | 11) 63 |
| 3) 32 | 6) 13 | 9) 64 | 12) 72 |



Keep Moving!

A. List the factors of the following numbers:

- | | | | | |
|-------|-------|-------|-------|--------|
| 1) 54 | 2) 38 | 3) 42 | 4) 51 | 5) 70 |
| 6) 85 | 7) 90 | 8) 57 | 9) 29 | 10) 99 |

B. Circle the prime numbers and box the composite numbers.
Do this in your notebook.

41	64	90	34	54	76	87	99	19	70	60	59	43
65	45	55	75	85	95	22	33	66	88	77	44	55

C. Do what each item tells you to do. Write your answers in your notebook.

1. Write all prime numbers from 5 to 37.
2. Write the prime numbers between 30 and 70.
3. Write the composite numbers between 10 and 50.
4. Write the composite numbers between 50 and 100.
5. Write the smallest composite number.



Apply Your Skills!

Answer the following questions. Write your answers in your notebook.

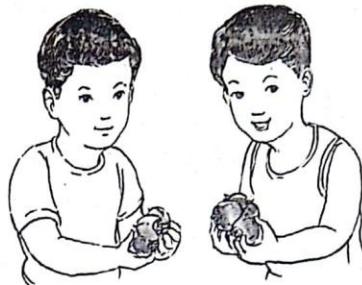
1. What is the largest 2-digit prime number?
2. What is the smallest prime number?
3. What is the largest 2-digit composite number?
4. What is the prime number immediately after 50?
5. What is the sum of all prime numbers between 10 and 30?
6. What is the sum of all prime numbers between 30 and 60?
7. What is the sum of all prime numbers from 61 to 97?
8. What is the product of the prime numbers between 11 and 19?
9. What is the product of the prime numbers immediately before and after 50?
10. What is the sum of the composite numbers from 40 to 50?

Lesson 27: Finding Common Factors and the Greatest Common Factor (GCF)



Explore and Discover!

Alvin has 12 guavas and Elorde has 18 guavas. Each of them will share the guavas to their friends. What is the greatest number of guavas each of their friends get if Alvin and Elorde will give the same number of guavas?



You find the Greatest Common Factor (GCF) of 12 and 18. Study the solution below.

Method 1: By listing the factors of 12 and 18

Factors of 12: 1, 2, 3, 4, 6, and 12

Factors of 18: 1, 2, 3, 6, 9, and 18

By finding the common factors of 12 and 18

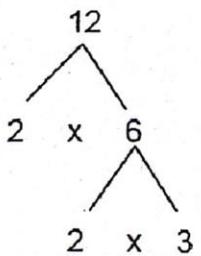
Common factors of 12 and 18: 1, 2, 3, and 6

By getting the Greatest Common Factor (GCF) of 12 and 18

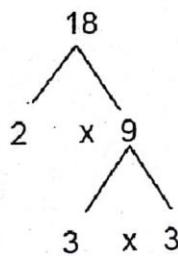
The GCF of 12 and 18 is 6.

Method 2: By writing each number as a product of its prime factors.

Using Factor Tree



$$12 = 2 \times 2 \times 3$$



$$18 = 2 \times 3 \times 3$$

Using Continuous Division

2	12	18
3	6	9
	2	3

$$\text{GCF: } 2 \times 3 = 6$$

By multiplying the common prime factors of 12 and 18

$$12 = \left| \begin{array}{c} 2 \\ | \\ 2 \end{array} \right| \times \left| \begin{array}{c} 2 \\ | \\ 3 \end{array} \right|$$
$$18 = \left| \begin{array}{c} 2 \\ | \\ 2 \end{array} \right| \times \left| \begin{array}{c} 3 \\ | \\ 3 \end{array} \right| \times 3$$

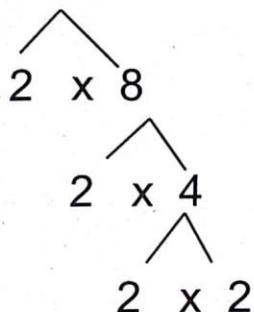
GCF = $2 \times 3 = 6$ So, each of their friends gets 6 guavas.



Get Moving!

- A. Write each number as a product of its prime factors. Use factor tree. The first one is done for you.

1. $16 \rightarrow 16$



2. 24

3. 30

4. 32

5. 48

$16 = 2 \times 2 \times 2 \times 2$

$24 = \underline{\hspace{2cm}}$

$30 = \underline{\hspace{2cm}}$

$32 = \underline{\hspace{2cm}}$

$48 = \underline{\hspace{2cm}}$

- B. List all the factors of each number. Then, find the common factors and the greatest common factor of each pair of numbers.

1. $18 = \underline{\hspace{2cm}}$

$27 = \underline{\hspace{2cm}}$

Common factors: $\underline{\hspace{2cm}}$ GCF: $\underline{\hspace{2cm}}$

2. $21 = \underline{\hspace{2cm}}$

$35 = \underline{\hspace{2cm}}$

Common factors: $\underline{\hspace{2cm}}$ GCF: $\underline{\hspace{2cm}}$

3. $24 = \underline{\hspace{2cm}}$

$36 = \underline{\hspace{2cm}}$

Common factors: $\underline{\hspace{2cm}}$ GCF: $\underline{\hspace{2cm}}$

4. $15 =$ _____

$25 =$ _____

Common factors: _____ GCF: _____

5. $12 =$ _____

$18 =$ _____

Common factors: _____ GCF: _____



Keep Moving!

A. Determine the GCF.

1) $12 = 2 \times 2 \times 3$

$20 = 2 \times 2 \times 5$

4) $28 = 2 \times 2 \times 7$

$42 = 2 \times 3 \times 7$

2) $18 = 3 \times 3 \times 2$

$24 = 2 \times 2 \times 2 \times 3$

5) $24 = 2 \times 2 \times 2 \times 3$

$12 = 2 \times 2 \times 3$

3) $20 = 2 \times 2 \times 5$

$30 = 2 \times 3 \times 5$

6) $32 = 2 \times 2 \times 2 \times 2 \times 2$

$40 = 2 \times 2 \times 2 \times 5$

B. Find the GCF of each pair of numbers. Use listing method, prime factorization, and continuous division. Write your answers in your notebook.

1) 15 and 20

2) 16 and 20

3) 9 and 21

4) 17 and 51

5) 36 and 42

6) 12 and 8

7) 5 and 6

8) 9 and 27

9) 21 and 30

10) 16 and 56



Apply Your Skills!

Read and solve each problem and write your answers in your answer sheet.

1. Ian and Isagani went fishing. Ian caught 21 fish and Isagani caught 28 fish. What is the greatest number of fish each could catch per hour, if they caught the same number of fish per hour?
2. Mr. Rojas has 2 pieces of wood for his scrabble board. One has a width of 18 cm and the other one has 20 cm. If both sizes of wood are to be cut into scrabble tiles of the same width without wasting any wood, what is the greatest width into which the woods can be cut?

Challenge yourself with this problem!

Read the problem and then write the answers to the questions in your notebook.

Aling Juanita has 100 pieces of *suman* to sell. She wants to sell them in pairs, fours, fives, and tens.

- a. How will Aling Juanita sell the pieces of *suman* given her plan?
- b. Can Aling Juanita sell all the pieces of *suman* if she sells them in threes, sixes, and by the dozen? How?

Lesson 28: Finding the Common Multiples and the Least Common Multiple (LCM) of Two Numbers



Explore and Discover!

Carina baked *puto*. She wants to pack them in boxes of 8 and 12 pieces. What is the smallest number of pieces of *puto* that she can pack using the boxes?

To solve the problem, you need to find the least common multiple or LCM of 8 and 12.

Here's how you do it.

➤ By Listing Method

Write the multiples of 8: 8, 16, 24, 32, 40, 48, ...

Write the multiples of 12: 12, 24, 36, 48, 60, ...

Common Multiples: 24, 48

Least Common Multiple (LCM): 24

➤ By Prime Factorization

$$8 = 2 \times 2 \times 2$$

$$12 = 2 \times 2 \times 3$$

$$\text{LCM: } 2 \times 2 \times 2 \times 3 = 24$$

➤ By Continuous Division

2	8	12
2	4	6
3	2	3
2	2	1
		1

$$\text{LCM} = 2 \times 2 \times 3 \times 2 = 24$$

- Notice that 24 is the least common multiple or LCM of 8 and 12. Therefore, the smallest number of pieces of *puto* that can be packed using the boxes is 24.
- You do not include 0 when dealing with common multiples.



Get Moving!

A. Find the common multiples and least common multiple (LCM) of each pair of numbers. Some of the multiples are already given.

1. 2 (0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...)

4 (0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...)

Common multiples: _____

Least Common Multiple (LCM): _____

2. 6 (0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, ...)

8 (0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, ...)

Common multiples: _____

Least Common Multiple (LCM): _____

3. 10 (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, ...)

5 (0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ...)

Common multiples: _____

Least Common Multiple (LCM): _____

4. 6 (0, 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, ...)

4 (0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...)

Common multiples: _____

Least Common Multiple (LCM): _____

5. 18 (0, 18, 36, 54, 72, 90, 108, 126, 144, ...)

30 (0, 30, 60, 90, 120, 150, 180, 210, 240, ...)

Common multiples: _____

Least Common Multiple (LCM): _____

B. Write the letter of the correct answer in your notebook.

1. A common multiple of 6 and 4 is
a. 12 b. 6 c. 3 d. 2
2. A common multiple of 4 and 20 is
a. 3 b. 4 c. 8 d. 20
3. The LCM of 15 and 9 is
a. 135 b. 45 c. 15 d. 3
4. The LCM of 8 and 3 is
a. 24 b. 48 c. 72 d. 36
5. A common multiple of 14 and 10 is
a. 140 b. 70 c. 14 d. 7



Keep Moving!

A. Find the LCM of each set of numbers.

- | | |
|--------------|--------------|
| 1) 24 and 40 | 4) 10 and 15 |
| 2) 25 and 30 | 5) 8 and 10 |
| 3) 18 and 27 | 6) 18 and 6 |

B. Complete the table below. Write your solutions in your notebook.

Method	LCM of 8 and 12	LCM of 56 and 40	LCM of 18 and 24	LCM of 30 and 45
Listing Method				
Prime Factorization				
Continuous Division				



Apply Your Skills!

Answer the following questions and write the correct answers in your notebook.

1. Find the first three common multiples and LCM of 16, 12, and 8.
2. Ferdie works as a food crew every three days, while Angel attends to her job as a cashier every other day. If Ferdie and Angel start on the fifth day of the month, when will both of them report for work together?
3. The pupils of Dupag Elementary School collected used plastic bottles for recycling. They arranged the bottles in boxes of 5 and 6. What is the least number of bottles the pupils gathered in all?

Lesson 29: Solving Real-Life Problems Involving GCF and LCM of Two Given Numbers



Explore and Discover!

Cherry baked 48 pieces of butter cookies and 60 chocolate cookies. If she will put them separately in boxes, what is the most number of cookies that boxes will contain if these are of the same number?

How will you solve for the answer to the problem?



You can use the 4-step plan in solving for the answer.

Understand:	
What does the problem ask for?	The greatest number of cookies that a box will contain
What facts are given?	48 butter cookies, 60 chocolate cookies
Plan:	
How will you solve the problem?	By finding the Greatest Common Factor or GCF
Solve:	
How is the solution done?	By listing the factors 48: 1, 2, 3, 4, 6, 8, 12, 16, 24, and 48 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, and 60 GCF: 12 By Prime factorization $48 = 2 \times 2 \times 2 \times 2 \times 3$ $60 = 2 \times 2 \times 3 \times 5$ GCF: $2 \times 2 \times 3 = 12$
Check and Look Back: What is the answer to the problem?	A box will contain 12 pieces of each cookies

Can you think of other ways to solve the problem?



Get Moving!

Read each problem and answer the questions that follow.
Write your answers in your notebook.

1. There are 16 boys and 24 girls. If they will be grouped separately in teams with the same number, what is the biggest number of children in a group?
 - a. What is asked for in the problem? _____
 - b. What facts are given? _____
 - c. How will you solve the problem? _____
 - d. What is the answer to the problem? _____

2. Mang Andoy is going to put eggs in trays of 6 eggs and 12 eggs. What is the smallest number of eggs that Mang Andoy can put using the trays?
 - a. How will you solve the problem? _____
 - b. What is the answer to the problem? _____



Keep Moving!

Read and solve each problem. Write the solution in your notebook.

1. Mrs. Lim has 56 cups and 64 glasses. If she will put them in trays of cups and trays of glasses with the same number, what is the biggest number of cups or glasses that a tray will contain?

2. A factory is to pack pencils in boxes of 8 and 10 pieces. What is the smallest number of pencils that can be packed using the boxes?



Apply Your Skills!

Challenge yourself by solving these problems. Write your answers in your notebook.

1. What is the smallest number of avocados that can be placed in baskets with 50 and 75 pieces?
2. What is the largest number of pechay and cabbage plants that can be planted in rows of equal number if there are 60 pechay and 80 cabbage plants?
3. Mary has some chocolates. If she shares them equally among 4 friends or 5 friends, there are always 2 extra chocolates left. What is the possible number of chocolates Mary could have?
4. Biscuits are sold in packs of 10, 15, and 20 pieces. How can Lorena buy 90 pieces of biscuits? List all possible answers.

Lesson 30: Creating Problems Involving GCF and LCM

Explore and Discover!

How will you create a problem involving Greatest Common Factor (GCF) or Least Common Multiple (LCM) given the following information?

You can create a problem by following this guide:

- Familiarize yourself with the concepts of GCF and LCM and their application to real-life situations.
- Think of the type of problem you want to create.
- Read some problems and study their solutions.

- A. Hanah has 54 eggs. Joy has 60 eggs.
They want to put the eggs in a tray so that each tray will have the same number of eggs.
- B. ABM bus for Baguio City leaves Manila every 30 minutes.
JBM bus for Baguio City leaves Manila every 20 minutes.

Study the following problems as examples for the above information.

Problem A involves finding the Greatest Common Factor (GCF).

Hanah has 54 eggs. Joy has 60 eggs. They want to put the eggs in trays so that each tray will have the same number of eggs.

What is the greatest possible number of eggs in each tray and the number of trays that they can use?

Problem B involves finding the Least Common Multiple (LCM).

ABM bus for Baguio City leaves Manila every 30 minutes.
JBM bus for Baguio City leaves every 20 minutes.

How often do the two buses for Baguio City leave Manila at the same time?

Can you make another problem similar to these examples?



Get Moving!

- A. Write a question to complete each item. Then, solve each problem.
1. Randy and Harold love playing marbles. Randy has 60 marbles while Harold has 80 marbles. They plan to keep their marbles in a clay jar.
 2. Nayumi is preparing ube and butter cupcakes for her visitors. She arranges the cupcakes in a tray with 9 ube and 12 butter cupcakes.
- B. Create some problems involving GCF and LCM.



Keep Moving!

Write a problem for the numbers and phrases in the box.

- | | | | |
|----|-------------------------|------------------------------|--------------------|
| 1. | 36 and 24
Chairs | Chairs arranged
in a hall | Biggest number |
| 2. | 10 and 12
Oranges | Oranges in a tray | Least number |
| 3. | 4 and 6
String beans | Bundles of
string beans | Greatest
number |



Apply Your Skills!

Create problems involving GCF and LCM based on the following situations:

1. The children are arranging the bottles in a box.
2. Mother shared her vegetables with the neighbors.
3. Jay-ar is selling *pandesal* in the morning.
4. Different groups of volunteers for the typhoon victims
5. Kris is preparing salad for her visitors.

Lesson 31 : Identifying Proper Fraction, Improper Fraction, and Mixed Number



Explore and Discover!

Danny, Wilbert, and Anson are friends. They decided to run a distance.

Study the results below:

Anson $\frac{11}{12}$ kilometer



Danny $\frac{5}{4}$ kilometers

Wilbert $1\frac{2}{7}$ kilometers

Notice that:

In the fraction $\frac{11}{12}$, the numerator is smaller than the denominator. It is a fraction less than 1. It is a *proper fraction*.

In the fraction $\frac{5}{4}$, the numerator is bigger than the denominator. It is a fraction greater than 1. It is an *improper fraction*. A fraction whose numerator is equal to the denominator is also an improper fraction. It is a fraction equal to 1.

An example is $\frac{5}{5}$.

The fraction $1\frac{2}{7}$, contains a whole number and a fraction. It is a *mixed number*.



Get Moving!

Write P if the given is a proper fraction, I if it is an improper fraction, and M if it is a mixed number.

1) $\frac{6}{11}$

6) $\frac{27}{15}$

2) $6 \frac{8}{10}$

7) $\frac{7}{1}$

3) $1 \frac{2}{7}$

8) $\frac{3}{8}$

4) $\frac{15}{60}$

9) $9 \frac{5}{8}$

5) $\frac{9}{8}$

10) $\frac{4}{5}$



Keep Moving!

Write the given fractions correctly in the appropriate column in the table.

$\frac{9}{8}$	$\frac{3}{7}$	$\frac{13}{11}$	$3 \frac{4}{10}$	$\frac{19}{16}$
$\frac{15}{17}$	$7 \frac{5}{6}$	$\frac{7}{5}$	$\frac{21}{9}$	$\frac{6}{13}$

Proper Fractions	Improper Fractions	Mixed Numbers



Apply Your Skills!

Read the problem and write your answer in your notebook.

A meat vendor sells $5\frac{1}{2}$ kilograms of meat to Maricris, $\frac{7}{2}$ kilograms to Glesy, and $\frac{3}{4}$ kilogram to Jim.

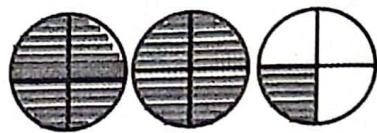
Which fraction is improper? proper? mixed number?

Lesson 32: Changing Improper Fractions to Mixed Numbers and Vice-Versa



Explore and Discover!

Beng will serve $\frac{9}{4}$, *bibingka* to her friends.



How many whole *bibingka* and fractional part of a *bibingka* does she have?

Notice that there are 2 whole *bibingka* and $\frac{1}{4}$ of a *bibingka*.

You need to change $\frac{9}{4}$ to a mixed number.

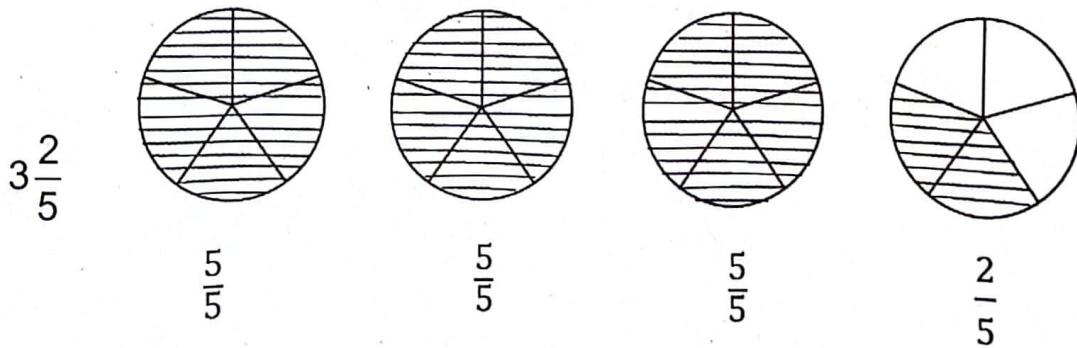
Study the solution below:

$$\frac{9}{4} = 9 \div 4 = 4 \frac{1}{4}$$

Express the remainder as a fraction.

How do you change a mixed number to an improper fraction?

Look at the example:



There are $\frac{17}{5}$ in all.

By computation.

$$\begin{array}{c} + \\ \times \\ \text{---} \\ 3 \frac{2}{5} \\ = \frac{(5 \times 3) + 2}{5} = \frac{15 + 2}{5} = \frac{17}{5} \end{array}$$



Get Moving!

Fill in the boxes with the correct numerator or denominator to make each item true.

$$1) 3\frac{1}{4} = \frac{\square}{4}$$

$$2) 2\frac{3}{5} = \frac{\square}{5}$$

$$3) 4\frac{2}{3} = \frac{14}{\square}$$

$$4) 6\frac{4}{5} = \frac{34}{\square}$$

$$5) \frac{13}{2} = \frac{\square}{2} \frac{1}{2}$$

$$6) \frac{27}{8} = \frac{\square}{8} \frac{3}{8}$$

$$7) 5\frac{3}{4} = \frac{23}{\square}$$

$$8) 7\frac{2}{5} = \frac{\square}{5}$$

$$9) 9\frac{1}{5} = \frac{46}{\square}$$

$$10) \frac{23}{2} = \frac{\square}{2} \frac{1}{2}$$



Keep Moving!

A. Write the following as improper fractions:

$$1) 3\frac{4}{5}$$

$$2) 5\frac{3}{7}$$

$$3) 4\frac{4}{7}$$

$$4) 10\frac{2}{3}$$

$$5) 7\frac{3}{5}$$

$$6) 9\frac{6}{7}$$

$$7) 8\frac{3}{8}$$

$$8) 6\frac{5}{7}$$

$$9) 7\frac{2}{9}$$

$$10) 11\frac{5}{6}$$

B. Write the following as mixed numbers or whole numbers:

$$1) \frac{13}{3}$$

$$2) \frac{16}{5}$$

$$3) \frac{11}{11}$$

$$4) \frac{8}{3}$$

$$5) \frac{30}{9}$$

$$6) \frac{18}{4}$$

$$7) \frac{21}{6}$$

$$8) \frac{24}{8}$$

$$9) \frac{23}{7}$$

$$10) \frac{14}{7}$$



Apply Your Skills!

Supply the missing number.

$$1) \square \frac{4}{5} = \frac{14}{5}$$

$$2) \square \frac{6}{\square} = \frac{30}{8}$$

$$3) \frac{35}{4} = \square \frac{3}{4}$$

Solve.

1. How many fourths are there in $3\frac{2}{8}$?

2. How many fifths are there in $8\frac{4}{5}$?

Lesson 33: Changing Fractions to Lowest Terms

Explore and Discover!

Nhel is helping Edward clean the backyard. They spend 2 hours doing this every Saturday morning.

What part of the day do they spend cleaning the backyard? Express your answer in lowest term.

How will you solve the problem?

THINK: 2 hours out of 24 hours

In fraction, it is written as $\frac{2}{24}$

To change $\frac{2}{24}$ to its lowest term, you do this:

$$\frac{2}{24} = \frac{2}{24} \div 2 = \frac{1}{12}$$



The divisor 2 is the greatest common factor of 2 and 24.

That means, Nhel and Edward spend $\frac{1}{12}$ of the day cleaning the backyard. A fraction is in its lowest term if the numerator and denominator have no other common factor except 1.

Both $\frac{1}{12}$ and $\frac{2}{24}$ are equivalent fractions. Equivalent fractions are fractions with the same size.



Get Moving!

- A. Put a check (✓) before each item if the given fraction is in its lowest term and cross (X) if it is not.

_____ 1) $\frac{3}{7}$

_____ 2) $\frac{2}{28}$

_____ 3) $\frac{8}{14}$

$\underline{\quad} 4) \frac{3}{5}$

$\underline{\quad} 5) \frac{4}{25}$

$\underline{\quad} 6) \frac{9}{15}$

$\underline{\quad} 7) \frac{3}{24}$

$\underline{\quad} 8) \frac{5}{9}$

$\underline{\quad} 9) \frac{2}{17}$

$\underline{\quad} 10) \frac{8}{12}$

B. Fill in the boxes with the correct numerator or denominator to make the fractions equivalent.

$1) \frac{6}{8} = \frac{\square}{4}$

$2) \frac{2}{4} = \frac{\square}{2}$

$3) \frac{10}{18} = \frac{5}{\square}$

$4) \frac{12}{18} = \frac{36}{\square}$

$5) \frac{6}{9} = \frac{2}{\square}$

$6) \frac{27}{30} = \frac{9}{\square}$

$7) \frac{3}{6} = \frac{1}{\square}$

$8) \frac{8}{10} = \frac{\square}{5}$

$9) \frac{5}{15} = \frac{45}{\square}$

$10) \frac{3}{33} = \frac{1}{\square}$

C. Reduce each fraction to its lowest term.

$1) \frac{15}{25}$

$2) \frac{12}{16}$

$3) \frac{6}{12}$

$4) \frac{10}{35}$

$5) \frac{8}{40}$

$6) \frac{3}{12}$

$7) \frac{9}{27}$

$8) \frac{13}{39}$

$9) \frac{3}{45}$

$10) \frac{8}{48}$



Keep Moving!

A. Put a check (\checkmark) if the fraction is in lowest term. If not, write it in lowest term. Write your answers in your notebook.

$1) \frac{4}{7}$

$2) \frac{7}{21}$

$3) \frac{3}{12}$

$4) \frac{5}{12}$

$$5) \frac{8}{40}$$

$$6) \frac{3}{40}$$

$$7) \frac{11}{15}$$

$$8) \frac{13}{39}$$

$$9) \frac{3}{27}$$

$$10) \frac{6}{20}$$

B. Write each fraction in lowest term.

$$1) \frac{10}{25} =$$

$$2) \frac{15}{18} =$$

$$3) \frac{9}{18} =$$

$$4) \frac{12}{36} =$$

$$5) \frac{9}{45} =$$

$$6) \frac{6}{24} =$$

$$7) \frac{7}{21} =$$

$$8) \frac{16}{48} =$$

$$9) \frac{2}{30} =$$

$$10) \frac{9}{54} =$$



Apply Your Skills!

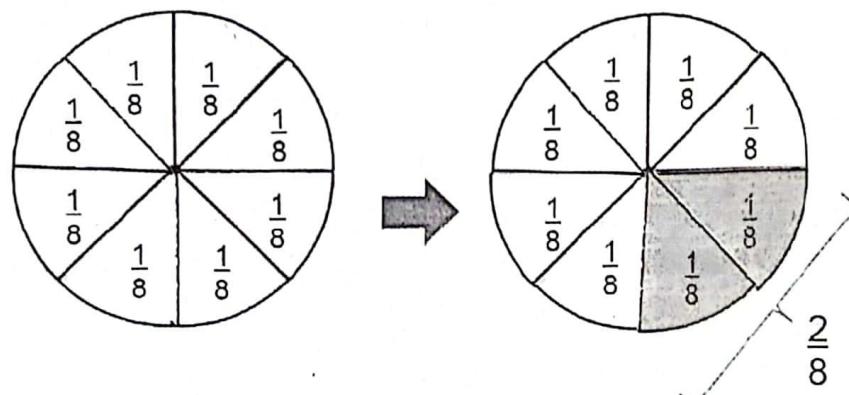
Read each problem. Then, solve.

1. Every Saturday, Mother and Claire go to the market. On each marketing day, they spend 3 hours including the travel time. What fraction of the day is used in marketing every Saturday? Express your answer in lowest term.
2. Century is what part of the Millennium? Express your answer in lowest term.
3. A farmer planted $\frac{12}{18}$ of his farm with pechay. How many thirds of the farm was planted with pechay?

Lesson 34 : Visualizing Addition and Subtraction of Similar Fractions

Explore and Discover!

Joseph and his mother bought a cake near Sto. Domingo Church. They divided the cake into eight equal parts. They ate $\frac{2}{8}$ and brought home the rest. What part of the cake did they bring home?



$$\frac{8}{8} - \frac{2}{8} = \frac{6}{8}$$

$\frac{6}{8}$ can still be reduced to lowest term by getting the GCF.

$$\frac{6 \div 2}{8 \div 2} = \frac{3}{4}$$

Therefore, Joseph and his mother brought home $\frac{3}{4}$ cake. Fractions with the same denominator are called similar fractions. Study how you add similar fractions.



$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$



Get Moving!

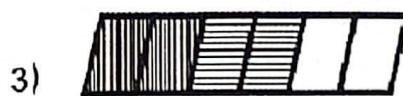
Find the sum or difference and express your answer in lowest term if possible.



$$\frac{3}{4} - \frac{2}{4} =$$



$$\frac{5}{7} - \frac{3}{7} =$$



$$\frac{2}{6} + \frac{2}{6} =$$



$$\frac{8}{9} + \frac{5}{9} =$$

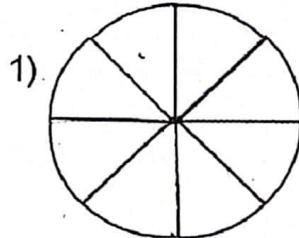


$$\frac{10}{12} + \frac{6}{12} =$$

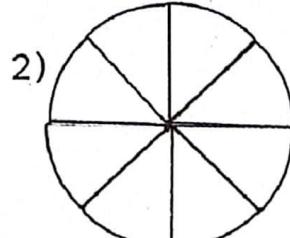


Keep Moving!

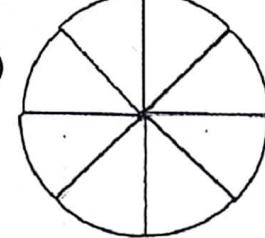
- A. Show the fractional parts of the given illustrations by using crayons. Then, perform the indicated operation.



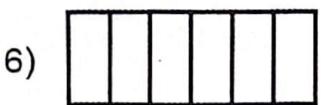
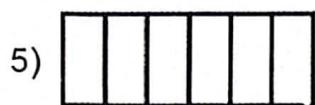
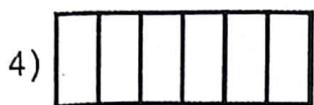
$$\frac{8}{8} - \frac{3}{8} =$$



$$\frac{2}{8} + \frac{2}{8} =$$



$$\frac{6}{8} - \frac{4}{8} =$$

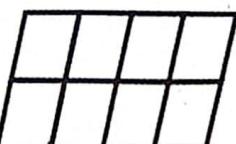
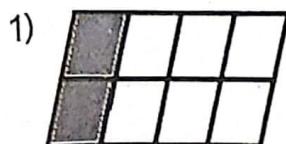


$$\frac{2}{6} + \frac{4}{6} =$$

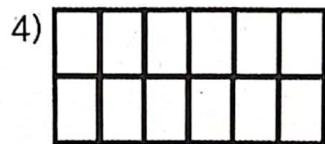
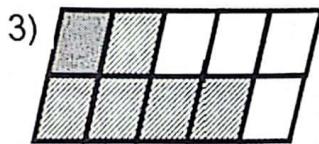
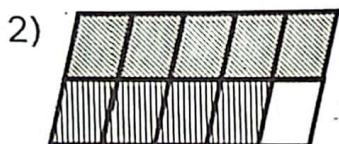
$$\frac{3}{6} + \frac{1}{6} =$$

$$\frac{5}{6} + \frac{1}{6} =$$

B. Complete each number sentence by writing the missing fraction.
Then, use the shaded regions to show the number sentence.



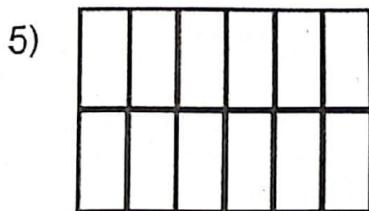
$$\frac{2}{8} + \boxed{} = \frac{6}{8}$$



$$\frac{9}{10} - \boxed{} = \frac{5}{10}$$

$$\frac{6}{10} - \boxed{} = \frac{1}{10}$$

$$\boxed{} + \frac{5}{12} = \frac{11}{12}$$



$$\frac{5}{12} + \frac{7}{12} = \boxed{}$$

6)

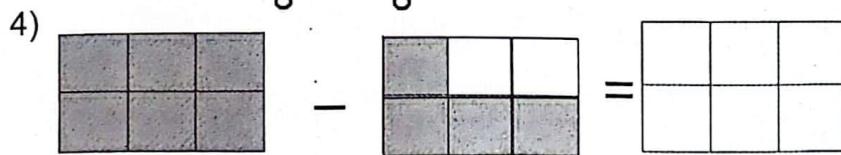
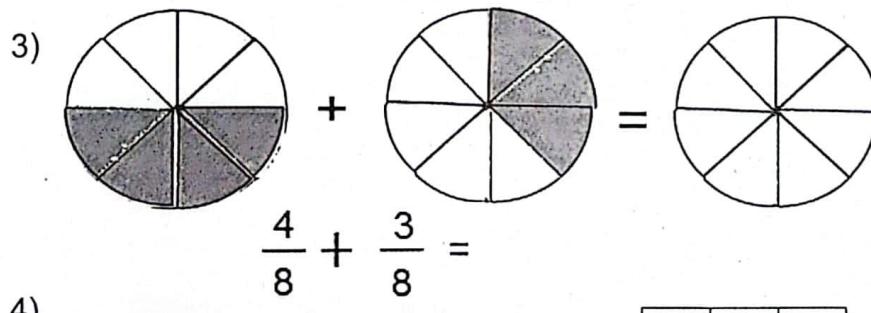
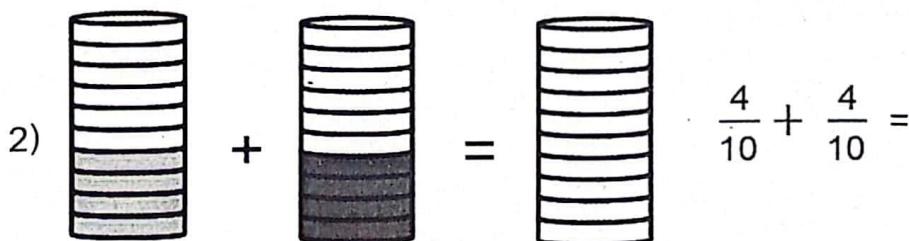
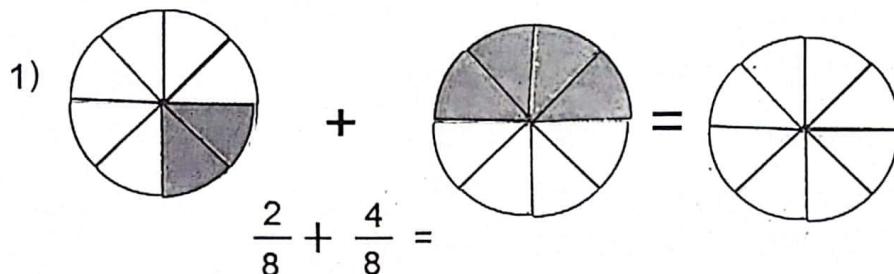


$$\frac{18}{18} - \frac{11}{18} = \boxed{}$$



Apply Your Skills!

A. Find the sum or difference. Shade using crayons to show the answer.



$$\frac{6}{6} + \frac{4}{6} =$$

B. Find the sum or difference and express your answer in lowest term if possible.

1) $\frac{3}{7} + \frac{1}{7} = \underline{\quad}$ 2) $\frac{5}{12} + \frac{3}{12} = \underline{\quad}$ 3) $\frac{4}{15} - \frac{1}{15} = \underline{\quad}$

4) $\frac{6}{9} - \frac{11}{18} = \underline{\quad}$ 5) $\frac{3}{8} - \frac{2}{8} = \underline{\quad}$

Lesson 35: Adding and Subtracting Similar Fractions



Explore and Discover!

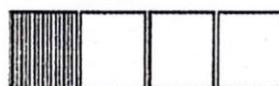
The Supreme Pupil Government (SPG) of Bussing School was able to collect $\frac{2}{4}$ kg of plastic bottles and $\frac{1}{4}$ kg of disposable spoons and forks for their project *Pera Mula sa Basura*. How many kilograms of items did the pupils collect in all? How many kilograms more of plastic bottles than disposable spoons and forks were collected?



Find $\frac{2}{4} + \frac{1}{4}$



$\frac{2}{4}$ parts is shaded



$\frac{1}{4}$ part is shaded



$\frac{3}{4}$ parts is shaded

So, $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

Notice that $\frac{2}{4}$ and $\frac{1}{4}$ are similar fractions.

When adding similar fractions, add the numerators and write the sum over the common denominator.

Answer: The SPG was able to collect $\frac{3}{4}$ kg of items.

To find the answer to the second question, subtract $\frac{1}{4}$ from $\frac{2}{4}$.

$$\frac{2}{4} - \frac{1}{4} = \frac{1}{4}$$

Answer: There was $\frac{1}{4}$ kilogram more of plastic bottles collected than disposable spoons and forks.

In subtracting similar fractions, subtract the numerators and write the difference over the common denominator.

Solve $\frac{8}{9} + \frac{5}{9}$

$$\frac{8}{9} + \frac{5}{9} = \frac{13}{9} \text{ or } 1\frac{4}{9}$$

Solve $\frac{8}{9} - \frac{5}{9}$

$$\frac{8}{9} - \frac{5}{9} = \frac{3}{9} \text{ or } \frac{1}{3}$$



Get Moving!

Give the missing numbers.

1) $\frac{3}{5} + \frac{1}{5} = \frac{\square}{5}$

2) $\frac{4}{7} + \frac{2}{7} = \frac{\square}{7}$

3) $\frac{3}{8} + \frac{2}{8} = \frac{\square}{8}$

4) $\frac{7}{11} - \frac{2}{11} = \frac{\square}{11}$

5) $\frac{10}{15} - \frac{3}{15} = \frac{\square}{15}$

6) $\frac{13}{21} - \frac{8}{21} = \frac{\square}{21}$



Keep Moving!

A. Find the sum. Write your answers in lowest terms if possible.

1) $\frac{3}{6} + \frac{1}{6}$

4) $\frac{8}{15} + \frac{2}{15}$

2) $\frac{7}{20} + \frac{4}{20}$

6) $\frac{4}{8} + \frac{2}{8}$

3) $\frac{5}{10} + \frac{3}{10}$

7) $\frac{8}{30} + \frac{12}{30}$

B. Find the difference. Write your answers in lowest terms if possible.

$$1) \frac{5}{6} - \frac{3}{6}$$

$$4) \frac{15}{20} - \frac{10}{20}$$

$$2) \frac{7}{10} - \frac{3}{10}$$

$$5) \frac{20}{24} - \frac{4}{24}$$

$$3) \frac{8}{12} - \frac{5}{12}$$

$$6) \frac{25}{30} - \frac{5}{30}$$



Apply Your Skills!

Read each problem then, answer the questions that follow.

1. Liza bought *bibingka*. She sliced it into 8 equal pieces.

She ate $\frac{1}{8}$ and Danny ate $\frac{3}{8}$. What part of the *bibingka* did they eat?

- a. What is asked?
- b. What are given?
- c. How will you draw a picture to represent the problem?
- d. What is the operation to be used?
- e. What is the number sentence?
- f. How is the solution done? Show your solution.
- g. What is the complete answer?

2. Luz will cook hot cake for her snack. She needs $\frac{15}{20}$ cup of flour. Mother gave her $\frac{10}{20}$ cup of flour. How many more cups does she need?

- a. What is the operation to be used?
- b. What is the number sentence?
- c. How is the solution done? Show your solution.
- d. What is the complete answer?

Lesson 36: Visualizing Subtraction of a Fraction from a Whole Number

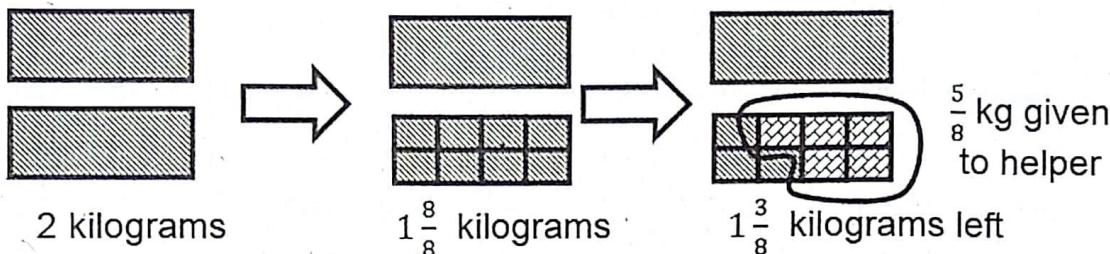
Explore and Discover!

Father bought 2 kilograms of fruits from the market. He gave $\frac{5}{8}$ kg to his helper.

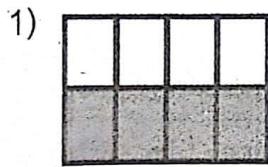


How many kilograms of fruits were left for his family?
How will you solve the problem?

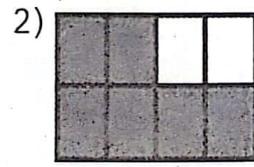
Study the illustration and solution below.



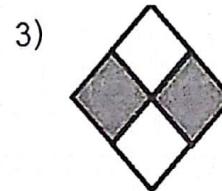
Get Moving!



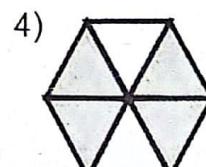
$$\frac{8}{8} - \frac{4}{8} = \underline{\quad}$$



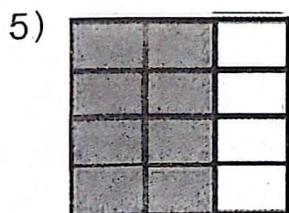
$$\frac{8}{8} - \frac{6}{8} = \underline{\quad}$$



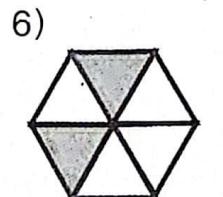
$$\frac{4}{4} - \frac{2}{4} = \underline{\quad}$$



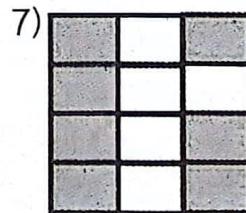
$$\frac{6}{6} - \frac{4}{6} = \underline{\quad}$$



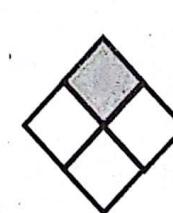
$$\frac{12}{12} - \frac{8}{12} = \underline{\quad}$$



$$\frac{6}{6} - \frac{2}{6} = \underline{\quad}$$



$$\underline{\quad} - \frac{7}{12} = \frac{5}{12}$$



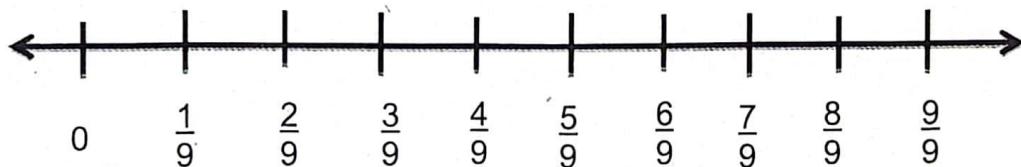
$$\frac{4}{4} - \frac{2}{4} = \frac{1}{4}$$



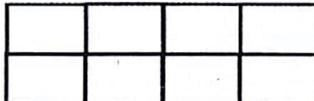
Keep Moving!

Read the situation carefully. Then, answer the questions that follow.

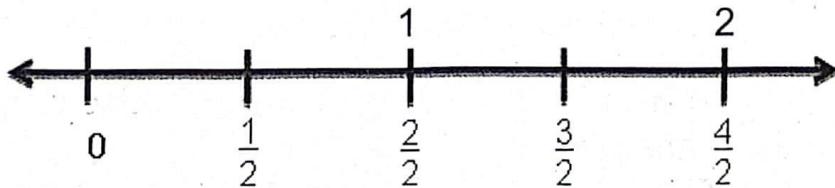
1. Genevieve was walking to school one day when she noticed that her handkerchief was missing. She already walked 1 kilometer from her house. She thought that she had dropped it on her way to school. She had walked back $\frac{3}{9}$ kilometer when she found her handkerchief.
 - a. How far from home did she find her handkerchief?
 - b. Show in the number line the path that Genevieve went through to find her handkerchief.



2. Randy bought 1 whole cartolina. He shared $\frac{3}{8}$ of it with friends.
 - a. What part of the cartolina was left for him?
 - b. Shade the figure below to show your answer.



3. Jericho bought 2 meters of wire in the hardware. He used $\frac{1}{2}$ meter for his project. How long was left of the wire?



4. From 10 meters of wire, $\frac{3}{4}$ meter was cut.
 - a. How many meters of wire were left?
 - b. Show your answer by using an illustration.

5. What is the difference between 2 and $\frac{3}{6}$?
Show your answer using a number line.



Apply Your Skills!

A. Find the difference.

Use regions or number lines to show your answers.

$$1) \quad 4$$

$$\begin{array}{r} - \\ 3 \\ \hline 5 \end{array}$$

$$2) \quad 5$$

$$\begin{array}{r} - \\ 4 \\ \hline 7 \end{array}$$

$$3) \quad 6$$

$$\begin{array}{r} - \\ 2 \\ \hline 3 \end{array}$$

$$4) \quad 5$$

$$\begin{array}{r} - \\ 7 \\ \hline 8 \end{array}$$

$$5) \quad 7$$

$$\begin{array}{r} - \\ 2 \\ \hline 5 \end{array}$$

$$6) \quad 8$$

$$\begin{array}{r} - \\ 3 \\ \hline 7 \end{array}$$

$$7) \quad 6$$

$$\begin{array}{r} - \\ 4 \\ \hline 5 \end{array}$$

$$8) \quad 5$$

$$\begin{array}{r} - \\ 9 \\ \hline 12 \end{array}$$

$$9) \quad 4$$

$$\begin{array}{r} - \\ 2 \\ \hline 9 \end{array}$$

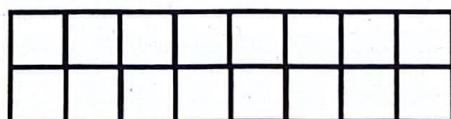
$$10) \quad 6$$

$$\begin{array}{r} - \\ 2 \\ \hline 7 \end{array}$$

B. Read and solve the following problems:

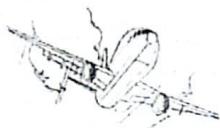
1. Mother divided a cassava cake into 16 equal parts.

Her children ate $\frac{7}{16}$. How much cake was left? Use crayons to illustrate the answer.



2. If $\frac{5}{12}$ is subtracted from 5, what is the difference? Illustrate your answer.

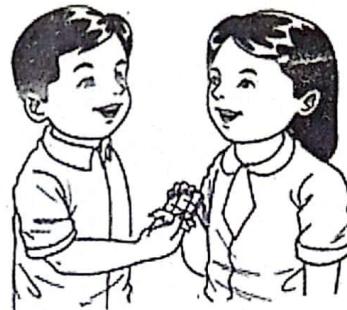
Lesson 37: Visualizing Addition and Subtraction of Dissimilar Fractions



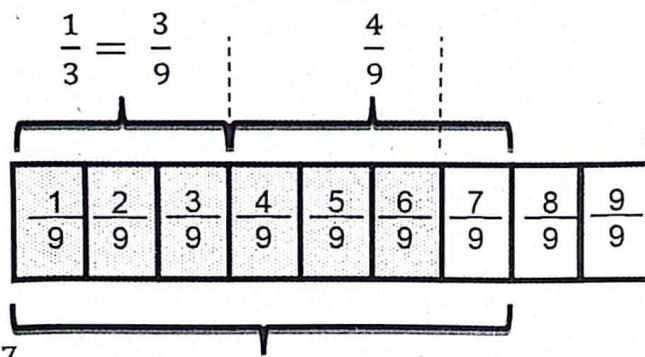
Explore and Discover!

Ellen received $\frac{7}{9}$ of a chocolate bar. When John asked for some, she gave $\frac{1}{3}$. How much was left with Ellen?

You can find the answer by using regions or illustration. One whole chocolate bar is represented by one strip.



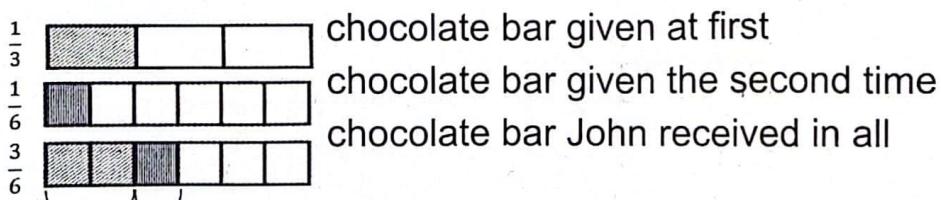
Chocolate shared



$$\frac{7}{9} - \frac{3}{9} = \frac{4}{9} \quad \text{Chocolate left with Ellen}$$

What if Ellen gave John $\frac{1}{6}$ more chocolate bar? How much chocolate did John receive in all?

To find the answer you need to draw regions.



$$\frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \frac{3}{6} \text{ or } \frac{1}{2}$$



Get Moving!

A. Match expressions on the left with the illustrations on the right.

$$1) \frac{3}{5} + \frac{2}{10}$$

a. + =

$$2) \frac{3}{4} - \frac{1}{2}$$

b. + =

$$3) \frac{3}{4} + \frac{1}{8}$$

c. - =

$$4) \frac{4}{5} + \frac{1}{2}$$

d. - =

$$5) \frac{2}{3} - \frac{1}{2}$$

e. - =

B. Illustrate by using rectangular regions, then solve.

$$1) \frac{3}{4} + \frac{1}{3}$$

$$2) \frac{2}{3} - \frac{2}{5}$$

$$3) \frac{1}{2} + \frac{1}{5}$$

$$4) \frac{4}{5} + \frac{1}{2}$$

$$5) \frac{3}{4} + \frac{2}{3}$$



Keep Moving!

A. Illustrate to find the sum or difference.

$$1) \frac{1}{2} - \frac{1}{6}$$

$$2) \frac{2}{3} + \frac{1}{4}$$

$$3) \frac{5}{8} + \frac{1}{4}$$

$$4) \frac{5}{6} + \frac{2}{3}$$

$$5) \frac{7}{9} - \frac{1}{3}$$

$$6) \frac{3}{4} - \frac{3}{6}$$

$$7) \frac{6}{7} + \frac{3}{14}$$

$$8) \frac{9}{10} - \frac{1}{2}$$

$$9) \frac{8}{9} - \frac{1}{3}$$

$$10) \frac{1}{2} + \frac{3}{7}$$



Apply Your Skills!

Read and solve. Use drawings to help you.

1. Larry spent $\frac{12}{15}$ hour doing his assignments while Amado spent $\frac{3}{4}$ hour. Who spent more time in doing his assignments? By how much more?
2. Luis had $\frac{8}{10}$ meter of wood for the frame that he is doing. His Father gave him $\frac{1}{4}$ meter more. How many meters of wood does he have now?
3. Angelica needs $\frac{4}{5}$ kilogram of chicken for her recipe in EPP-H.E. subject. She already has $\frac{2}{4}$ kilogram. How many more kilograms does she need?
4. Ella had a piece of ribbon. After using $\frac{3}{8}$ meter for her headband, she had $\frac{1}{4}$ meter left. How many meters of ribbon did she have at first?

Lesson 38: Adding and Subtracting Dissimilar Fractions



Explore and Discover!

Lisa bought $\frac{3}{4}$ kilogram of lanzones and $\frac{1}{2}$ kilogram of apples. How many kilograms of fruits did she buy in all? How many more kilogram of lanzones than apple did she buy?



How will you answer the questions in the problem?

To answer the first question, add $\frac{3}{4}$ and $\frac{1}{2}$.

The number sentence is $\frac{3}{4} + \frac{1}{2} = n$

$$\begin{array}{rcl} \frac{3}{4} & = & \frac{3}{4} \\ + \frac{1}{2} & = & \frac{2}{4} \\ \hline \frac{5}{4} & = & 1 \frac{1}{4} \end{array} \quad \begin{array}{l} \longrightarrow \text{LCD} \\ \longrightarrow \text{LCD} \end{array}$$

- Change $\frac{3}{4}$ and $\frac{1}{2}$ to similar fractions by finding the Least Common Denominator (LCD) or LCM of 2 and 4.
- Add the numerators.
- Write the sum over the least common denominator.
- Write the answer as a mixed number if it is an improper fraction.

Answer: Liza bought $1 \frac{1}{4}$ kilograms of fruits in all.

To find the answer to the second question in the problem, subtract $\frac{1}{2}$ from $\frac{3}{4}$.

The number sentence is $\frac{3}{4} - \frac{1}{2} = n$

$$\begin{array}{rcl} \frac{3}{4} & = & \frac{3}{4} \\ - \frac{1}{2} & = & \frac{2}{4} \\ \hline \frac{1}{4} & & \end{array} \quad \begin{array}{l} \longrightarrow \text{LCD} \\ \longrightarrow \text{LCD} \end{array}$$

- Change $\frac{3}{4}$ and $\frac{1}{2}$ to similar fractions by first finding the LCD of 2 and 4.
- Subtract the numerators.
- Write the sum over the least common denominator.

So, Liza bought $\frac{1}{4}$ kilogram more lanzones than apples.



Get Moving!

A. Add or subtract. Write your answers in your notebook.

$$1) \frac{5}{8} + \frac{1}{2} = \boxed{}$$

$$5) \frac{3}{5} + \frac{1}{2} = \boxed{}$$

$$2) \frac{3}{4} + \frac{1}{3} = \boxed{}$$

$$6) \frac{9}{10} - \frac{2}{5} = \boxed{}$$

$$3) \frac{6}{9} + \frac{2}{3} = \boxed{}$$

$$7) \frac{4}{5} - \frac{1}{2} = \boxed{}$$

$$4) \frac{5}{6} - \frac{1}{4} = \boxed{}$$

$$8) \frac{9}{12} - \frac{3}{6} = \boxed{}$$



Keep Moving!

Solve for n . Write your answers in lowest form if needed.

$$1) \frac{3}{5} + \frac{1}{2} = n$$

$$6) \frac{5}{6} - \frac{1}{3} = n$$

$$2) \frac{5}{6} + \frac{1}{3} = n$$

$$7) \frac{7}{10} - \frac{3}{5} = n$$

$$3) \frac{2}{3} + \frac{1}{4} = n$$

$$8) \frac{8}{9} - \frac{2}{3} = n$$

$$4) \frac{3}{10} - \frac{4}{5} = n$$

$$9) \frac{5}{6} - \frac{3}{4} = n$$

$$5) \frac{7}{8} - \frac{1}{3} = n$$

$$10) \frac{11}{12} - \frac{5}{6} = n$$



Apply Your Skills!

- A. Study the problem and answer the questions that follow. Write the answers in your notebook.

Alma went to the grocery store to buy $\frac{1}{2}$ kg of Baguio cabbage and $\frac{1}{8}$ kg of imported cabbage. Her mother used $\frac{1}{8}$ kg of cabbage for *pancit*. How many kilograms of cabbages were left?

1. What did Alma buy?
2. How many kilograms of cabbages did Alma buy from the grocery?
3. How many kilograms of cabbages did her mother use for *pancit*?
4. How many kilograms were left?
5. How did you solve the problem?

- B. Read and solve each problem. Write the answer in your notebook.

1. Mrs. Santos has $\frac{2}{3}$ meter of red lace. Her daughter gave her $\frac{2}{3}$ meter of yellow lace. How many more meters of red lace does Mrs. Santos have than yellow lace?
2. Rose has $\frac{2}{3}$ cup of coconut vinegar. Her neighbor Liza asks for $\frac{2}{3}$ cup of vinegar. How much vinegar was left with Rose?
3. Jane has $\frac{2}{3}$ of a pizza. Her friend Remy has $\frac{2}{3}$ of a pizza. Who has more pizza? By how much?

Lesson 39: Solving Word Problems Involving Addition or Subtraction of Fractions



Explore and Discover!

Marlon painted his poultry house using $\frac{5}{6}$ liter of green paint and $\frac{2}{3}$ liter of yellow paint. What color of paint was used more than the other? How much more of it was used than the other?



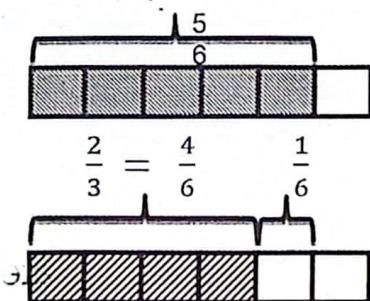
You can solve the problem using the following steps.

Understand:

- Know what is asked:
The paint color that was used more and by how much more
- Know the given facts:
 $\frac{5}{6}$ liter of green paint; $\frac{2}{3}$ liter of yellow paint

Plan:

- Draw a picture:



- Identify the operation to use:
Subtraction
- Write the number sentence:
$$\frac{5}{6} - \frac{2}{3} = n$$

Solve:

- Solution:

Check and Look back:

- Answer:

$$\begin{aligned}\frac{5}{6} - \frac{2}{3} &= \frac{5}{6} - \frac{4}{6} = \frac{1}{6} \\ \text{a. more green paint was used} \\ \text{b. by } \frac{1}{6} \text{ liter}\end{aligned}$$



Get Moving!

Read each problem carefully and then solve.

1. A vendor sliced some pizzas into eighths. After selling 57 slices, 7 slices were left. How many whole pizzas did the vendor slice?
2. The Boy Scouts spent $\frac{10}{12}$ hour doing their daily exercises. They only used $\frac{1}{4}$ hour in hiking. How much time did they use for other body exercises?
3. Ervin hiked $\frac{5}{7}$ of a kilometer. Jericho hiked $\frac{2}{3}$ kilometer. Who covered a longer distance? How much longer?



Keep Moving!

Read and solve each problem.

1. Humprey rode his bicycle $\frac{1}{2}$ kilometer to school, $\frac{1}{5}$ kilometer to the store, and $\frac{2}{10}$ kilometer home. What is the distance traveled by Humprey?
2. Alma ran for $\frac{7}{8}$ hour and walked for $\frac{1}{2}$ hour to practice for a race. How much longer did she run than walk?
3. Father bought a pizza. Tess ate $\frac{2}{5}$ and Lotis ate $\frac{2}{10}$. How much of the pizza was left?
4. Metchie used $\frac{8}{9}$ liter of vegetable oil in frying fishball while $\frac{13}{45}$ liter was used in preparing *kikiam*. Which food item used $\frac{3}{5}$ more vegetable oil? By how much more?
5. Samantha and Antonio bought 5 kilograms of pechay from the market. They gave $\frac{5}{6}$ kilogram to their aunt. How many kilograms of pechay did they bring home?



Apply Your Skills!

Challenge yourself with more problems!

Read and answer each problem.

1. Mother plans to buy $\frac{1}{2}$ kilogram of chicken and $\frac{2}{5}$ kilogram of beef. How many kilograms of meat does she plan to buy?
2. Marlen has 3 pieces of lace each measuring $\frac{1}{7}$ meter, $\frac{5}{15}$ meter, and $\frac{3}{7}$ meter. How long are the pieces of lace put together?
3. Rhodora has $\frac{2}{8}$ meter of ribbon. Ellen's ribbon is $\frac{1}{5}$ meter longer than Rhodora's. How many meters of ribbon do the girls have altogether?

Lesson 40: Creating Problems Involving Addition and Subtraction of Fractions



Explore and Discover!

How do you create a word problem involving addition, subtraction, or addition and subtraction of fractions?

You can create a word problem by observing the following guide:



- Familiarize yourselves with the concepts of addition and subtraction of fractions and their application to real-life situations.
- Think of the problem you want to write.
- Read some problems and study their solutions.

You also consider the following when creating a problem:

- a. Characters
- b. Situation/Setting
- c. Data
- d. Key question

Study the table below:

Name	Fruit They Bought	Quantity	Unit
1. Cyril	Banana	$\frac{3}{4}$	kg
2. Cyrus	Guava	$\frac{1}{4}$	kg

Study the problem as an example for the data given.

Cyril and Cyrus went to the market. Cyril bought $\frac{3}{4}$ kilogram of banana while Cyrus bought $\frac{1}{4}$ kilogram of guava. How many kilograms of fruits did they buy in all?



Get Moving!

Use the data below to create a one-step word problem involving subtraction of fractions:

Name	Fruit They Bought	Quantity	Unit
1. Eric	atis	$\frac{3}{4}$	kg
2. Simon	chico	$\frac{1}{4}$	kg



Keep Moving!

Use the data below to create a two-step word problem involving addition and subtraction of fractions.

Name	Quantity	Unit	Fruit They Bought
1. Rico	$\frac{3}{4}$	kg	Banana
2. Alvin	$\frac{1}{4}$	kg	Guava
3. John	$\frac{1}{4}$	kg	Rambutan



Apply Your Skills!

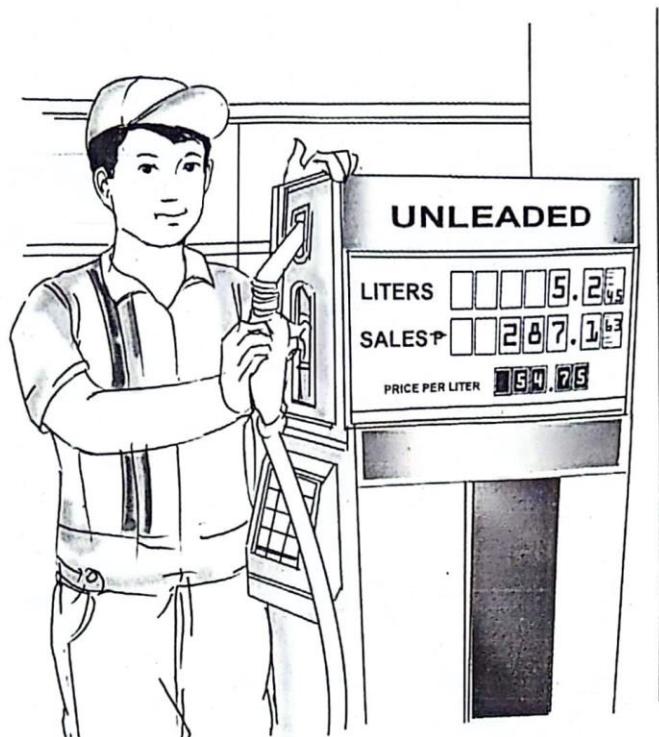
Using the data below, create a problem for each of the following.

1. One-step word problem involving addition of fractions
2. One-step word problem involving subtraction of fractions
3. Two-step word problem involving addition and subtraction of fractions

Name	Quantity	Quantity (in kilograms)
1. Shanot	Lansones	$\frac{1}{2}$
2. Tabern	Guava	$\frac{1}{2}$
3. Dick	Rambutan	$\frac{3}{4}$

CHAPTER 4

DECIMALS



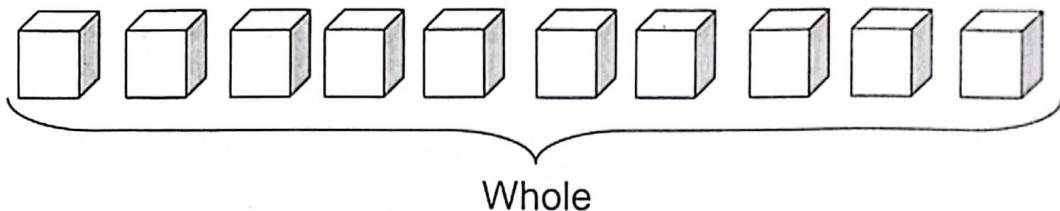
This chapter deals with decimals which are first introduced in Grade 4. It starts with visualizing decimals using models like blocks, grids, number lines, and money. With these lessons, you will see the relationship between decimals and fractions as a means to be able to change one form to the other and vice versa; that is, renaming decimals to fractions and then fractions to decimals. You will also learn to determine the place value and value of a digit of a given decimal number through hundredths which will help you to read and write decimal numbers in words and in symbols.

Lesson 41: Visualizing Decimal Numbers Using Models like Blocks, Grids, Number Lines, and Money

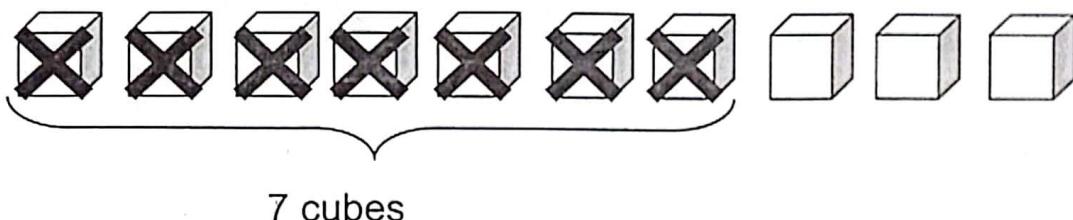


Explore and Discover!

Look at the blocks or cubes model below to visualize 0.7. Observe that there are 10 cubes representing the whole.

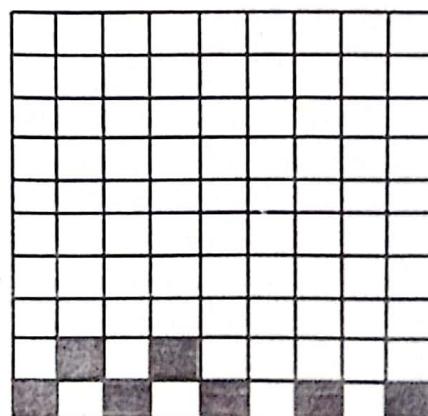


Cross out 7 cubes from the whole unit.

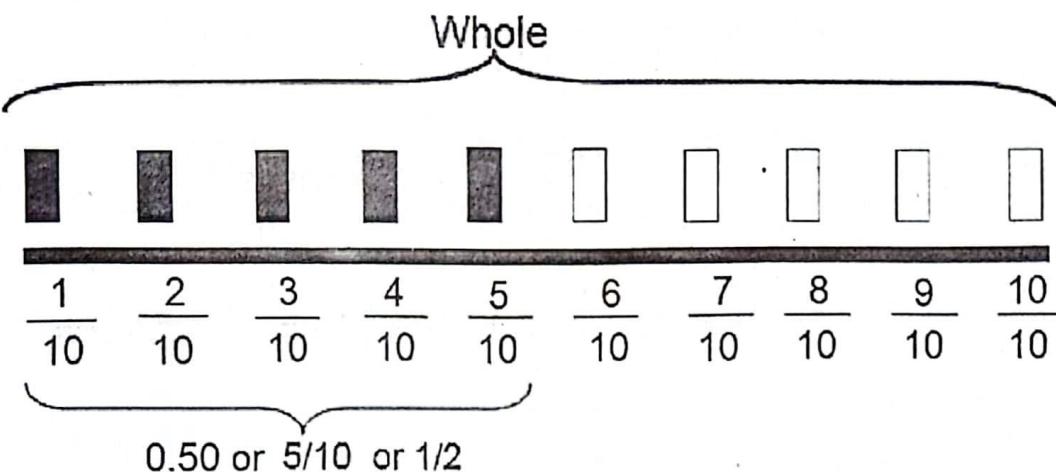


There are 7 cubes crossed out of 10. This can be written as $\frac{7}{10}$ in fraction form or 0.7 in decimal form.

Look at the grid at the right. You observe that there are 100 squares. This means the whole is equally divided into 100 squares. There are 7 squares shaded out of 100 squares.
 $\frac{7}{100}$ can be written as 0.07 in decimal form.



Look at the illustration below. Notice the number of posts in the number line. There are 10 posts. 5 posts out of 10 are painted. $\frac{5}{10}$ of the posts are painted. $\frac{5}{10}$ is written as 0.5 in decimal.



Think of a Php1 coin. This is equal to 100 centavos. 40 centavos can be written as $\frac{4}{100}$ in fractional form or 0.40 in decimal form.

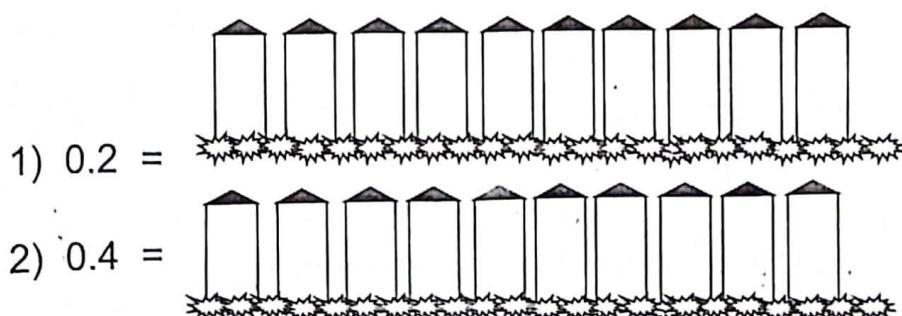


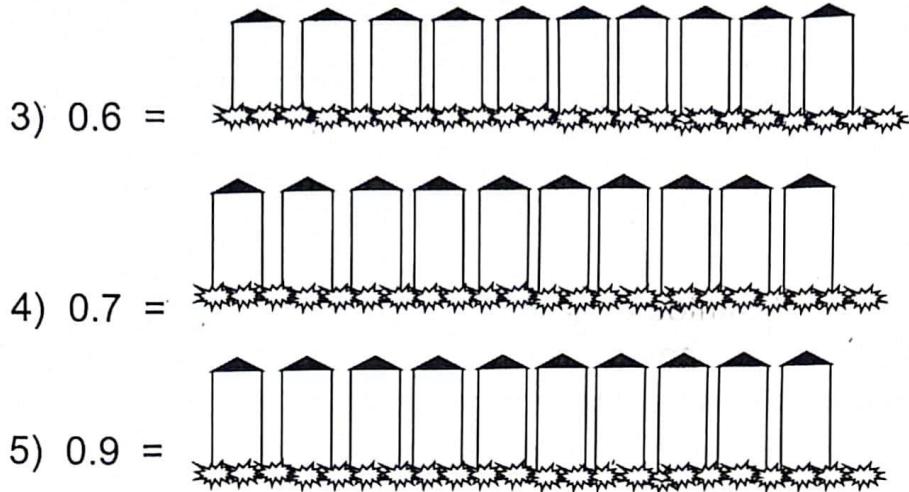
Get Moving!

Draw a grid or blocks to illustrate the following decimal numbers:

- 1) 0.4
- 2) 0.6
- 3) 0.25
- 4) 0.50
- 5) 0.075

Color the posts to show the following decimal numbers:





Keep Moving!

Draw grids to show the following decimals:

- 1) 0.6 2) 0.9 3) 0.55 4) 0.75 5) 0.89

Draw number lines to show the following decimals:

- 6) 0.3 7) 0.25 8) 0.4 9) 0.1 10) 0.2

Write each amount using the peso sign.

- | | |
|-----------------|-----------------|
| 11) 75 centavos | 12) 95 centavos |
| 13) 5 centavos | 14) One peso |



Apply Your Skills!

Read and write the answers in your notebook.

1. Shanot bought 0.75 kilogram of sugar. Draw a grid or blocks to show the given decimal number.

2. Cyrus paid Php30 for a hand towel. Draw the paper bills and coins to show the given amount.
3. Cyril hikes a distance of 0.75 kilometer in going to school every day. Draw a number line to show the distance.
4. Dejay painted 0.6 of the posts in the garden. If there were 10 posts, how many were painted? Draw the posts in a line to show your answer.
5. Timothy harvested some vegetables in the garden. The squash weighed 0.95 kilogram. Draw a weighing scale to show the given decimal number.

Lesson 42: Renaming Decimal Numbers to Fractions Whose Denominators Are Factors of 10 and 100

Explore and Discover!

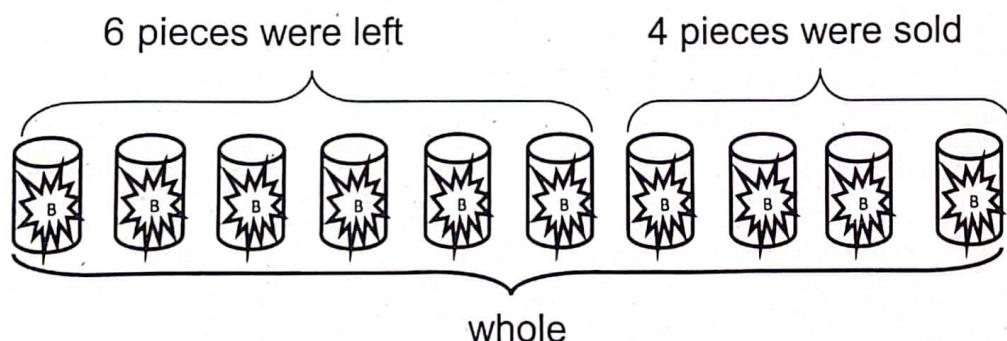
Mang Timoteo cut a bamboo pole into 10 equal parts and made them into 10 pieces of coin banks. He sold 0.4 of the coin banks. What fractional part of the coin banks was sold?



How do you rename a decimal number to a fraction?

You can rename a decimal number to a fraction by writing it as a fraction with 10 or 100 as a denominator. Think of 0.4 to be renamed as a fraction.

Study this illustration:



So, 4 pieces were sold out of 10 pieces. In fractional form, 0.4 is written as $\frac{4}{10}$.

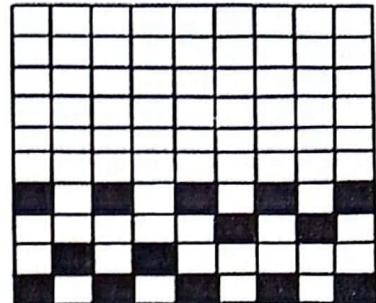
Study the example below.

The decimal number 0.7 can be written as $\frac{7}{10}$ in fraction as shown by the shaded regions below.



As a decimal, 0.7 has one digit after the decimal point.
So, you rename 0.7 as $\frac{7}{10}$ in fraction.

Look at how 0.14 is written as a fraction. The decimal number 0.14 is written as $\frac{14}{100}$ in fraction form as shown in the hundred squares.



Study these examples of renaming decimals to fractions.

- | | |
|--|---|
| 1) $0.5 = \frac{5}{10}$ or $\frac{1}{2}$ | 4) $0.28 = \frac{28}{100}$ or $\frac{7}{25}$ |
| 2) $0.4 = \frac{4}{10}$ or $\frac{2}{5}$ | 5) $0.55 = \frac{55}{100}$ or $\frac{11}{20}$ |
| 3) $0.6 = \frac{6}{10}$ or $\frac{3}{5}$ | |



Get Moving!

Rename the following decimal numbers to fractions:
Item 1 is done for you.

- | | |
|--|----------|
| 1) $0.2 = \frac{2}{10}$ or $\frac{1}{5}$ | 6) 0.44 |
| 2) 0.45 | 7) 0.18 |
| 3) 0.56 | 8) 0.95 |
| 4) 0.07 | 9) 0.8 |
| 5) 0.08 | 10) 0.64 |



Keep Moving!

Write the following in fractions:

- | | |
|---------|----------|
| 1) 0.9 | 6) 0.24 |
| 2) 0.09 | 7) 0.2 |
| 3) 0.19 | 8) 0.45 |
| 4) 0.10 | 9) 0.68 |
| 5) 0.69 | 10) 0.98 |



Apply Your Skills!

Read and write your answers in your notebook.

1. Shanot bought 0.75 kilogram of beef. Write 0.75 kilogram in fraction.
2. Tabern hiked a distance of 0.65 kilometer in going to the park. Write 0.65 kilometer in fraction.
3. Vicky used 0.9 meter of a piece of cloth for her project. Write 0.9 in fraction.
4. If 0.85 of a garden is planted with squash, express the part planted with squash as a fraction.
5. Dick paid Php20.25 for a handkerchief. Write 20.25 in fraction.

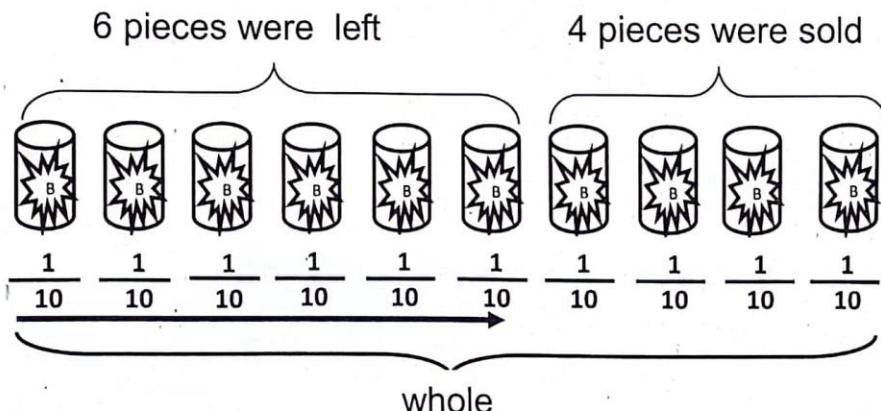
Lesson 43: Renaming Fractions Whose Denominators Are Factors of 10 and 100 to Decimal Numbers



Explore and Discover!

Mang Timoteo cut a bamboo pole into 10 equal parts and made them into 10 coin banks. If he sold some and had $\frac{6}{10}$ of the coin banks left, what decimal part of the coin banks was left?

How do you rename a fraction to a decimal number?



The illustration shows that 6 coin banks were sold out of 10 or $\frac{6}{10}$. How do you rename $\frac{6}{10}$ to a decimal number?

Notice that the denominator 10 has one zero. The number of zeros in the denominator is equal to the number of decimal places after the decimal point in a decimal number.

$$1) \frac{1}{2} = \frac{5}{10} = 0.5$$

$$2) \frac{1}{5} = \frac{2}{10} = 0.2$$

$$3) \frac{3}{5} = \frac{6}{10} = 0.6$$

$$4) \frac{4}{5} = \frac{8}{10} = 0.8$$

How will you write $\frac{35}{100}$ as a decimal? $\frac{8}{100}$?

$$\frac{35}{100} = 0.35$$

The denominator has 2 zeros.

It tells us that there are 2 digits after the decimal point in the decimal number.

$$\frac{8}{100} = 0.08$$

Zero is a place holder for tenths in 0.08.

Look at how these fractions are written as decimals.

$$1) \frac{8}{25} = \frac{32}{100} = 0.32$$

$$2) \frac{9}{20} = \frac{45}{100} = 0.45$$

$$3) \frac{12}{50} = \frac{24}{100} = 0.24$$

$$4) \frac{3}{50} = \frac{6}{100} = 0.06$$



Get Moving!

3.0 hr.

Rename the following fractions to decimal numbers.

$$1) \frac{4}{10}$$

$$2) \frac{80}{100}$$

$$3) \frac{4}{5}$$

$$4) \frac{12}{25}$$

$$5) \frac{36}{50}$$



Keep Moving!

write the following fractions as decimal numbers

$$6) \frac{5}{10}$$

$$7) \frac{56}{100}$$

$$8) \frac{75}{100}$$

$$9) \frac{17}{20}$$

$$10) \frac{3}{4}$$



Apply Your Skills!

Solve these problems.

1. In a long jump contest, Sharon recorded $\frac{75}{100}$ meter while Tabern had a record of $\frac{50}{100}$ meter. How much farther did Sharon jump than Tabern? Write the answer in decimal form.
2. John has $\frac{9}{10}$ meter of bamboo. Dick has $\frac{7}{10}$ meter. Write the fractions in decimal form.
3. Ester bought $\frac{3}{4}$ kilogram of fish and $\frac{14}{25}$ kilogram of chicken. Write the fractions as decimals.
4. Chara used $\frac{1}{2}$ meter of yellow ribbon for her headband and $\frac{1}{5}$ meter of red ribbon for her dress. How many meters of ribbon did she use in all? Write the answer in decimal form.

Lesson 44: Place Value and Value of a Digit in a Given Decimal Number through Hundredths



Explore and Discover!

Lyka used 0.25 meter of lace for a doll's dress.

Do you know what 0.25 means? Study how 0.25 is written on the place value chart. Study the chart below.

Whole Numbers		Decimal Point	Decimal Numbers	
Place Value	Ones		Tenths	Hundredths
Value	1		$\frac{1}{10}$	$\frac{1}{100}$
Digits	0	•	2	5

In 0.25, the digit 0 is a place holder for the ones place. The digit 2 is in the tenths place. Its value is 0.2. The digit 5 is in the hundredths place. Its value is 0.05. Hence, 0.25 means 2 tenths and 5 hundredths.

The decimal point separates the whole numbers from the decimal numbers.

Here are other examples;

In 0.56, 5 is in the tenths place. Its value is 0.5.

Six is in the hundredths place. Its value is 0.06.

In 0.09, 0 is in the tenths place. Nine is in the hundredths place. Its value is 0.09.



Get Moving!

Answer the following:

1. What digit holds the tenths place in 0.78?
2. What is the value of 8 in 0.28?
3. What digit occupies the hundredths place in 0.65?
4. What is the value of 6 in 0.60?
5. What digit is positioned in the tenths place in 0.58?
6. What is the place value of 7 in 0.87?
7. What is the value of the underlined digit in 0.92?
8. In 0.53, what digit is in the hundredths place?



Keep Moving!

A. Complete the table. Item 1 is done for you.

	Decimal Number	Place Value	Value
1.	0. <u>1</u> 5	Tenths	0.1
2.	0. <u>2</u> 6		
3.	0. <u>3</u> 9		
4.	0. <u>4</u> 5		
5.	0. <u>7</u> 6		
6.	0. <u>9</u> 4		

B. Write the place value and value of the underlined digits in your notebook.

7) 0.03
8) 0.99

9) 0.42
10) 0.67

11) 0.56
12) 0.88



Apply Your Skills!

Answer these problems:

- 88.
1. Rodel harvested some vegetables from the garden. The squash weighed 0.95 kilogram. What is the place value of 9 in 0.95 kilogram of squash? What is the value of 5 in 0.95?
 2. Abdul paid Php99.75 for a bath towel. Write the digit in the tenths place. What is the value of the digit in the hundredths place?
 3. What is the place value of 5 in 0.65? What is the value of 6 in 0.65?

Lesson 45: Reading and Writing Decimal Numbers Through Hundredths

Explore and Discover!

Mark and Ara walk a distance of 0.95 kilometer in going to school.



How do you read and write decimal numbers?

The decimal 0.95 is read as *ninety-five hundredths*. In expanded form, it means $0.9 + 0.05$. It is written as 0.95.

When reading a decimal number, read it like reading a whole number, then, say the place value of the last digit.

Study these examples in reading decimal numbers.

0.4 is read as *four tenths*.

0.6 is read as *six tenths*.

0.09 is read as *nine hundredths*

0.83 is read as *eighty-three hundredths*.

Look at these examples on writing decimal numbers.

Eight tenths is written as 0.8. It is written one decimal place after the decimal point.

Three hundredths is written as 0.03. It is written two decimal places after the decimal point. The 0 as a placeholder takes the place of the tenth since the decimal number has no tenths.

Twelve hundredths is written as 0.12. It is written as a decimal number with two decimal places.



Get Moving!

How do you read the following decimals?

- 1) 0.8 is read as _____ tenths
- 2) 0.08 is read as _____ hundredths
- 3) 0.65 is read as _____ hundredths
- 4) 0.60 is read as _____ hundredths
- 5) 0.68 is read as _____ hundredths

Write the following in decimal notation:

- 6) Six tenths _____
- 7) Seven tenths _____
- 8) Two hundredths _____
- 9) Thirty-five hundredths _____
- 10) Fifty-two hundredths _____



Keep Moving!

Read the following decimal numbers:

- | | |
|---------|----------|
| 1) 0.7 | 6) 0.95 |
| 2) 0.29 | 7) 0.74 |
| 3) 0.18 | 8) 0.67 |
| 4) 0.38 | 9) 0.92 |
| 5) 0.01 | 10) 0.44 |

Copy and complete the table

	Decimal in Words	Decimal in Symbols
1.	Six tenths	
2.	Nine tenths	
3.	Ten hundredths	
4.	Nineteen hundredths	
5.	Twenty-five hundredths	

Write the following decimals in words:

- 6) 0.07 _____
7) 0.14 _____
8) 0.26 _____
9) 0.45 _____
10) 0.58 _____



Apply Your Skills!

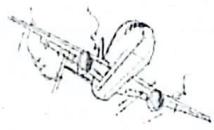
Read and then answer the questions that follow:

1. In a long jump contest, Sheena, Tony, Wahab, Princess, Dick, and Renz have different records as to distance covered. Study the tally board and write the decimals in words.

Contestant	Distance in meter	In Words
Sheena	0.71	
Tony	0.75	
Wahab	0.78	
Princess	0.81	
Dick	0.84	
Renz	0.85	

2. In a long jump contest, Aries recorded $\frac{7}{100}$ meter while Lito had a record of $\frac{50}{100}$ meter. How much farther did Aries jump than Lito? Write your answer in decimal form and give the value of the digit in the tenths place.
3. A patola measures $\frac{28}{100}$ meter while a whole ampalaya measures $\frac{25}{100}$ meter. Which is longer? Write your answer in decimal form and give the value of the digit in the hundredths place.

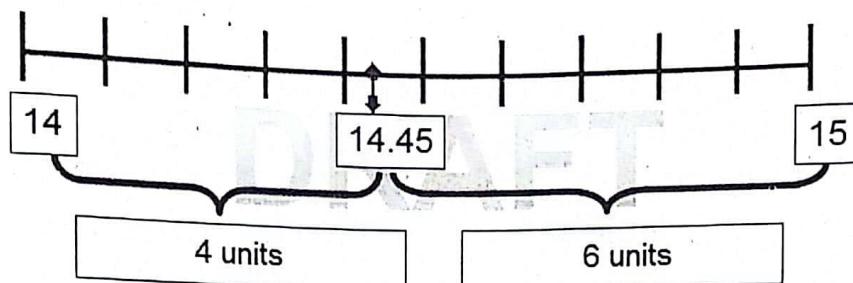
Lesson 46: Rounding Decimal Numbers to the Nearest Whole Number and Tenth



Explore and Discover!

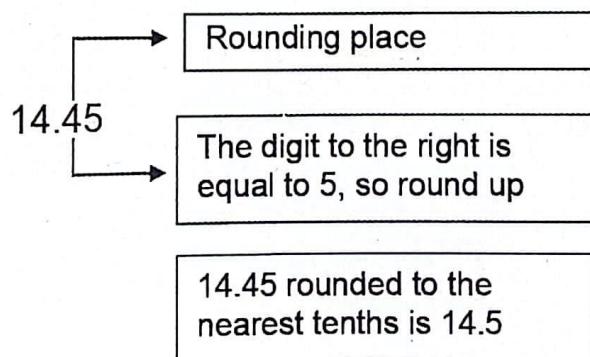
Cyrus walked a distance of 14.45 meters in going to the park. If you rounded to the nearest whole number, how far did Cyrus walk?

The number line below will guide you to get the answer.



Since 14.45 is nearer to 14 than 15, the decimal number 14.45 rounded to the nearest whole number is 14.

Now, let us try to round 14.45 to the nearest tenth. Study the illustration below.



To round decimals:

- ❖ Find the place where rounding is to be done.
- ❖ Look at the digit to its right. If the digit is less than 5, round down. If the digit is equal to or greater than 5, round up.



Get Moving!

Fill in the blanks.

- 1) 1.82 rounded to the nearest whole number is _____.
- 2) 6.08 rounded to the nearest whole number is _____.
- 3) 26.65 becomes _____ when rounded to the nearest tenths.
- 4) 16.65 rounded to the nearest tenths is _____.
- 5) 25.68 is read as _____ when rounded to the nearest whole number.



Keep Moving!

Round the following decimal numbers to the place indicated.

	Decimal	Rounded to the Nearest Whole Number	Rounded to the Nearest Tenths
1.	46.28		
2.	56.45		
3.	63.67		
4.	74.56		
5.	90.69		

Answer the following questions:

1. What is the smallest decimal number with two decimal places that becomes 0.5 when rounded to the nearest tenths?
2. What is the largest decimal number with two decimal places which becomes 3 when rounded to the nearest whole number?



Apply Your Skills!

Read the problem. Then, complete the table by rounding the decimal numbers as indicated.

In a one-minute running contest, the distance covered by the runners is recorded. The tally board shows the record of Sharon, Sheryl, Cadidia, Mildred, Dinah, and Rhoda.

Contestants	Distance in Meters	Round to the	
		Nearest Whole Number	Nearest Tenths
Sharon	25.71		
Sheryl	24.75		
Cadidia	23.78		
Mildred	22.81		
Dinah	21.84		
Rhoda	20.85		

Lesson 47: Comparing and Arranging Decimal Numbers



Explore and Discover!

How do you compare decimal numbers?

A place value chart can help you compare two decimal numbers.

Study the place value chart below.

Place Value	Ones	Decimal Point	Tenths	Hundredths
Value	1	•	$\frac{1}{10}$	$\frac{1}{100}$
Digits	2	•	2	5
Digits	2	•	2	9

Compare these numbers:

2.25 and 2.29.

Start at the left side.

The ones digits are the same. They are both 2.

The tenths digits are the same. They are $\frac{2}{10}$ or 0.2.

The hundredths digits are not the same. 5 is $\frac{5}{100}$ or 0.05, and 9 is $\frac{9}{100}$ or 0.09. 9 is more than 5.

So, 2.29 is greater than 2.25. In symbol, $2.29 > 2.25$.

Which is larger 5.4 or 5.40?

The ones digits are the same. The tenths digits are the same.

The hundredths place in 5.40 is 0. It has no value.

Therefore, 5.4 and 5.40 are equal. In symbol $5.4 = 5.40$

Study these examples on arranging decimal numbers from least to greatest.

$$0.9, 0.7, 0.5, 0.6 \longrightarrow 0.5, 0.6, 0.7, 0.9$$

$$0.25, 0.28, 0.24, 0.23 \longrightarrow 0.23, 0.24, 0.25, 0.28$$

$$0.3, 0.36, 0.32, 0.33, 0.34 \longrightarrow 0.3, 0.32, 0.33, 0.34, 0.36$$

Look at the examples of arranging decimal numbers from greatest to least.

$$0.4, 0.7, 0.9, 0.6 \longrightarrow 0.9, 0.7, 0.6, 0.4$$

$$0.45, 0.42, 0.48, 0.49, 0.4 \longrightarrow 0.49, 0.48, 0.45, 0.42, 0.4$$



Get Moving!

Answer the following:

1. Which is larger, 1.82 or 1.28?
2. If you compare 6.08 to 6.8, _____ is the larger decimal number.
3. Which is bigger 7.8 or 7.80? _____. Why?
4. Is 6.08 equal to 6.80? _____. Why?
5. What if 6.08 is compared to 6.8, which is larger? _____.

Compare the decimal numbers. Use $>$, $<$, or $=$.

$$1) 0.48 \underline{\hspace{1cm}} 0.49$$

$$4) 0.7 \underline{\hspace{1cm}} 0.6$$

$$2) 0.6 \underline{\hspace{1cm}} 0.60$$

$$5) 0.68 \underline{\hspace{1cm}} 0.7$$

$$3) 0.98 \underline{\hspace{1cm}} 0.89$$



Keep Moving!

Arrange the decimal numbers from least to greatest and vice versa.

	Decimal Numbers	Arrange from Least to Greatest	Arrange from Greatest to Least
1.	6.28, 6.82, 6.80		
2.	6.45, 6.40, 6.04		
3.	3.67, 3.07, 3.70		
4.	4.56, 4.50, 4.05		
5.	9.69, 9.50, 9.96		



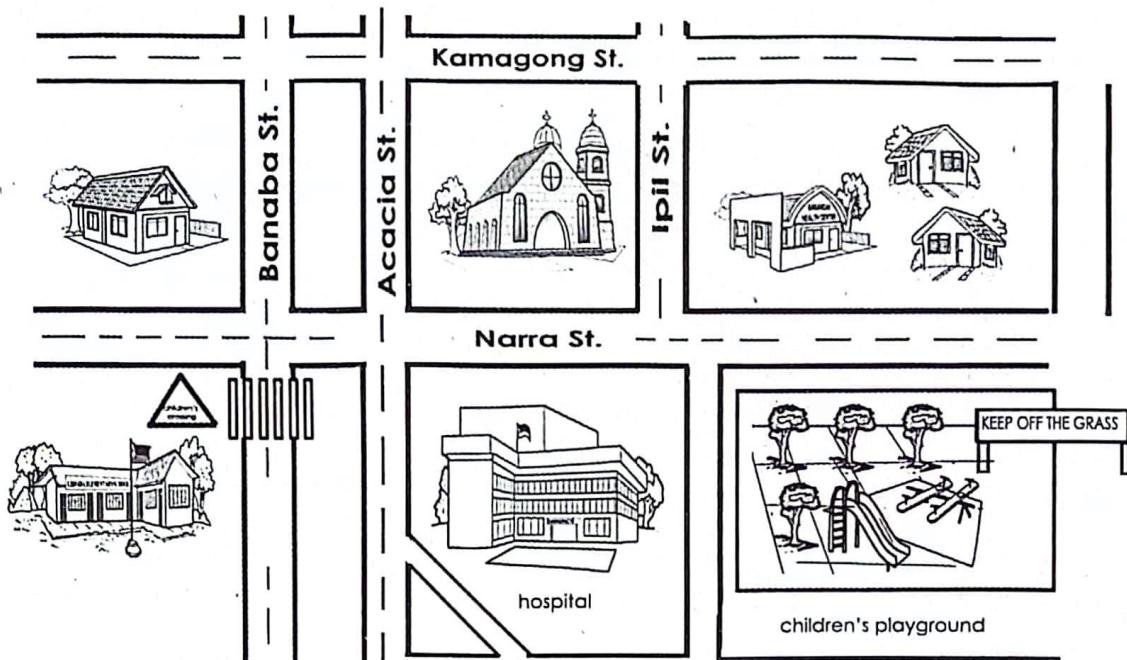
Apply Your Skills!

Read and solve the following:

1. Aling Ester went to the market. While in a multicab, she noticed that she received a change of Php3.50 while one of the passengers was given Php2.00. Whose change was smaller?
2. Aling Ester dropped by a meat shop and bought the following: 0.75 kg beef, 0.8 kg chicken, 1.25 kg lean meat. Which meat did Aling Ester buy the most? the least? Arrange the weights from least to greatest.
3. Aling Rosa bought 0.95 m of red ribbon, 0.8 m of yellow ribbon, 0.75 m of blue ribbon, and 0.7 m of white ribbon. Which ribbon was the longest? the shortest? Arrange the lengths of the ribbons from the longest to the shortest.

CHAPTER 5

LINES AND PLANE FIGURES



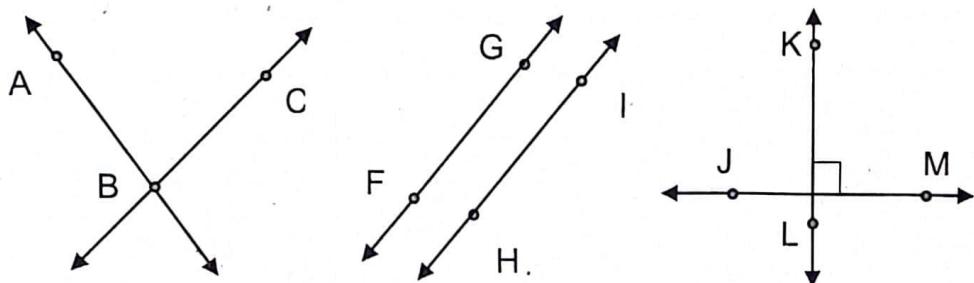
If you look around, you will see geometric figures. The roads, electric posts, the path going to your library, the classroom floor, walls, and ceilings are representations of these geometric figures. This chapter deals with lines and plane figures. It starts with a lesson on parallel, intersecting, and perpendicular lines. You will learn to identify, describe, and illustrate different kinds of angles, triangles, and quadrilaterals. The activities provided to you in this chapter will make you appreciate lines and plane figures by relating them with the things that you see in your environment.

Lesson 48: Identifying Parallel, Intersecting, and Perpendicular Lines



Explore and Discover!

How many lines does each diagram below have? Two lines can be related to each other in different ways.



Line A intersects with line C. They form **intersecting lines**.

Line FG and line HI do not intersect. They do not meet at any point. They are **parallel lines**.

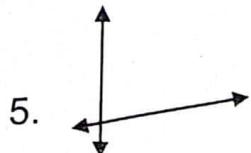
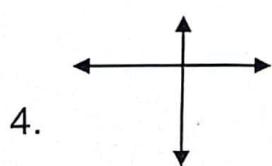
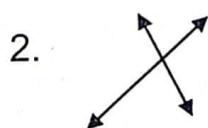
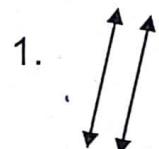
Line KL and line JM intersect in a special way forming square corners. They are **perpendicular lines**.

Can you name the different kinds of lines shown above?



Get Moving!

Draw a star for **parallel lines**, a diamond for **intersecting lines**, and a square for **perpendicular lines**.





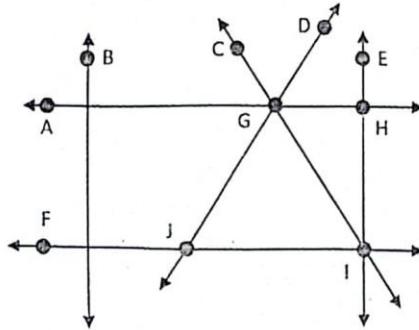
Keep Moving!

A. Identify the different kinds of lines in the figure below.

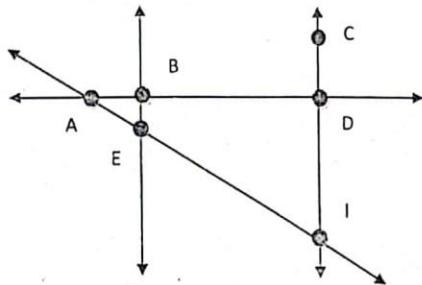
Give 2 pairs of parallel lines.

Give 2 pairs of intersecting lines.

Give a pair of perpendicular lines.



B. Using the figure below, answer the questions that follow.



1. How many lines are there in the figure?
2. What are the intersecting lines?
3. What is the point of intersection of line CI and AI?
4. Which lines are parallel?
5. Which lines are perpendicular?



Apply Your Skills!

Using a ruler and a set square, draw each pair of lines in the given statements.

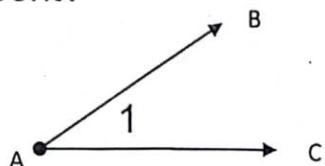
1. Line AB and line CD are parallel lines.
2. Line EF and line GH are perpendicular lines.
3. Line IJ and line KL are intersecting lines. They intersect at point M.

Lesson 49: Describing and Illustrating Different Kinds of Angles



Explore and Discover!

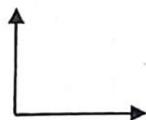
Look at the hands of the clock.
How many hands does it have?
What geometric figure does each hand represent?



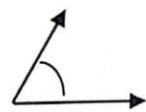
Ray AB meets with ray AC at point A. When two rays meet at a common endpoint, they form an **angle**. Point A, the common endpoint, is called the **vertex**. An angle can be named in 3 ways:

- \angle BAC is read as "angle BAC."
- \angle CAB is read as "angle CAB."
- \angle A is read as "angle A" or $\angle 1$ is read as "angle 1."

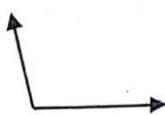
An angle is measured in degrees ($^{\circ}$). Angles can be classified according to their measurements.



A **right angle** measures 90° . It forms a square corner.

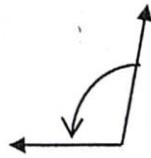
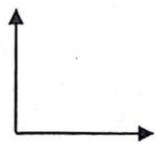
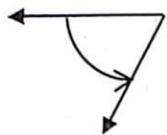


An **acute angle** measures less than 90° . It is smaller than a right angle.



An **obtuse angle** measures more than 90° but less than 180° .

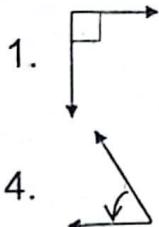
Name the angles below. What kind of angles are they?





Get Moving!

A. Tell whether each kind of angle is right, acute, or obtuse.



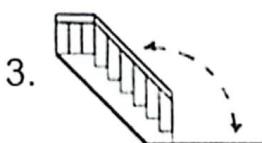
B. Draw the following angles:

1. $\angle ABC$ - acute angle
2. $\angle DEF$ - obtuse angle
3. $\angle GHI$ - right angle



Keep Moving!

Give the kind of angle represented by each of the following figures:



Apply Your Skills!

A. Give what is asked for in each item.

1. Name 2 objects with right angles.
2. Name 2 objects with acute angles.
3. Name 2 objects with obtuse angles.

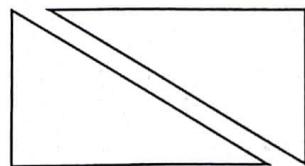
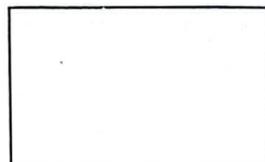
B. Draw your dream house using different angles. Label the angles used.

Lesson 50: Describing Triangles and Quadrilaterals



Explore and Discover!

Mr. Tabilang bought a cartolina for his Math class. He needs two triangles of the same size without wasting any part of the cartolina. How will he divide it?



What shapes are formed?

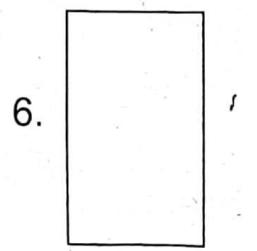
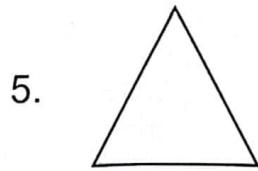
A **triangle** is a polygon with 3 sides and 3 angles. A **polygon** is a closed figure made up of several line segments that are joined together. The **line segments** are called sides and do not cross each other. There are exactly two sides that meet at a point.

A **quadrilateral** is a polygon with 4 sides and 4 angles.



Get Moving!

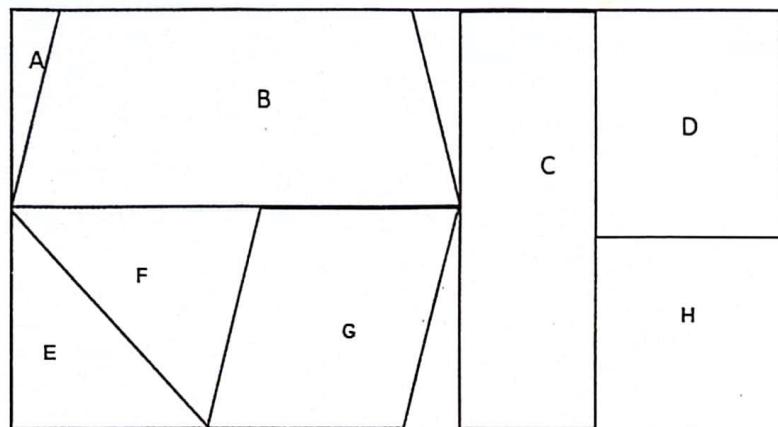
Tell whether each figure is a triangle or a quadrilateral.





Keep Moving!

- A. Using the drawing below, tell whether the figure labelled by each letter is a triangle or a quadrilateral.



- B. Answer the following questions. Draw a circle if your answer is Yes and a diamond if it is No.

1. Do all triangles have 3 equal sides and 3 angles?
2. Do all quadrilaterals have 4 sides and 4 angles?
3. Can a quadrilateral be divided into 2 triangles?
4. Is any 3-sided polygon a triangle?
5. Is any 4-sided polygon a quadrilateral?



Apply Your Skills!

Do what is asked creatively.

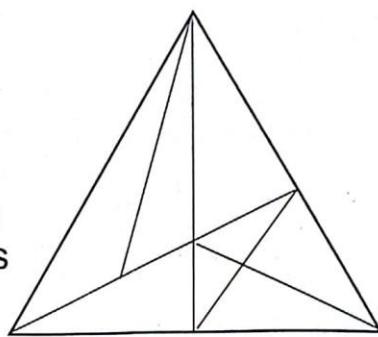
Draw a rectangular garden. At the center, draw a triangular pool. Design your garden with any 4-sided object that will make it beautiful.

Lesson 51: Identifying and Describing Triangles

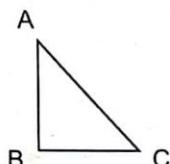


Explore and Discover!

Mr. Medes showed a big triangle to his class. He has to divide it into small triangles of different sizes. Look at how he divided it.

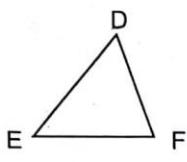


How many small triangles does he have? Are the sides and angles of each triangle equal?

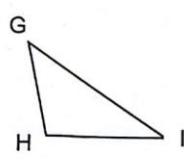


Triangles can be classified according to their angles.

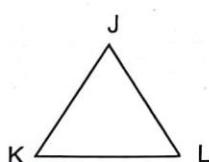
A **right triangle** has a right angle which measures 90° . $\triangle ABC$ is a right triangle.



An **acute triangle** has 3 acute angles, each measuring less than 90° . $\triangle DEF$ is an acute triangle.

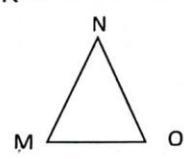


An **obtuse triangle** has an obtuse angle which measures more than 90° . $\triangle GHI$ is an obtuse triangle.

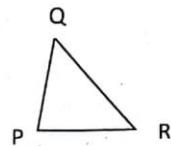


Triangles can be classified according to their sides.

An **equilateral triangle** has 3 equal sides. $\triangle JKL$ is an equilateral triangle.



An **isosceles triangle** has 2 equal sides. $\triangle MNO$ is an isosceles triangle.

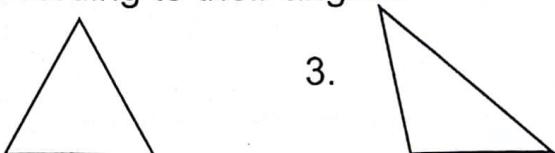
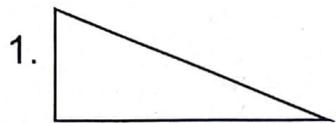


A **scalene triangle** has no equal sides. $\triangle PQR$ is a scalene triangle.

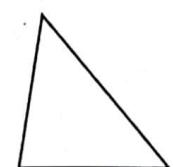
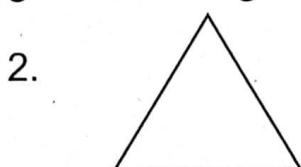


Get Moving!

A. Identify the following triangles according to their angles:



B. Identify the following triangles according to their sides:



Keep Moving!

Answer the following questions:

1. How many equal sides does an isosceles triangle have?
2. How many equal sides does an equilateral triangle have?
3. What kind of angle does an acute triangle have?
4. What kind of angle does a right triangle have?
5. What kind of angle does an obtuse triangle have?



Apply Your Skills!

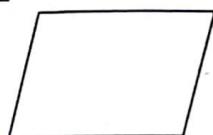
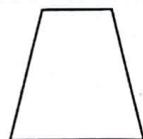
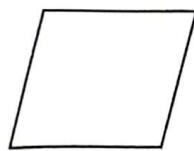
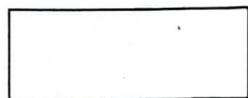
Using old calendars, cut out different triangles. Classify them according to sides and angles.

Lesson 52: Identifying and Describing Different Quadrilaterals



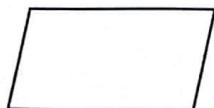
Explore and Discover!

Look at the different quadrilaterals.



What are the different kinds of quadrilaterals?

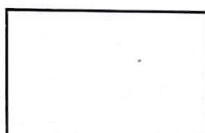
A **quadrilateral** is a polygon with 4 sides and 4 angles. The following are different quadrilaterals:



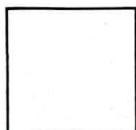
A **parallelogram** has 2 pairs of parallel sides and its opposite sides are equal.



A **rhombus** is a parallelogram that has 4 equal sides.



A **rectangle** is a parallelogram that has 4 right angles. Its opposite sides are equal



A **square** is a parallelogram that has 4 equal sides and 4 right angles.



A **trapezoid** has only one pair of opposite sides that are parallel.



Get Moving!

Identify the following quadrilaterals:

- 1.
- 2.
- 3.
- 4.
- 5.



Keep Moving!

Answer the following questions. Draw a circle if your answer is Yes and a diamond if it is No.

1. Is a parallelogram a rectangle?
2. Is a trapezoid a parallelogram? Why?
3. Is a square a rectangle?
4. Is a rhombus a square?
5. Is a rectangle a parallelogram?



Apply Your Skills!

Using recycled materials like boxes of soap, toothpaste, or any indigenous materials, create any art work applying your lessons on quadrilaterals.

CHAPTER 6

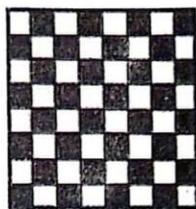
NUMBER PATTERNS AND EQUATIONS



zebra



dalmation



chess board



snake skin



dart board

You see patterns in things or objects around you. The activities that you do every day follow a pattern. The way you arrange your toys or things in a cabinet follows a pattern. Patterns take many forms. In art, decorations may be combined or repeated to form patterns. The structure of a building or how the windows are built, suggest patterns. In the bodies of animals and even in leaves and branches of trees, patterns can be observed. Numbers are used to form patterns. When you skip count, you are creating a pattern.

This chapter will provide you with lessons and activities on number patterns. It includes lessons on determining missing terms in a sequence of even or odd numbers, and multiples or factors of a number, etc. The lesson on number patterns is extended to finding the missing number in a number sentence which is a pre-algebra concept.

Lesson 53: Determining Missing Term/s in a Sequence of Numbers



Explore and Discover!

7, 10, ?, 16, ?

Look at the sequence of numbers.
What are the missing terms?

A list of numbers arranged in a row is called a **number sequence**.
Each number in the sequence is called a **term**.

To find the missing term/s in a number sequence, we must first look for its pattern.

Look closely at 7, 10, ___, and 16, and ___. In the number sequence, each term is formed by adding 3 to the preceding number. So, the missing terms are $10 + 3 = 13$ and $16 + 3 = 19$. See to it that the pattern is true to the whole sequence from 7 to 19.

Here is another example of a number sequence.

Find the missing terms: 45, 37, 29, ?, ?, 5

The sequence of numbers is in descending order. Get the difference between 45 and 37. In like manner with 37 and 29, the difference is 8. The missing terms are 21 and 13 since 13 is 8 more than the last term which is 5.

Let us take a look at this example.

What are the missing terms in 6, 8, 12, ___, 26, ___?

Look closely at the difference of 6 and 8 ($8 - 6 = 2$); 8 and 12 ($12 - 8 = 4$). The difference is a multiple of 2. The missing terms may be 18 and 36. Adding 6 to 12 becomes 18 and adding 8 to 18 becomes 36. Hence, 18 and 36 are the missing terms.

Here is another example.

Find the missing term in this number sequence: 1, 3, 7, 15, ___.

Get the difference of the consecutive terms. Take note that as the number increases, the difference is multiplied by the common factor of each term which is 2.

$$\begin{array}{ccccccccc} 1 & \underbrace{3} & \underbrace{7} & \underbrace{15} & \underbrace{31} & \underbrace{63} \\ & 2 & 4 & 8 & 16 & 32 \end{array}$$

To find the missing terms, multiply the preceding difference by 2 and then add the product to the current term to obtain the next term.

$$8 \times 2 = 16 \quad 16 + 15 = 31 \text{ is the fifth term}$$

$$16 \times 2 = 32 \quad 32 + 31 = 63 \text{ is the sixth term}$$

The same process will be done to obtain the succeeding terms.

Find the missing terms in the following situations below:



Can you find the pattern or sequence used?

The numbers inside the squares are multiplied by odd numbers 3, 5, 7, and 9. Starting with $2 \times 3 = 6$, then $6 \times 5 = 30$, $30 \times 7 = 210$, $210 \times 9 = 1890$. So, the missing number in the last square is 1890.

How about the numbers inside the circles?

The series of numbers inside the circles uses even numbers 2, 4, 6, 8 as factors. So, the missing number inside the circle is 384 (48×8).



Get Moving!

Find the missing terms in each of the following number sequence.

- 1) 23, 25, 27, __, __, 33
- 2) 32, 37, __, __, 52, 57
- 3) 85, __, 77, 73, __, 65

- 4) 64, 57, __, 43, __, 29
- 5) 1, 2, 4, __, 11, __



Keep Moving!

A. Find the missing terms in the following number sequences:

- 1) 5, 6, 8, __, 15, __
- 2) 18, 20, 24, __, 38, __
- 3) 25, 28, 34, __, __, 70

- 4) 55, 54, 51, 46, __, __, 19
- 5) 82, 81, 78, __, 66, __

B. Find the missing terms.

- 1) 2, 2, 4, 12, __, __
- 2) 1, 2, 4, 8, __, __

- 3) 1, 3, 9, 27, 81, __
- 4) 1, 5, 25, 125, __



Apply Your Skills!

Find the missing term/s.

1) 10, 20, 34, 48, 64, __, 102

2) 5, 7, 11, 17, 25, __

3) 7, 14, 21, 28, 35, __

4)

5)

6) Lorena visits her sister, Louela, every seventh day of the week. She visited her sister last December 1, 2014. At what date will she visit her sister for the fourth time?

7) Alma has a magic basket. Anything she places inside the basket doubles every minute. If she placed an apple inside the basket, how many apples would there be after 6 minutes?

Lesson 54: Finding the Missing Number in an Equation



Explore and Discover!

An **equation** is a mathematical sentence that states the equality of expressions.

Look at these equations. Could you give the missing number/s?

A. $(10 \times 2) + (10 \times 5) = \underline{\quad} \times (\underline{\quad} + 5)$
B. $(40 + 5) + (\underline{\quad} + 15) = (\underline{\quad} + 15) + (40 + 30)$

How will you make each equation correct?

Try to evaluate each equation.

In the first equation, you will use the **Distributive Property of Multiplication over Addition**:

A. $10 \times (\underline{2} + 5) = (10 \times 2) + (10 \times 5)$
 $10 \times 7 = 20 + 50$
 $70 = 70$

In the second equation, you will use **the Commutative Property** and **Associative Property of Addition**

B. $(40 + 5) + (\underline{30} + 15) = (\underline{5} + 15) + (40 + 30)$
 $45 + 45 = 20 + 70$
 $90 = 90$

Were you able to get the correct number/s?



Get Moving!

Give the missing number/s in the equations below.

- 1) $6 \times \underline{\quad} = 5 \times 6$
- 2) $(9 \times \underline{\quad}) \times 4 = \underline{\quad} \times (2 \times 4)$
- 3) $(1 \times 4) \times 0 = \underline{\quad} \times (\underline{\quad} \times 0)$
- 4) $17 + \underline{\quad} = 19 + 17$
- 5) $(13 + 6) + 7 = 13 + (\underline{\quad} + \underline{\quad})$
- 6) $0 + 6 = \underline{\quad} + 0$

7) $\underline{\quad} + 9 = 3 + 14$
 8) $20 - \underline{\quad} = 6 + 8$

9) $9 + 6 + 5 = \underline{\quad} \times 5$
 10) $8 + 7 + 2 = \underline{20} - (\underline{2} + \underline{\quad})$



Keep Moving!

Give the property used in each equation. Then, write the missing numbers.

- $(6 + 12) + (5 + 7) = (5 + \underline{\quad}) + (\underline{\quad} + 12)$: _____
- $(7 \times 6) \times 5 = \underline{\quad} (6 \times \underline{\quad})$: _____
- $20 + \underline{\quad} = 40 + \underline{\quad}$: _____
- $24 + (36 + 50) = (\underline{\quad} + \underline{\quad}) + 50$: _____
- $7 \times (10 + 5) = (\underline{\quad} \times 10) + (7 \times \underline{\quad})$: _____



Apply Your Skills!

- A. Use the properties to make the following equations true by filling the missing number/s. Check the equation to find out if your answer is correct.

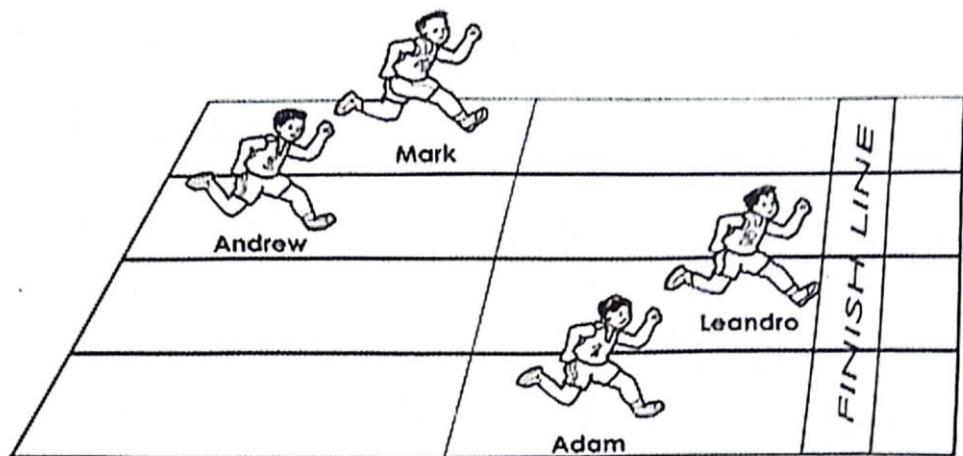
1.	$\underline{\quad} \times (4 + 8)$	$= (2 \times \underline{\quad}) + (2 \times \underline{\quad})$
2.	$6 + 10 + 12 + 24$	$= (\underline{\quad} + \underline{\quad}) + (6 + 24)$
3.	$(7 \times 1) + 0$	$= \underline{\quad} \times (1 + \underline{\quad})$
4.	$12 \times \underline{\quad}$	$= \underline{\quad} \times 15$
5.	$\underline{\quad} + 240$	$= 460 + \underline{\quad}$

- B. Fill in the missing number to make each equation correct.

- $8 \times 8 = 40 + 4 + \underline{\quad}$
- $50 - \underline{\quad} = 20 + 8$
- $\underline{\quad} + 12 = 19 + 5$
- $8 + 8 + \underline{\quad} = 2 \times 10$
- $40 - (6 + 5) = 11 + 10 + \underline{\quad}$

CHAPTER 7

TIME MEASUREMENT, PERIMETER, AND SQUARE UNIT OF MEASURES



Athlete	Time in Minutes and Seconds
Mark	1 min 35 sec
Andrew	1 min 40 sec
Leandro	59 sec
Adam	1 min 16 sec

This chapter deals with time measurement, perimeter, and square units of measures. It starts with a lesson on finding elapsed time in minutes and seconds. Knowing how to read time in minutes or seconds is necessary for you to be able to find the length of time that an event occurred. You will also learn to estimate elapsed time in minutes and seconds which is an essential skill in telling time.

You will also learn to find the perimeter, which is the distance around a polygon, by getting the sum of all its sides and later introduce you to a shorter way of doing it. This chapter also provides you with a lesson on square units of measures. You will learn to convert one square unit of measure to another square unit of measure.

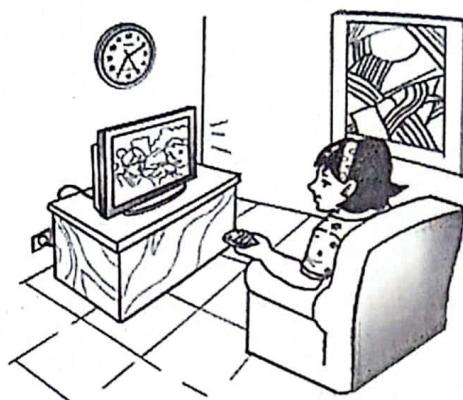
Problem-solving lessons are also included as application of your knowledge and skills learned on elapsed time, perimeter, and square units of measure.

Lesson 55: Finding Elapsed Time

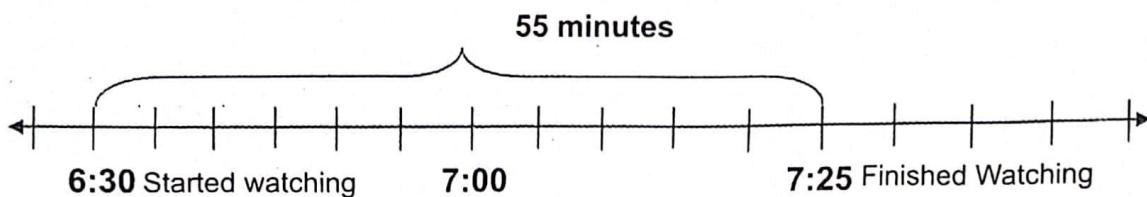


Explore and Discover!

Alice started watching her favorite educational TV program at 6:30 in the evening. If she finished watching at 7:25 in the evening, how long did Alice watch the program?



How will you solve the problem?
You can use a number line to solve for the answer.



You notice that from 6:30 to 7:25 is 55 minutes.
You can also subtract to find the answer:

$$\begin{array}{r} 7:25 \rightarrow 6:60 + 25 \\ 7:25 \rightarrow 6:85 \\ - 6:30 \rightarrow 6:30 \\ \hline 0:55 \end{array}$$

Rename 1 hour as 60 minutes.
Add 60 and 25 minutes.
Subtract.

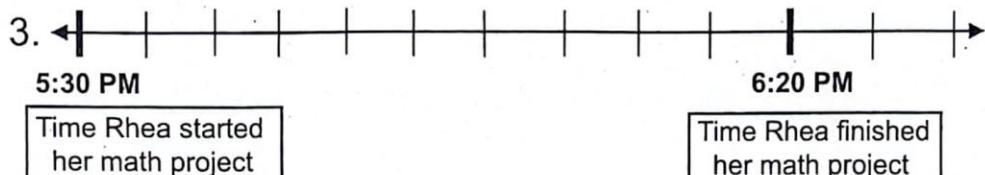
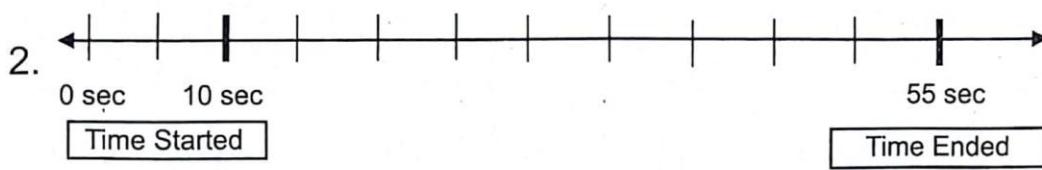
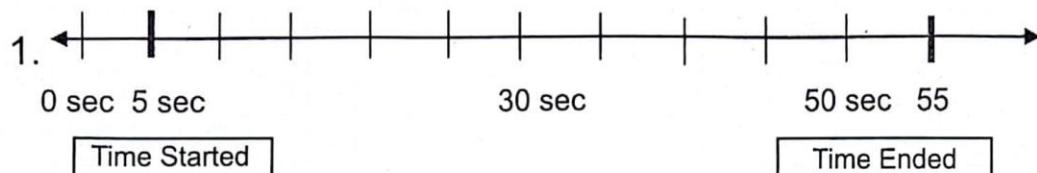
So, Alice watched her favorite TV program for 55 minutes.
The length of time that Alice spent watching TV is called **elapsed time**.

Can you think of other ways to solve for the answer to the problem?



Get Moving!

Find the elapsed time shown by each number line. Write the answers in your notebook.



B. Complete the table by filling in the elapsed time.

Start Time	End Time	Elapsed Time
0:06:15	0:06:56	
0:03:05	0:03:48	
0:05:04	0:05:59	
1:05 p.m.	1:54 p.m.	
2:55 p.m.	3:25 p.m.	
4:45 a.m.	5:30 a.m.	
7:36 a.m.	8:12 a.m.	



Keep Moving!

A. Use the table to answer the following questions below:

Friendly Airlines Flight Schedule	
Departure	Arrival
Manila 6:30 a.m.	Legaspi 7:25 a.m.
Manila 12:35 p.m.	Laoag 1:25 p.m.
Cebu 3:25 p.m.	Iloilo 4:10 p.m.
Davao 9:45 a.m.	Butuan 10:50 a.m.
Cebu 5:45 p.m.	Masbate 6:25 p.m.

1. How long is the flight from Manila to Legaspi?
 2. If Mrs. Ortiz is going to Iloilo from Cebu, how long will her flight be?
 3. How long will Cathy's flight be if she goes to Butuan from Davao City?
 4. How long will a group of tourists travel from Manila to Laoag?
 5. How many minutes longer is the flight from Cebu to Iloilo than from Cebu to Masbate?
- B. Use the Metro Rail Transit (MRT) schedule to answer the questions below. Write your answers in your notebook.

Leave North Avenue Station	Arrival
5:30 a.m.	Cubao 5:35 a.m.
5:32 a.m.	Ortigas 5:38 a.m.
5:41 a.m.	Guadalupe 5:52 a.m.
5:45 p.m.	Ayala 6:00 p.m.
6:15 p.m.	Taft Ave. 6:32 p.m.

1. How long does it take to go from
 - a. North Avenue to Cubao?
 - b. North Avenue to Ortigas?
 - c. North Avenue to Guadalupe?

- d. North Avenue to Ayala?
- e. North Avenue to Taft Avenue?



Apply Your Skills!

Read and solve each problem. Write the answer in your notebook.

1. Allen began his breakfast at 6:55 a.m. and finished at 7:10 a.m. How long did it take him to eat?
2. Mary left school at 4:15 p.m. and arrived home at 5:05 p.m. How long did she travel?
3. The Cruz family arrived at the bus station at 7:30 a.m. The bus left at 8:15 a.m. How long did they wait?
4. Carlo finished the 100-meter distance in 48 seconds as shown in the stopwatch. If the timer started recording the time after 5 seconds, how long was Carlo's running time?

Lesson 56: Estimating Elapsed Time



Explore and Discover!

Rod jogs everyday around the park. This morning, he started jogging at 6:12 a.m. and ended at 6:48 a.m. About how long did he jog this morning?



What is being asked in the problem?

Will you compute for the exact time that Rod spent in jogging?

What will you do then?

Estimate the amount of time spent by Rod in jogging.

How will you do it? Round the times in minutes.

Study this.

Actual Times Estimated Times

$$\begin{array}{r} 6:48 \longrightarrow 6:50 \\ - 6:12 \longrightarrow 6:10 \\ \hline 0:36 \qquad\qquad\qquad 0:40 \end{array}$$

Subtract the rounded times.

Therefore: Rod jogged for about 40 minutes.

Try to round the actual elapsed time. Is your answer reasonable?



Get Moving!

Do you know the term which means the scientific study of matter, energy, force, and motion and the way they relate to each other? Find the word by finding the estimated elapsed time of the table below.

Time Started	7:19 a.m.	11:34 p.m.	4:02 p.m.	1:03 p.m.	5:07 a.m.	8:08 a.m.	2:11 p.m.
Time Finished	7:31 a.m.	11:57 p.m.	5:03 p.m.	1:51 p.m.	5:28 a.m.	8:48 a.m.	2:58 p.m.
Estimated Time							
Letter Assigned							
10 minutes	20 minutes	30 minutes	40 minutes	50 minutes	60 minutes		
P	I	H	C	S	Y		



Keep Moving!

During the Physical Fitness Test (1000-m walk/run), five boys recorded their time in the table below. Complete the table by filling in the estimated and actual elapsed time.

Name	Time Started	Time Ended	Estimated Elapsed Time	Actual Elapsed Time
Abe	8:07 a.m.	8:28 a.m.		
Ian	8:15 a.m.	8:32 a.m.		
Larry	8:05 a.m.	8:18 a.m.		
Amado	8:25 a.m.	8:36 a.m.		
Isagani	8:57 a.m.	9:22 a.m.		



Apply Your Skills!

Find the estimated and actual elapsed times in each situation below:

1. The Tabilang family arrived in Baluarte at 10:28 in the morning. They left their house at 10:05 a.m.
Estimated elapsed time: _____ Actual elapsed time: _____
2. Lolita started eating her dinner at 6:35 p.m. and finished eating at 7:03 p.m.
Estimated elapsed time: _____ Actual elapsed time: _____
3. Section A of the Grade 4 class of Sudipen Central Elementary School started their tour around Barangay Poblacion at 8:06 a.m. They were back to school at 8:58 a.m.
Estimated elapsed time: _____ Actual elapsed time: _____

4. Lorena and Ian started working on their project in Music after their classes in the afternoon at 5:30 p.m. They finished their project at 6:05 p.m.

Estimated elapsed time: _____ Actual elapsed time: _____

5. Rayman was called to the Principal's office at 3:22 p.m.

He came back to his room at 3:45 p.m.

Estimated elapsed time: _____ Actual elapsed time: _____

Lesson 57: Solving Problems Involving Elapsed Time



Explore and Discover!

Amado finished encoding his report in English at 8:15 p.m. If he started at 7:20 p.m., how many minutes did he spend encoding?



How will you solve the problem?

Use these steps to solve for the problem

Steps	Answer
Understand:	
1. What is asked in the problem?	The time Amado spent encoding
2. What are given?	8:15 p.m. (time ended); 7:20 p.m. (time started)
Plan:	
3. What operation will you use?	Subtraction
4. What is the number sentence?	$8:15 - 7:20 = N$
Solve:	
5. How is the solution done?	$\begin{array}{r} 8:15 \longrightarrow 7:75 \\ - 7:20 \longrightarrow 7:20 \\ \hline \end{array}$
Check and Look back:	
6. What will you do to check if your answer is correct?	Add the difference to the subtrahend. $\begin{array}{r} 7:20 \\ + 0:55 \\ \hline 7:75 \\ 7:75 = 8:15 \end{array}$
7. What is the answer to the problem?	Amado spent 55 minutes encoding.



Get Moving!

A. Read each problem. Then, write the letter of the correct answer.

1. John wakes up at 5:30 a.m. so that he will have time to prepare himself for school. At 6:10 a.m., he is ready to go to school. How long does it take him to prepare for school? What is asked in the problem?

- a. The time John wakes up
- b. The time he is ready to go to school
- c. The length of time it takes John to prepare
- d. The activity he does every morning

What operation will be needed to solve the problem?

- a. addition
- b. subtraction
- c. division
- d. multiplication

What is the number sentence?

- a. $5:30 - 6:10 = N$
- b. $6:10 + 5:30 = N$
- c. $6:10 \times 5:30 = N$
- d. $6:10 - 5:30 = N$

What is the answer to the problem?

- a. It takes 40 mins. for John to prepare.
- b. It takes 20 mins. for John to prepare.
- c. John wakes up at 5:30.
- d. John prepares for school from 5:30 to 6:10.

2. Mrs. Arce begins cleaning their house at 9:10 a.m.

She expects to finish her work at 9:55 a.m. How long will Mrs. Arce do the cleaning?

What is asked? _____

What are the given facts? _____

What is the operation to be used? _____

What is the number sentence? _____

How is the solution done? _____

What is the answer? _____



Keep Moving!

Solve the following problems:

1. The Arce family will go to Baguio for a three-day vacation. They arrived at the bus station at 7:55 a.m. If the bus will leave at 8:30 a.m., how many minutes will they wait?

What is asked? _____

What are the given facts? _____

What operation is needed? _____

What is the number sentence? _____

How is the solution done? _____

What is the answer? _____

2. The Grade 4 pupils of Ms. Alma took their lunch right after their class at 11:45 a.m. If they finished eating at 12:30 p.m., how long did they take their lunch?

What is asked? _____

What are the given facts? _____

What operation is needed? _____

What is the number sentence? _____

How is the solution done? _____

What is the answer? _____

3. Before going to sleep, Mrs. Medes spent 40 minutes watching her favorite TV show. She stopped viewing at 9:30 p.m. At what time did she start watching?

What is asked? _____

What are the given facts? _____

What is the operation to be used? _____

What is the number sentence? _____

How is the solution done? _____

What is the answer? _____



Apply Your Skills!

Challenge yourself with more problems!

Read and solve the following problems.

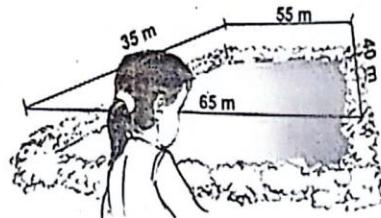
1. During the gardening time, Mr. Buemia gave his pupils their assigned work in their school garden. The pupils started to prepare their garden plots at 2:55 p.m. At 3:30 p.m., Mr. Buemia asked them to go back to their classroom. How long did they stay in their school garden?
2. Isagani and his teammates started their practice in the gymnasium at 7:20 a.m. They ended at 9:10 a.m. with just enough time to prepare for their classes. How many minutes did they spend practicing?
3. Amado took 25 minutes to eat his lunch. He finished at 12:40 p.m. What time did he start eating?
4. Lorena and Eudis walked around the plaza for 35 minutes. If they started at 5:30 p.m., what time did they stop walking?
5. The Grade 4 pupils spent 33 minutes doing their Science activity. If they finished the activity at 9:54 a.m., what time did they start the activity?

Lesson 58: Measuring Perimeter



Explore and Discover!

Lorena wants to stay fit and so she walks around the park every day before going to school. What is the distance that Lorena covers every day?



How will you find the answer to the problem?

To solve for the answer to the problem, you add the measurements of the sides of the park.

The park has four sides.

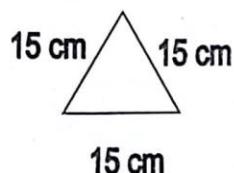
So,

$$55 \text{ m} + 40 \text{ m} + 65 \text{ m} + 35 \text{ m} = 195 \text{ m}$$

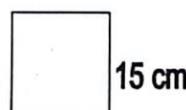
So, Lorena walks a distance of 195 m every day. This distance around the park is called **perimeter**.

Can you think of other ways to find the perimeter of the park?

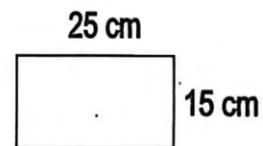
A. Study how the perimeter of each figure is obtained.



Let s be the length of one side of the equilateral triangle.
If P is the perimeter of the triangle, then
$$\begin{aligned} P &= s + s + s \\ &= 15 + 15 + 15 \\ &= 45 \text{ cm} \end{aligned}$$



Let s be the length of one side of the square and P be the perimeter of the square. Then,
$$\begin{aligned} P &= s + s + s + s \\ &= 15 + 15 + 15 + 15 \\ &= 60 \text{ cm} \end{aligned}$$

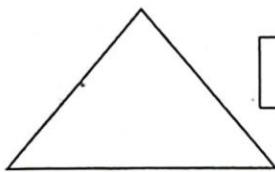
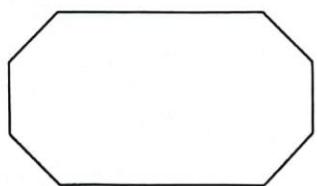


Let L be the length and W be the width of a rectangle.
If P be the perimeter of the rectangle then,
$$\begin{aligned} P &= 2L + 2W \\ &= (2 \times 25) + (2 \times 15) \\ &= 80 \text{ cm} \end{aligned}$$

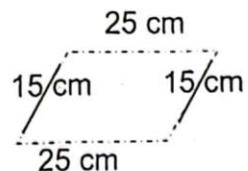
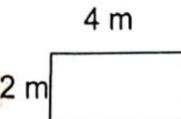
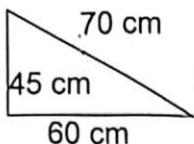
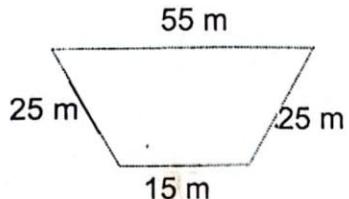


Get Moving!

A. Use a ruler to find the perimeter in cm of the following figures:

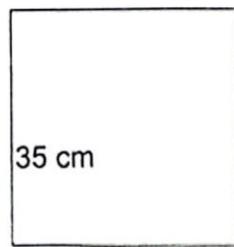
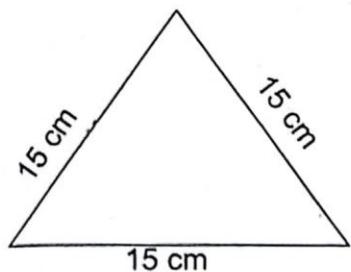
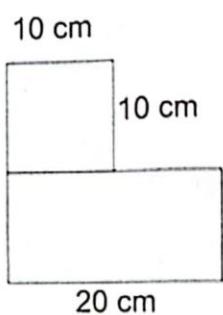
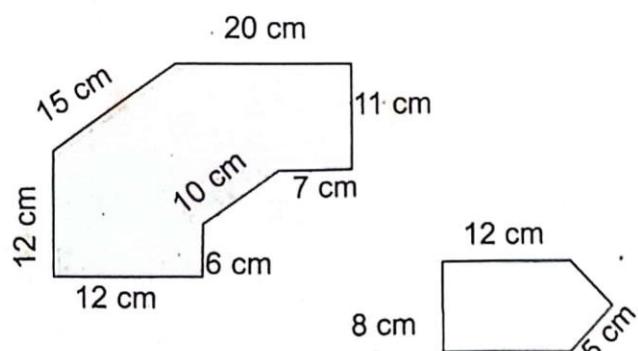


B. Derive a formula to find the perimeter of the following figures.



Keep Moving!

Find the perimeter of each figure.



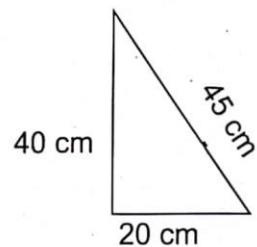
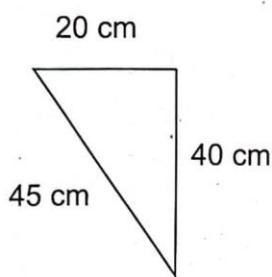


Apply Your Skills!

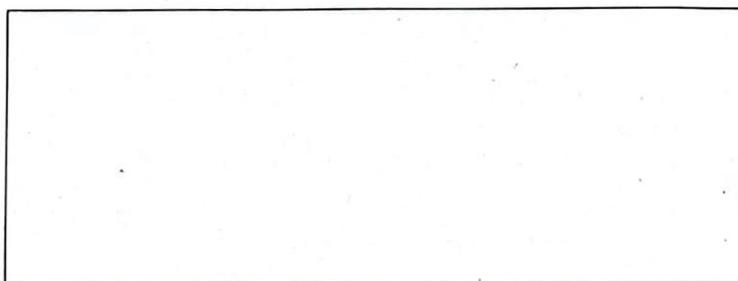
A. Follow the directions.

1. Draw a rectangle.
2. Measure its sides. Then, write the measurements on its corresponding sides.
3. Write a formula to find the perimeter of the figure you drew.
4. Find the perimeter.

B. 1. Find the perimeter of the two triangles below:



2. Get the total perimeter of the two triangles.
3. Make a parallelogram using the two triangles.



4. Find the perimeter of the new figure you formed.

Lesson 59: Solving Routine and Nonroutine Problems in Real-Life Situations Involving Perimeter

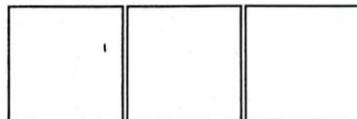
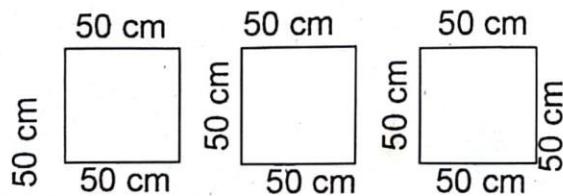


Explore and Discover!

- A. One side of a square working table measures 50 cm. Find its perimeter.

Steps	Answer
Understand:	
What is asked?	The perimeter of the table
What is given?	50 cm
Plan:	
What operation will you use?	Addition or Multiplication
What is the number sentence?	$50+50+50+50 = n$ or $4 \times 50 = n$
Check and Look back:	
What is answer to the problem?	The perimeter of the table is 200 cm.

- B. Using the perimeter of the table above, how many sticks 10 m long are needed to get the perimeter?
- C. Using the given in letter A, if three tables are placed end-to-end, what will be the perimeter of the new table formed?



From this you can say that the perimeter of the long table formed is 400 cm.



Get Moving!

A. Read each problem. Then, answer the questions that follow.

1. A handkerchief measures 30 cm long and 25 cm wide. Jayne wants to put lace around it. How many centimeters of lace will she buy to decorate its sides?

What is asked? _____

What are the given facts? _____

What is the process needed? _____

What is the number sentence? _____

What is the answer? _____

2. A softball diamond is 20 meters long on each side. How many meters does a player run if he makes a homerun?

What is asked? _____

What are the given facts? _____

What is the process needed? _____

What is the number sentence? _____

What is the answer? _____

B. Solve the following problems using illustrations.

1. A square lot is to be planted with santan plants all around.

The side of the lot measures 10 m. If plants will be planted 20 cm apart, how many plants must be planted in all?

2. Lian uses 200 regular paces to walk around a square park.

If one pace of Lian measures 40 cm, what is the measure of each side of the park?



Keep Moving!

Solve each problem.

1. The three sides of a triangle measure 24 cm, 34 cm, and 52 cm. What is the perimeter of the triangle?
2. From a square piece of cartolina whose sides measure 60 cm each, Andrew cut squares along its corners. If the side of each square measures 10 cm, what is the perimeter of the cartolina after the cutting?
3. Lorena's flower garden has a length of 12 m and a width of 6 m. Find the perimeter.
4. Jay enclosed a vegetable garden with a fence. The four sides of the garden measure 10 m, 8 m, 9 m, and 12 meters, respectively. How long is the fence?
5. An equilateral triangular park has a perimeter equal to the perimeter of a rectangular garden whose length is 25 m and whose width is 20 m. Find the measurement of the sides of the triangular park.
6. How many centimeters of ribbon will Jane need to decorate the sides of a bed sheet which measures 164 cm by 86 cm?



Apply Your Skills!

Challenge yourself with more problems!
Solve each problem.

1. Jane has an illustration board which is 25 cm long and 15 cm wide for her project in Arts. She will put a lace around it as decoration. How many centimeters of lace does she need?
2. Enchong jogs around a rectangular park which measures 120 m by 75 m. How far is the distance covered by Enchong if he goes around the park thrice?
3. Julie has a square cartolina whose sides measure 40 cm each. She cuts the cartolina into two equal rectangles. Find the perimeter of one piece of rectangle.

Lesson 60: Converting Square Centimeters to Square Meters and Vice-versa



Explore and Discover!

Lian and Jay are busy cleaning the playground of Castro Elementary School. If the area of the school playground is 640 000 sq cm, what is its equivalent in square meters?



How will you solve the problem?

Study this:

$$10\,000 \text{ sq cm} = 1 \text{ sq m}$$

$$640\,000 \text{ sq cm} = \underline{\hspace{2cm}} \text{ sq m}$$

$$\begin{aligned}\text{Solution: } 640\,000 \text{ sq cm} &= 640\,000 \text{ sq cm} \times \frac{1 \text{ sq m}}{10\,000 \text{ sq cm}} \\ &= \frac{640\,000}{10\,000} \text{ sq m} \\ &= 64 \text{ sq m}\end{aligned}$$

Study this example:

Lorena wanted to find out how many square centimeters there are in 14 sq m.

Help her to solve for the answer.

Below is the process to convert bigger square units to smaller square units.

$$1 \text{ sq m} = 10\,000 \text{ sq cm}$$

$$14 \text{ sq m} = \underline{\hspace{2cm}} \text{ sq cm}$$

$$\begin{aligned}\text{Solution: } 14 \text{ sq m} &= 14 \text{ sq m} \times \frac{10\,000 \text{ sq cm}}{1 \text{ sq m}} \\ &= 14 \times 10\,000 \text{ sq cm} \\ &= 140\,000 \text{ sq cm}\end{aligned}$$



Get Moving!

Change the following units as indicated:

1. $230\ 000 \text{ sq cm}$ = _____ sq m
2. $40\ 000 \text{ sq cm}$ = _____ sq m
3. $90\ 000 \text{ sq cm}$ = _____ sq m
4. 5 sq m = _____ sq cm
5. 6 sq m = _____ sq cm



Keep Moving!

Complete the table with the correct unit of square measure needed.

Area in Square Centimeters	Area in Square Meters
75 000	
	8
60 000	
	3
54 000	
40 000	
	10
	9

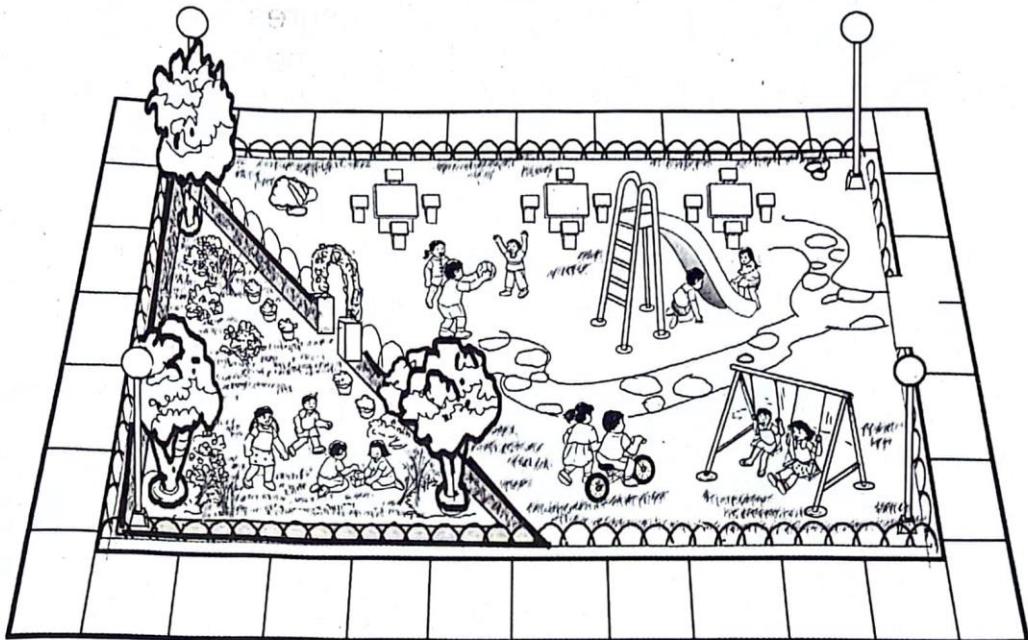


Apply Your Skills!

1. Your house has a floor area of 42 sq m. If you will clean your house, how many square centimeters will you clean?
2. The grassy lawn of Mr. Pascua measures 90 000 sq cm. What is the area of his lawn in square meters?
3. What is 19 000 sq cm converted to sq m?
4. Liana has a long table in their living room with an area of 3 sq m. How many square centimeters of cartolina does she need to completely cover the table?
5. A 6 sq m glass sliding door was broken. Ryan will temporarily replace it with plywood. How many square centimeters of plywood does he need?

CHAPTER 8

AREA OF PLANE FIGURES



This chapter deals with the area of plane figures. When you talk of the number of square tiles used to cover a bathroom floor, you are talking about the area of the bathroom.

This chapter includes lessons on finding and estimating the area of triangles, parallelograms, trapezoids, and irregular figures. You will have opportunities to visualize the area of these figures which will later lead you to derive the formula as an easier way to use in finding area in square units. Lessons on problem solving and creating problems are provided for the application of the knowledge and skills you learned.

Lesson 61: Finding the Area of an Irregular Figure

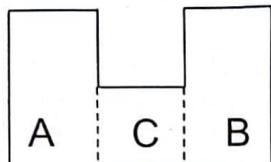
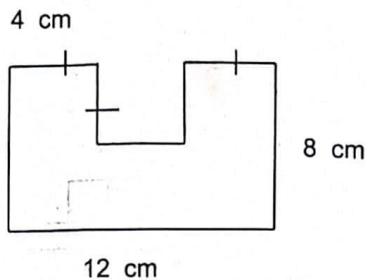


Explore and Discover!

The drawing at the right is an irregular figure.
It is made up of squares and rectangles.

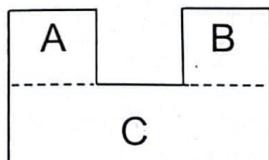
How can you find its area?

You can find its area using the following two ways.



There are two rectangles formed labeled A and B and one square labeled C.
To find the area of the figure, you do these:

$$\begin{aligned}\text{Area of Rectangle A: } &= 4 \text{ cm} \times 8 \text{ cm} = 32 \text{ sq cm} \\ \text{Area of Rectangle B: } &= 4 \text{ cm} \times 8 \text{ cm} = 32 \text{ sq cm} \\ \text{Area of Square C: } &= 4 \text{ cm} \times 4 \text{ cm} = 16 \text{ sq cm} \\ \text{Add the areas: } &32 + 32 + 16 = 80 \text{ sq cm}\end{aligned}$$



There are two squares formed labeled A and B
and one rectangle labeled C.
To find the area of the figure, you do these.

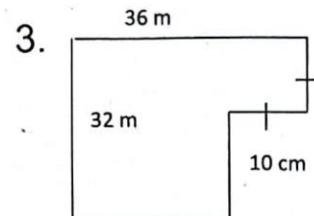
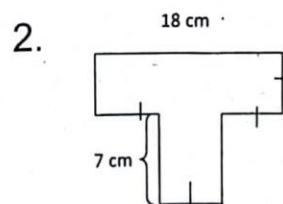
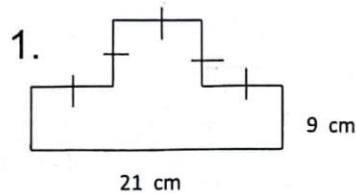
$$\begin{aligned}\text{Area of square A: } &4 \times 4 = 16 \text{ sq cm} \\ \text{Area of square B: } &4 \times 4 = 16 \text{ sq cm} \\ \text{Area of rectangle C: } &4 \times 12 = 48 \text{ sq cm} \\ \text{Add the areas: } &16 + 16 + 48 = 80 \text{ sq cm}\end{aligned}$$

The area of the irregular figure is 80 sq cm or 80 cm². Can you think of other ways to find the area of the given figure?



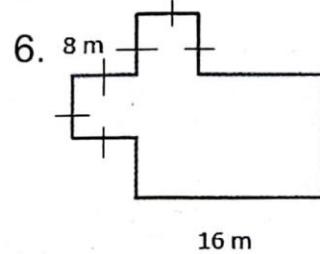
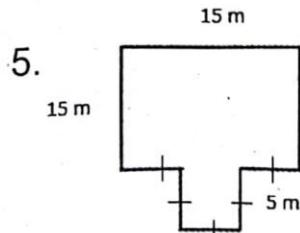
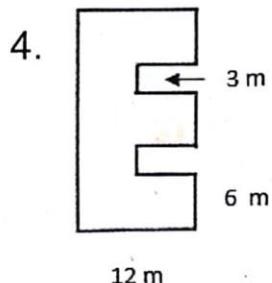
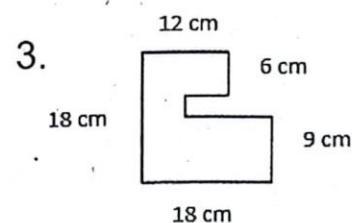
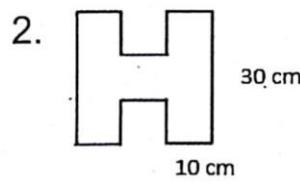
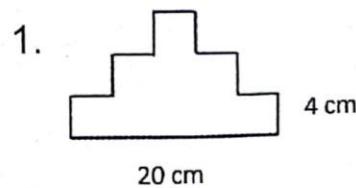
Get Moving!

Find the area of the following irregular figures. Show the answers in your notebook.



Keep Moving!

Find the area of these irregular figures. Write your answers in your notebook.

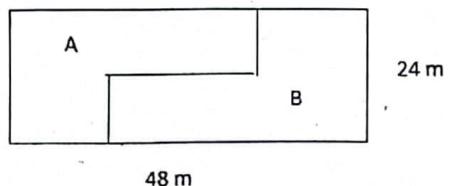




Apply Your Skills!

Read each problem. Then, solve for the answers in your notebook.

1. From a square piece of cartolina with a side of 60 cm, Liza cut the biggest cross. What is the area of the cross?



2. What is the area of region B?

3. Allen sweeps an L-shaped path. Both ends of the path measure 2 meters, while the outer sides measure 15 meters and 20 meters. What is the area of the path?

Lesson 62: Estimating the Area of Irregular Figures

Explore and Discover!

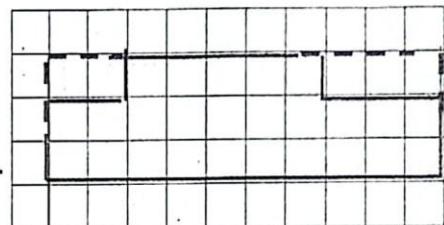
Dino is trying to estimate the area of the figure he saw in one of the pictures hanging in the school library. The figure he saw is shown below:

Can you help Dino?

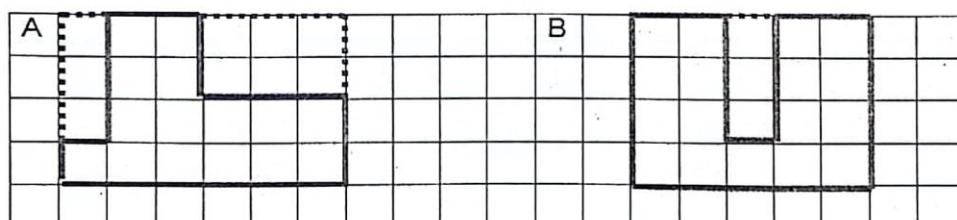
The figure is irregular in shape.
It is made of squares and rectangles.
You can estimate its area by
completing it as a square or rectangle.
In this figure, you can use a rectangle
to complete it. The area of the
rectangle less the number of square
units outside the irregular figure is the
area of the irregular figure.

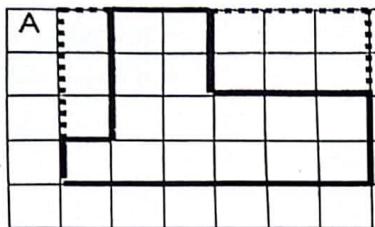
The area of the rectangle
is 30 square units ($A = 10 \times 3 = 30$).

Since there are 5 sq units outside the irregular figure,
the area of the irregular figure is $30 \text{ sq units} - 5 \text{ sq units} =$
25 sq units



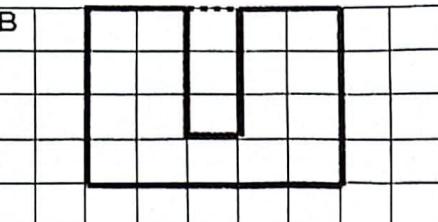
The drawings below are examples of irregular figures. Study how the areas are estimated. $\square = 1 \text{ square cm} = 1 \text{ cm}^2$





Area of the rectangle: $6 \times 4 = 24$

Area of the irregular figure:
 $24 \text{ cm}^2 - 9 \text{ cm}^2 = 15 \text{ cm}^2$



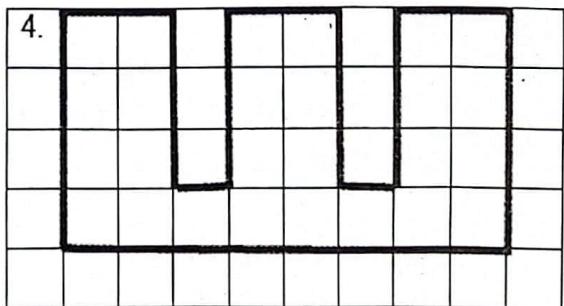
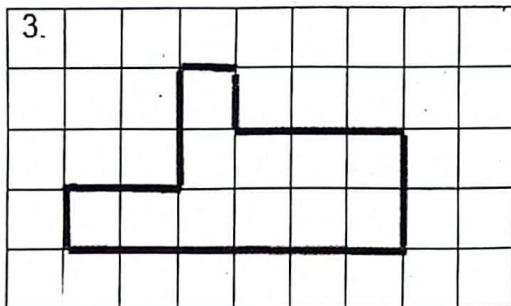
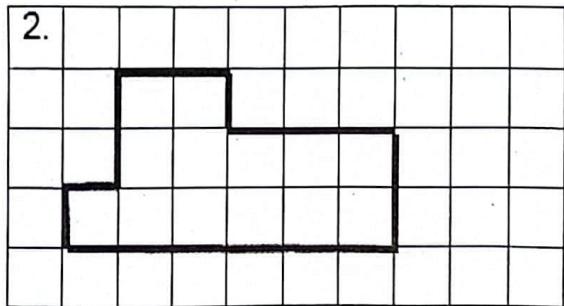
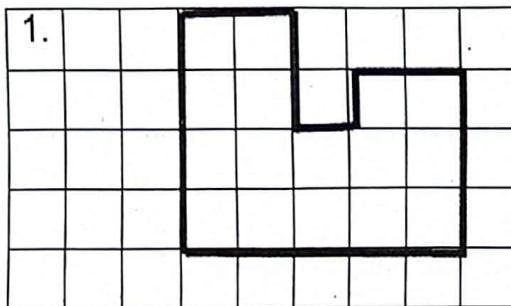
Area of the rectangle: $5 \times 4 = 20$

Area of the irregular figure:
 $20 \text{ cm}^2 - 3 \text{ cm}^2 = 17 \text{ cm}^2$



Get Moving!

Estimate the area of the following figures in square units:

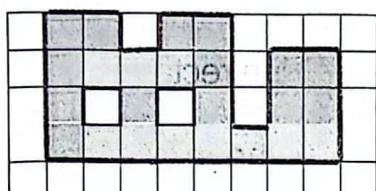




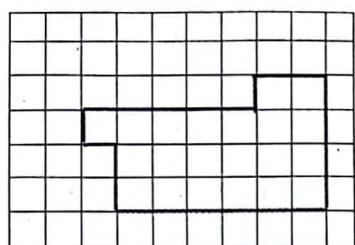
Keep Moving!

Estimate the area: \square is equal to 1 sq cm

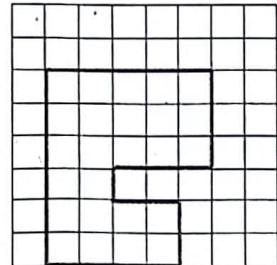
1.



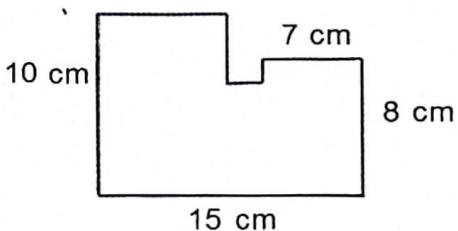
2.



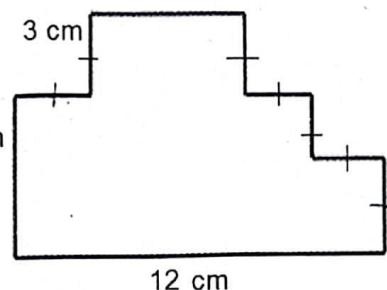
3.



4.



5.



Apply Your Skills!

Read the problem. Then, solve in your notebook. Use grid paper for your drawing.

1. On a piece of grid paper, first trace your hand with your fingers closed together. Then, trace your hand again, this time with your fingers spread apart. Think about how you might determine the area of your handprint. Will the amount of area covered differ if you trace your hand with your fingers closed together or spread apart?

Lesson 63: Finding the Area of a Parallelogram

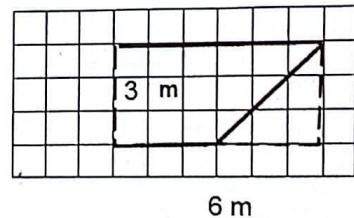
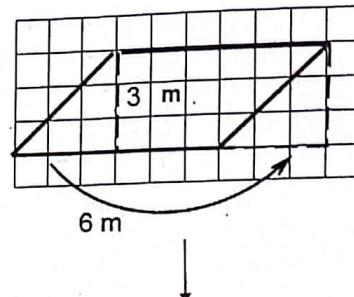


Explore and Discover!

A vegetable garden has the shape of a parallelogram. It has a base of 6 meters and a height of 3 meters. What is the area of the garden?

The illustration will help you find the area of the garden.

- The garden has the shape of a parallelogram. Its base is 6 m and its height is 3 m.
- Look at how the parallelogram is transformed into a rectangle.
- The illustration shows that the area of the rectangle is the same as the area of the parallelogram.
- By counting, the area of the rectangle is 18 sq m.
- Using the formula, the area of the rectangle is the product of its length (l) and width (w):



$$A = l \times w$$

$$A = 6 \text{ m} \times 3 \text{ m}$$

$$A = 18 \text{ sq m or } 18 \text{ m}^2$$

- Since the area of a rectangle can be found by multiplying its length by its width, you can find the area of the parallelogram by multiplying the base by the height. If b is base and h is the height of a parallelogram, then, the area of the parallelogram is:

$$A = b \times h$$

$$= 6 \text{ m} \times 3 \text{ m}$$

$$A = 18 \text{ sq m or } 18 \text{ m}^2$$

m^2 is a shorter way of writing square meter.



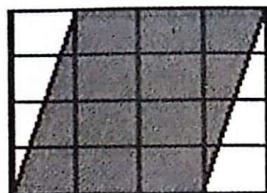
Get Moving!

Study each shape. Then, find the area of the shaded part.

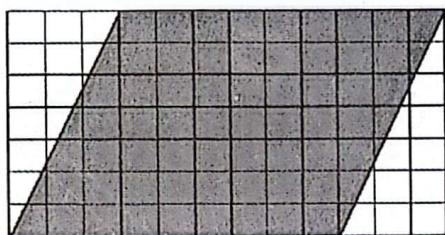
1.



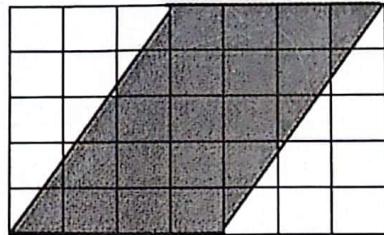
2.



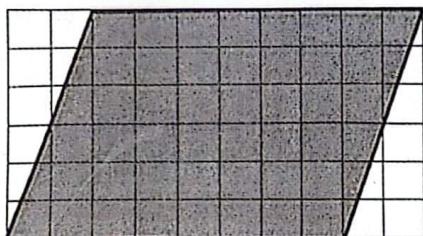
3.



4.



5.

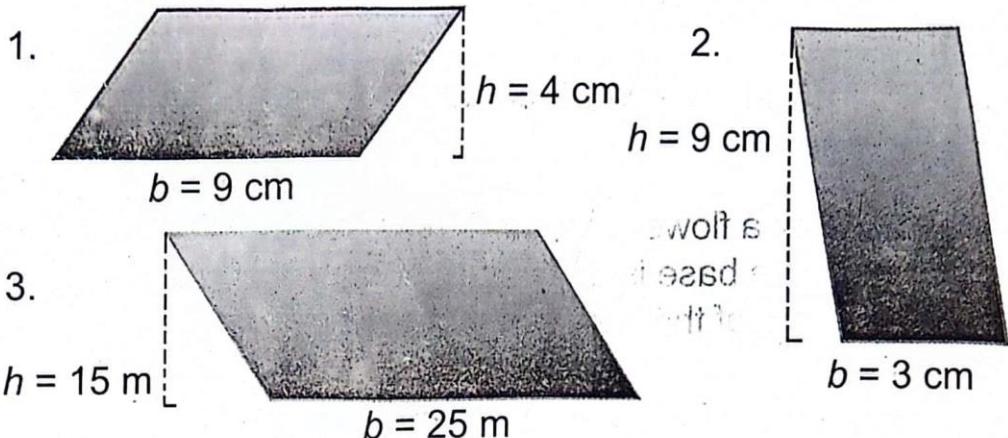


Keep Moving!

A. Complete the table.

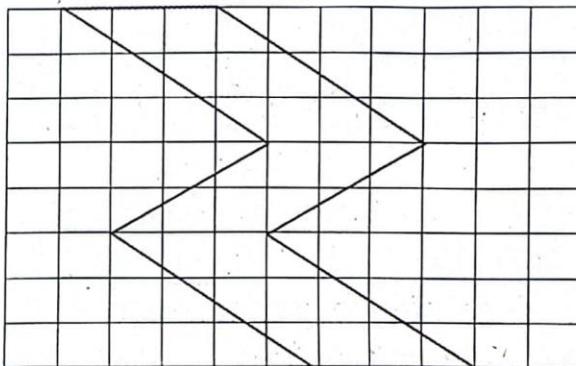
Parallelogram	Base (b)	Height (h)	Area (A)
1	8 cm	9 cm	
2	18 m	12 m	
3	12 cm		84 cm ²
4		3 in	36 in ²
5	34 dm	3 dm	

B. Find the area of each parallelogram using the formula.



Apply Your Skills!

A. Consider the figure below as a section of a garden path in a botanical garden. Find the area of the path using (1) estimation and (2) the formula for the area of a parallelogram. One unit = 1 sq meter.



B. Solve the following problems.

1. A residential lot in the shape of a parallelogram has a base of 16 m and a height of 12 m. What is its area?
2. A parallelogram has a base of 8 cm and a height of 6 cm. What is the area of a parallelogram with base and height twice as long?
3. A parallelogram has an area of 432 sq cm. If its height is 18 cm, how long is its base?

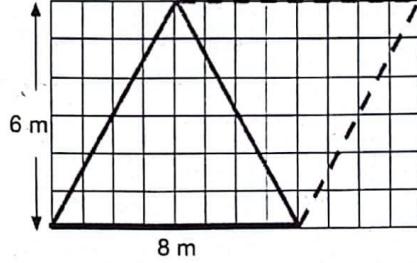
Lesson 64: Finding the Area of a Triangle



Explore and Discover!

Maris has a flower garden. The garden is triangular in shape. The length of the base is 8 meters, and the height is 6 m. What is the area of the garden?

The illustration will help you find the area of the garden.

- The flower garden has the shape of a triangle. The length of its base is 8 m and its height is 6 m.
- If you draw another triangle that is exactly the same as the given triangle and arrange these 2 triangles as shown in the figure, a parallelogram is formed.
- By counting, the area of the parallelogram is 48 m^2 .
- Since $\frac{1}{2}$ of the parallelogram is a triangle, the area of the triangle is $\frac{1}{2}$ the area of the parallelogram:
 $48 \text{ m}^2 \div 2 = 24 \text{ m}^2$
- Using the formula $A = b \times h$ for finding the area of the parallelogram, the area of the triangle can be found by using $A = \frac{b \times h}{2}$ or
 $A = \frac{1}{2}bh$ which means $\frac{1}{2}$ of the product of the base and height.



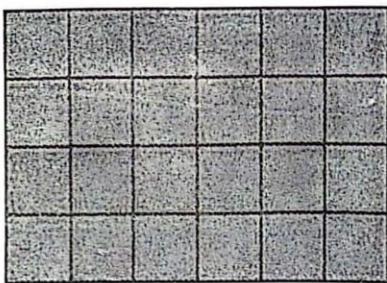
Get Moving!

Study each figure, then, do the following:

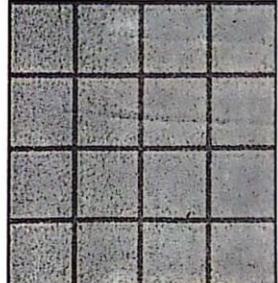
Find the area of each figure. Each \square is equal to 1 cm^2

- Using a ruler, draw a diagonal line from one corner to the opposite corner for each figure. How many parts is the original figure divided? What are the new shapes formed?
- Find the area of the new shapes.

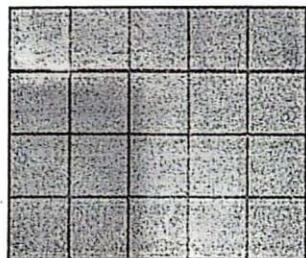
1.



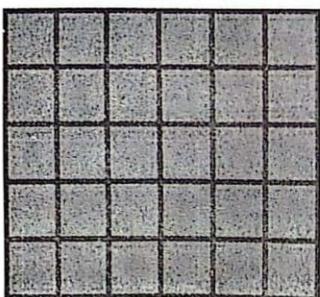
4.



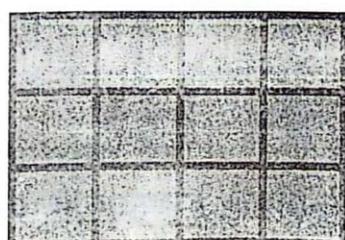
2.



5.



3.

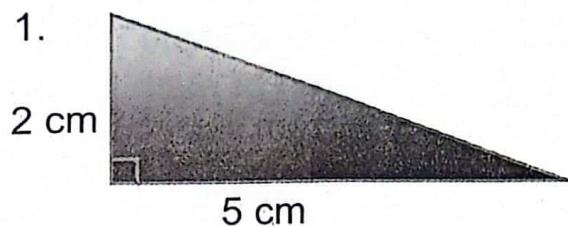




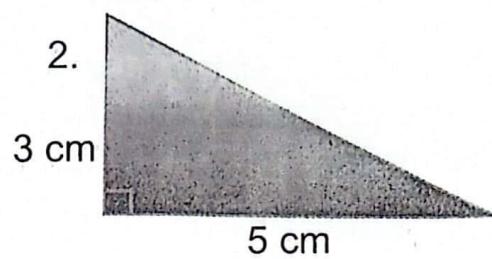
Keep Moving!

A. Find the area of each triangle using the formula.

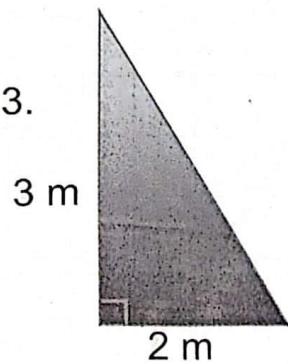
1.



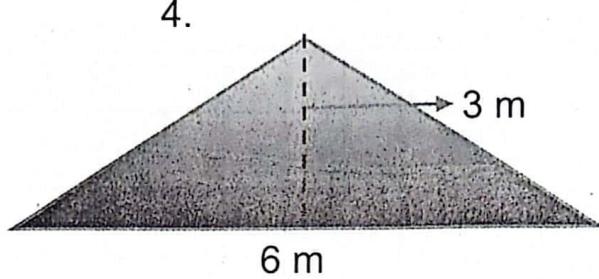
2.



3.



4.



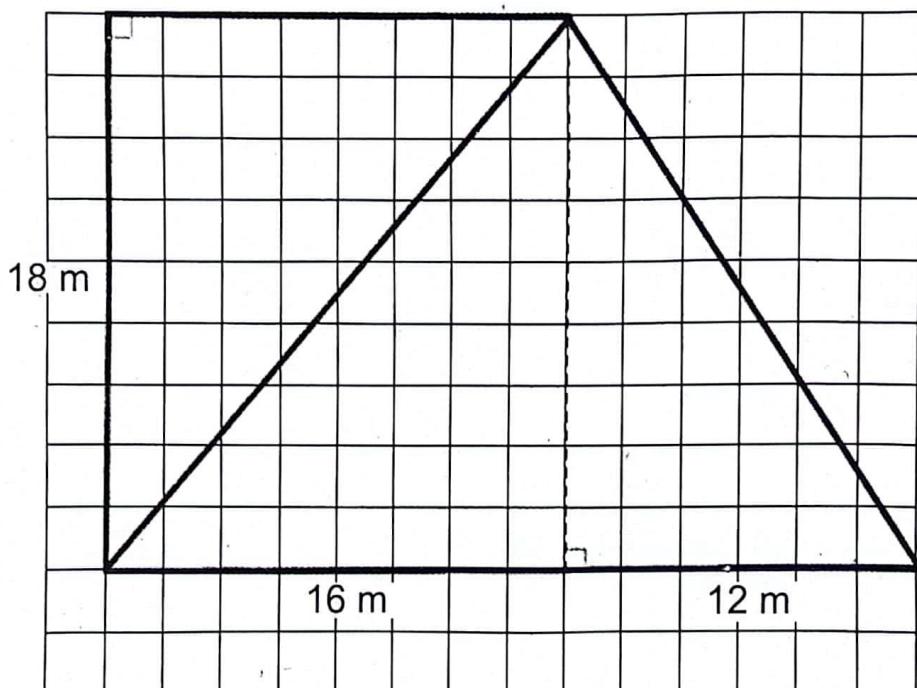
B. Complete the table. Use the formula for the area of a triangle.

Triangle	Base (b)	Height (h)	Area (A)
1	4 cm	2 cm	
2	6 m	4 m	
3	12 cm		84 cm ²
4		12 m	36 m ²
5	34 dm	3 dm	



Apply Your Skills!

Consider the figure of two adjoining lots on sale below. What is the total area of the two lots? Find the area of each lot using (1) estimation, and (2) the formula for the area of a triangle.



Lesson 65: Finding the Area of a Trapezoid



Explore and Discover!

Mr. Araneta bought a residential lot. The lot is in the shape of a trapezoid as shown in the illustration. What is the area of the lot?

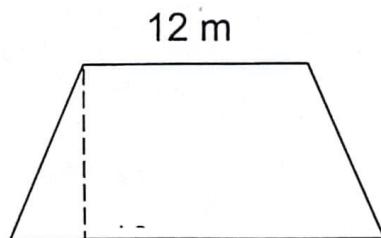


Figure 1

To find the area of the residential lot, you need to find the area of a trapezoid.

- The lot has an upper base of 12 m and a lower base of 20 m. Its height is 10 m.

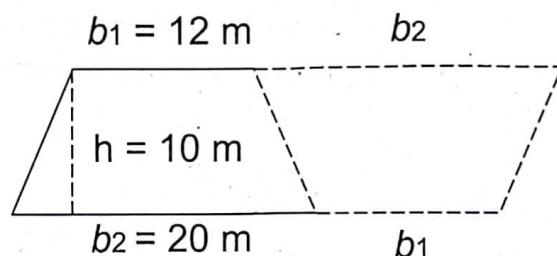


Figure 2

- If you draw another trapezoid that is exactly the same as the given trapezoid and arrange them as shown in Figure 2, a parallelogram is formed.

- You can say that the given trapezoid is $\frac{1}{2}$ of the parallelogram.
- The area of the parallelogram can be found by its formula
 $A = b \times h$
 $A = (12 \text{ m} + 20 \text{ m}) \times 10 \text{ m}$, where 12 m is the upper base (b_1)
 $A = 32 \text{ m} \times 10 \text{ m}$ and 20 m is the lower base (b_2)
 $A = 320 \text{ m}^2$

Since one trapezoid is $\frac{1}{2}$ of the parallelogram, the area of one trapezoid is $\frac{1}{2}$ the area of the parallelogram. Thus, the area (A) of the trapezoid is:

$$A = \frac{1}{2} (12 \text{ m} + 20 \text{ m}) \times 10$$

$$A = \frac{1}{2} (32 \text{ m}) \times 10 \text{ m}$$

$$A = \frac{1}{2} (320 \text{ m}^2)$$

$$A = 160\text{m}^2$$

- To solve for the area of a trapezoid, you use the formula

$$A = (b_1 + b_2) \times h \text{ or } A = \frac{(b_1 + b_2) \times h}{2},$$

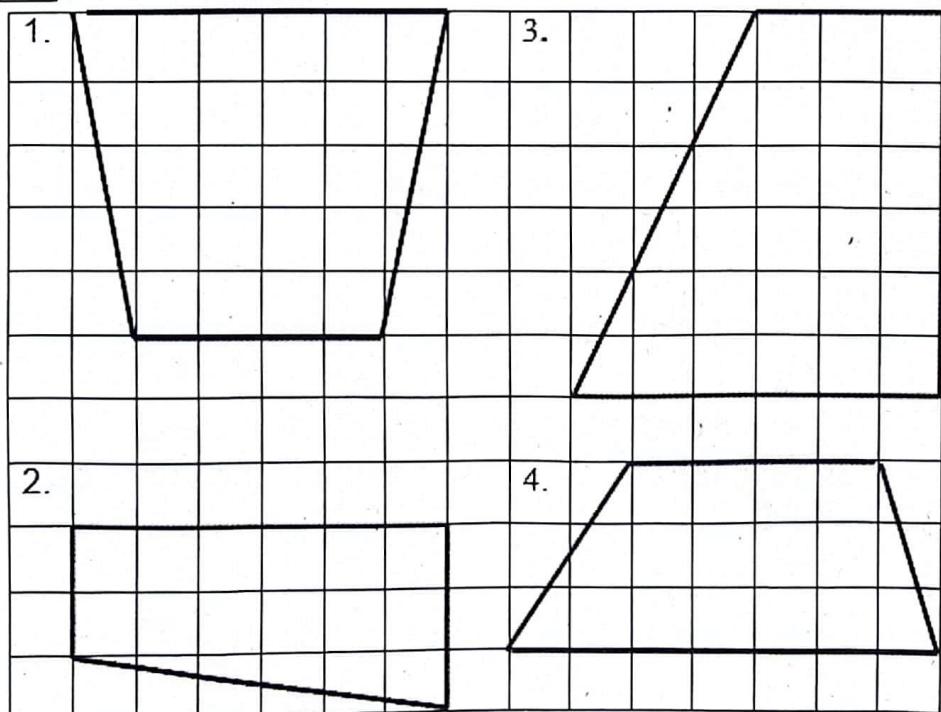
where:

b_1 and b_2 are the bases; and
 h is the height of the trapezoid.

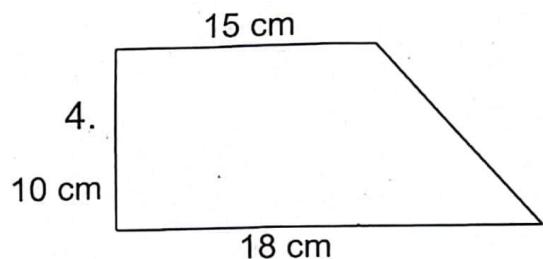
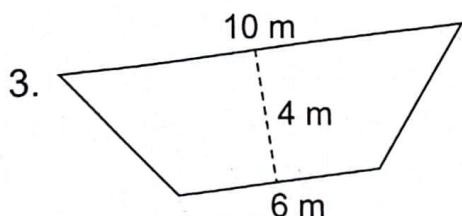
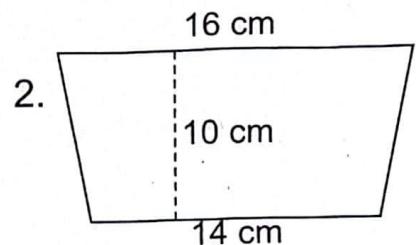
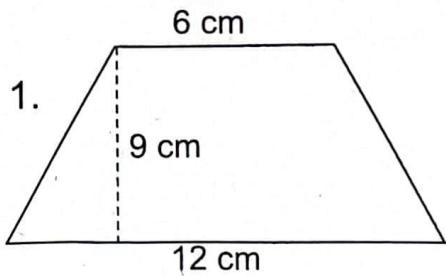


Get Moving!

Use estimation by counting to find the area of each trapezoid. Then, check your estimates by using the formula. Each \square is one square unit.



Find the area of the following trapezoids:

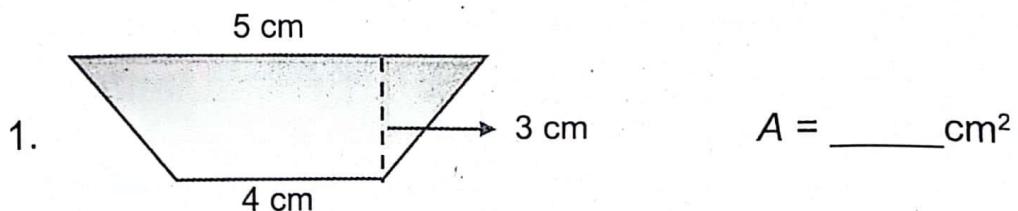


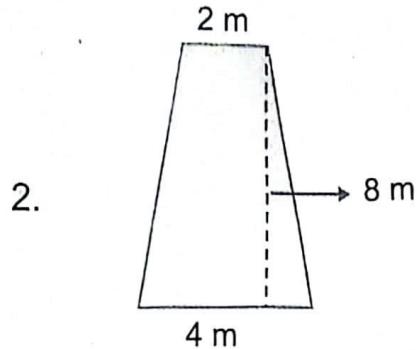
Keep Moving!

- A. Complete the table below by using the formula for the area of a trapezoid.

Trapezoid	b_1	b_2	h	A
1	4 cm	2 cm	2 cm	
2	6 cm	10 cm	4 cm	
3	12 cm	8 cm	10 cm	
4	6 cm	12 dm		90 dm^2
5	8 m	7 m		168 m^2

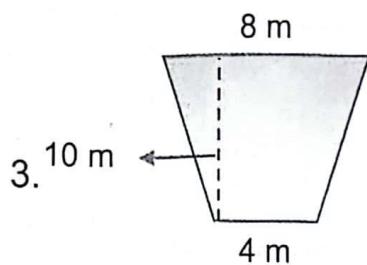
- B. Find the area of each trapezoid using the formula.





$$A = \underline{\hspace{2cm}} \text{ m}^2$$

$$A = \underline{\hspace{2cm}} \text{ cm}^2$$



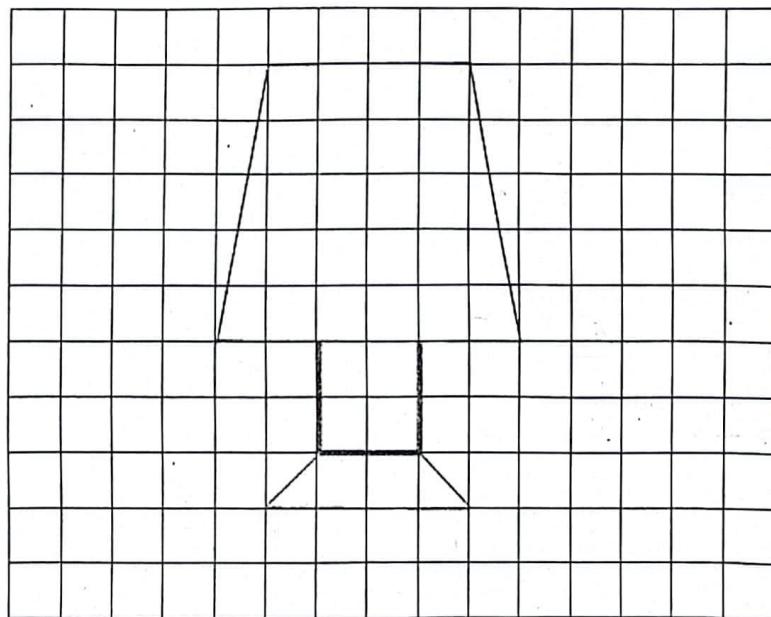
$$A = \underline{\hspace{2cm}} \text{ m}^2$$

$$A = \underline{\hspace{2cm}} \text{ cm}^2$$



Apply Your Skills!

Consider the figure below showing one side of a lamp; whose shade and base are in the shape of a trapezoid. Find the total area of the (a) shade, and (b) the base of the lamp. The scale of the drawing is 1 unit = 4 cm



Lesson 66: Estimating the Area of Parallelograms, Triangles, and Trapezoids

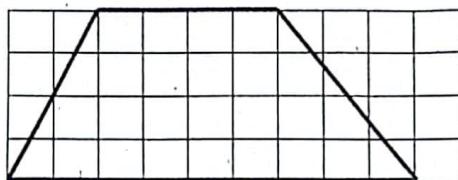
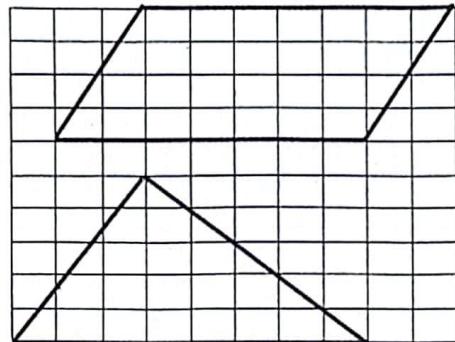


Explore and Discover!

Can you estimate the area of the figures?

You can estimate the area of a parallelogram, a triangle, and a trapezoid by counting how many square units it takes to cover each figure completely. When only part of a square is included in the figure, you may be able to put it together with a part of another square in the figure to form one whole square.

$$\square = 1 \text{ sq cm or } 1 \text{ cm}^2$$



The area of the parallelogram is 28 cm²

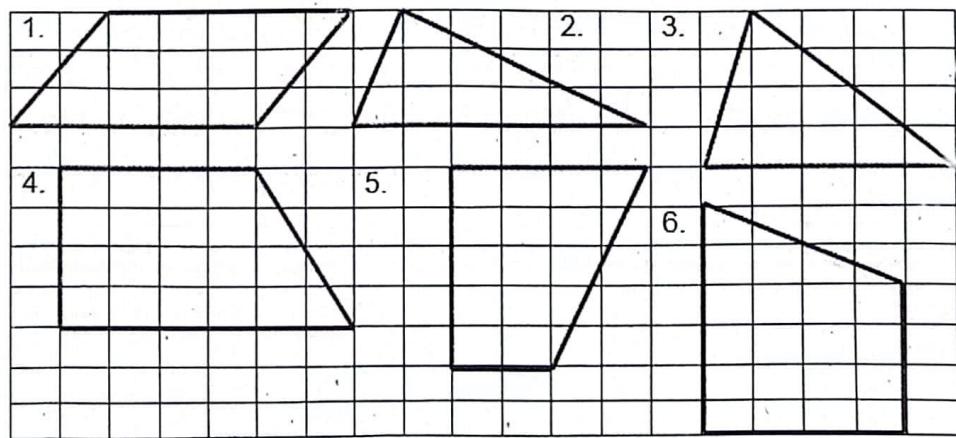
The area of the triangle is 20 cm²

The area of the trapezoid is 26 cm²



Get Moving!

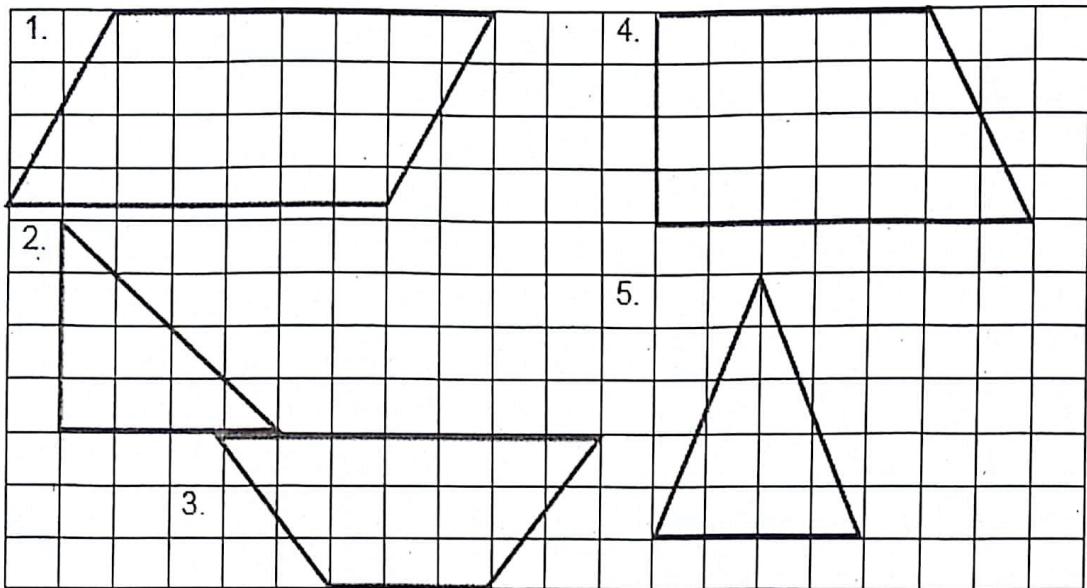
Estimate the area of each figure. $\square = 1 \text{ cm}^2$





Keep Moving!

Estimate the area. $\square = 1\text{m}^2$



Apply Your Skills!

Your principal wants to know how many floor tiles will be needed to cover the entire floor of your classroom. She needs to know the exact area, because she doesn't want to order too many tiles and waste money, or order too few and not be able to cover the entire floor. Your job is to measure your classroom, determine the floor area, and write a letter to the principal recommending to her how many tiles to buy. The letter should include an explanation about how you arrived at your estimate.

Lesson 67: Solving Routine and Nonroutine Problems Involving Squares, Rectangles, Triangles, Parallelograms, and Trapezoids



Explore and Discover!

Go around your classroom and identify objects corresponding to the different figures you have studied. Write the names of the actual objects you found in your room.

Complete the information for that object by making estimates using appropriate units of measurement of the dimensions and by getting the actual measurements using an appropriate measuring instrument.

Figure	Actual Objects Found in the Room	Your Estimate	Actual Area
Parallelogram		$b =$ $h =$ $A =$	$b =$ $h =$ $A =$
Triangle		$b =$ $h =$ $A =$	$b =$ $h =$ $A =$
Trapezoid		$b_1 =$ $b_2 =$ $h =$ $A =$	$b_1 =$ $b_2 =$ $h =$ $A =$
Rectangle		$l =$ $w =$ $A =$	$l =$ $w =$ $A =$
Square		$s =$ $A =$	$s =$ $A =$



Get Moving!

Do the following:

- 1: What is the shape of the blackboard in your classroom? Draw the blackboard in your notebook. Using a meter stick, measure the length and the width of the blackboard. Indicate these measures on the drawing. Then, compute the area of the board. Your teacher would like to put a curtain over the blackboard so that there is a 10 cm extension on each side of the blackboard, how many square meters of cloth will be needed for the curtain?

- 2: What is the shape of the top of the teacher's table in your classroom? Draw it in your notebook. Using a meter stick, measure the length and the width of the table top and indicate these on your drawing. Using an appropriate formula, find the area of the table top. If you will cover the table top with a plastic cover so that there is an extension of 10 cm on each side of the table, how many square centimeters of plastic will be needed for the cover?

Solve the following problems. Use the 4-Step Plan.

1. A residential lot has the shape of a parallelogram. Its base measures 20 meters. The distance between the 2 parallel sides is 8 meters. What is the area of the lot?

2. A triangular landscape has a base of 24 meters and a height of 12 meters. Find its area.

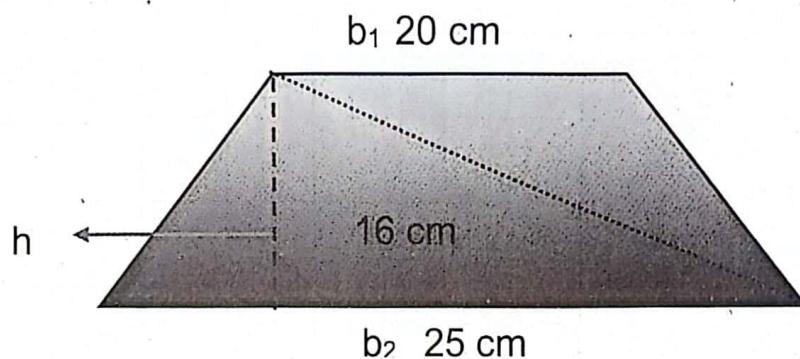
3. A trapezoidal lawn has an upper base of 16 meters and a lower base of 30 meters. The distance between the parallel bases is 10 meters. If the lawn is to be planted with bermuda grass, how many square meters of bermuda grass will be needed?



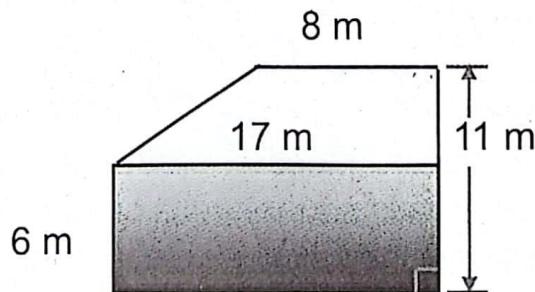
Keep Moving!

1: Consider the trapezoid below. If you cut the trapezoid along the dotted line, you divide it into two figures. Now, answer the following questions:

- Into what shapes has the trapezoid been divided?
- What are the height and base of each shape?
- Find the area of each shape and add them together.
- How does this sum compare to the area of the trapezoid?



2: Study the drawing below. Name at least two familiar figures you can see in the drawing. Find the area of the figure. If this drawing shows half of the drawing for a facade of a one-story building, draw the whole building. What familiar figures can you identify in the new drawing. Find the area of the new figure.

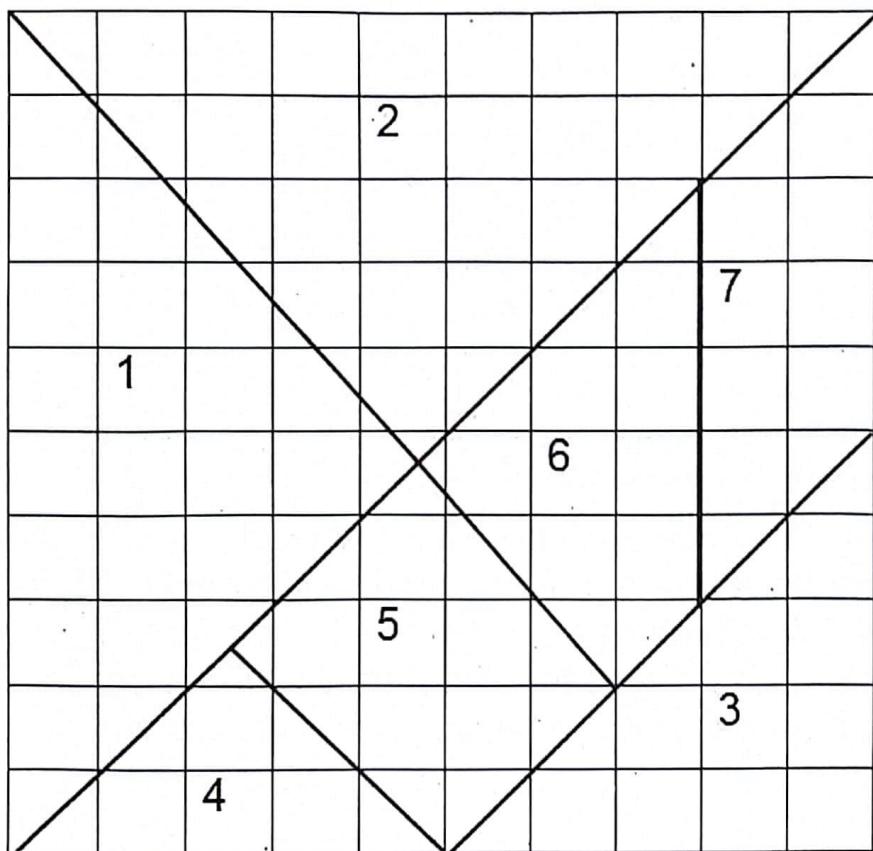


Read each problem and then, solve.

1. A triangular flaglet has a base of 40 centimeters and a height of 24 centimeters. How many square centimeters of material were used in making it?
2. A playground in the shape of a parallelogram has a base of 60 meters and a height of 45 meters. What is its area?



Apply Your Skills!



1. Using the seven pieces, create a symbol for yourself. Indicate the area in square units of your symbol. Give a name to your symbol. Paste it on a clean bond paper.
2. The area of a trapezoid is 390 cm^2 . If its height is 15 cm and one of the bases is 20 cm, what is the length of the other base?

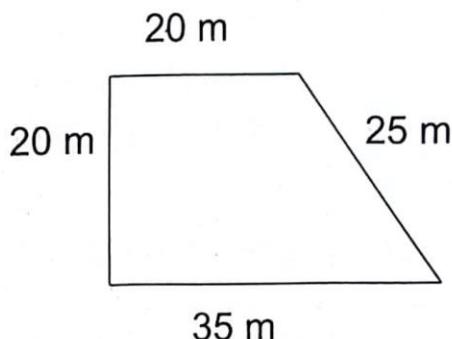
Lesson 68: Creating Problems Involving Perimeter and Area



Explore and Discover!

Study the problem.

The trapezoidal field at the right is completely covered with carabao grass.



Can you create a problem about the field?

You can create a problem by using the steps below:

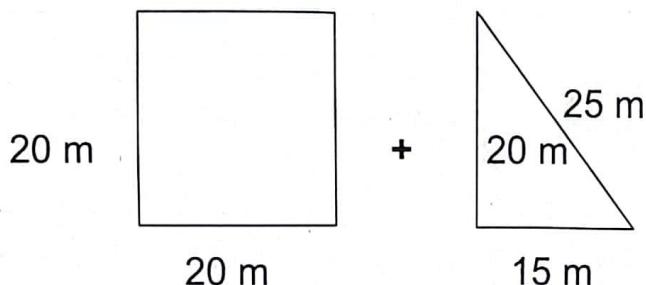
1. Familiarize yourself with the concepts. Think of the application to everyday life situations.
2. Think of the type of problem you want to create and the formula to be used. Relate the problem to a real-life situation.
3. Read more on Math problem solving. Study the solution in solving the problems.
4. Make your own styles/strategies to justify the solutions.

Below are the examples of problems that you can create:

1. The trapezoidal field is completely covered with carabao grass. How many square meters of grass were used?
2. The trapezoidal field which is completely covered with carabao grass is to be enclosed with a barbed wire fence. How many meters of barbed wire are needed for the fence?

Below are solutions to the problem created.

Break the figure into parts.



Area of trapezoid = area of the square + area of the triangle

$$= (\text{side} \times \text{side}) + \left(\frac{1}{2} \times \text{base} \times \text{height}\right)$$

$$= (20 \text{ m} \times 20 \text{ m}) + \left(\frac{1}{2} \times 15 \text{ m} \times 20 \text{ m}\right)$$

$$= 550 \text{ m}^2$$

Perimeter of trapezoid = sum of the four sides

$$= 20 \text{ m} + 20 \text{ m} + 35 \text{ m} + 25 \text{ m}$$

$$= 100 \text{ m}$$



Get Moving!

Create/Make a problem involving the perimeter and area of a triangle, parallelogram, and trapezoid with corresponding answers based on the given situation. Write the answers on your answer sheet.

1. The living room is in the shape of a trapezoid where one of the parallel sides is 4 m long and the other is 6 m long. The distance across these sides is 7 m.

Problem:

Answer:

2. A triangular parcel of land is 11 meters at its base and a height of 7 meters.

Problem:

Answer:



Keep Moving!

Create/Make a problem involving the perimeter and area of a triangle, parallelogram, and trapezoid. Write the answers on your answer sheet.

180

10

1. A rectangular yard has a length of 16 meters and a width of 3 meters.

Problem:

Answer:

2. A triangle has sides measuring 10 cm, 14 cm, and 15 cm.

Problem:

Answer:

3. A wooden area is in the shape of a trapezoid whose bases measure 128 meters and 92 meters and its height is 40 meters.

Problem:

Answer:



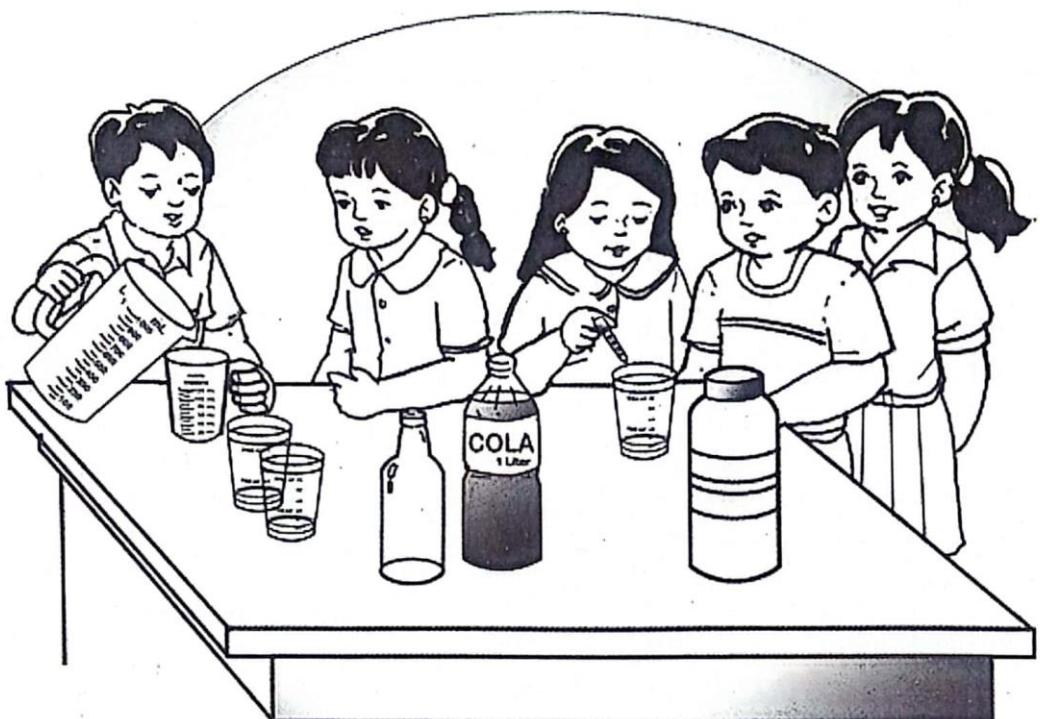
Apply Your Skills!

Create a problem involving the perimeter and area of a triangle, parallelogram, and trapezoid. Write your answers to each problem on your answer sheet.

1. Roy planted vegetables in his backyard.
The shape of the garden is a parallelogram.
It has a base of 6 meters and a height of 4 meters.
2. Ana has a rectangular herb garden that is 8 m long and
10 m wide.
3. Nur plans to put a fence around his vegetable garden that
is rectangular in shape. The length of the garden is 4
meters and the width is 2 meters.

CHAPTER 9

MEASURING VOLUME



This chapter deals with lessons on volume. When you want to know the number of marbles that are in a container, you speak of volume. When you want to know the amount of water that a container holds, you are talking of volume. Lessons in this chapter include visualizing volumes using non-standard and standard units. You will also have opportunities to find the volume of rectangular prisms, solve routine and nonroutine problems, and create problems on the volume of rectangular prisms.

Lesson 69: Visualizing the Volume of a Solid Using Non-Standard Units

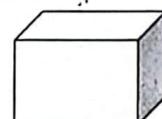


Explore and Discover!

Study the situation:

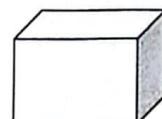
Miko and Carlo wanted to find the volume of an empty box.

First, they filled the box with balls:
About 54 balls filled the box.



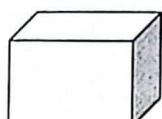
about 54 balls

Next, they filled the box with marbles.
About 285 marbles filled the box.



about 285 marbles

Then, they filled the box with beans.
About 740 beans filled the box.



about 740 beans

Did Miko and Carlo get the same number of units for the volume of the box?
Why?

Non-standard units do not give the same measure of volume for the same container. Balls, marbles, and beans are used as non-standard units for measuring the volume of the box.

Try to remember the following:

- **Volume** is the amount of space a solid figure occupies.
- A **solid figure** is a three-dimensional shape.
- Non-standard units can be used to measure volume.
- When a non-standard unit used is small, more units are needed to fill a container. When the non-standard unit used is bigger, fewer units are needed to fill the container.
- Non-standard units do not give a consistent and accurate measurement of the volume of a container.



Get Moving!

Get boxes like those in the table below. Visualize the volume. Estimate how many marbles will fill each box. Then, find the actual number of marbles that will fill each box. (Use marbles of the same size.) Write the answers in your notebook.

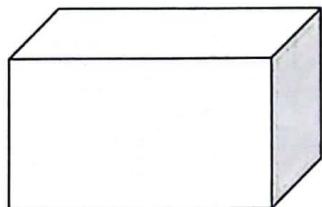
Box	Estimated Number of Marbles	Actual Number of Marbles
1. 		
2. 		
3. 		
4. 		



Keep Moving!

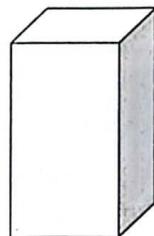
Use a non-standard unit of the same material and size. Which unit will give the greater number for the volume of the container? Visualize the volume and explain your answer.

1.



Pingpong balls

2.



mongo seeds

Which of these materials will you put inside a box so that smaller gaps or spaces can be seen? Why?



Apply Your Skills!

Read and answer each problem.

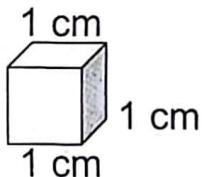
1. Two containers were filled with marbles of the same material and size. Container A had 200 marbles. Container B had 250 marbles. In what way does the volume of container A compare with the volume of container B?
2. Get a medium-sized chocolate box and a medium-sized powdered milk carton. Which do you think has a greater volume? How will you test which box has the greater volume? Visualize.

Lesson 70: Visualizing the Volume of a Solid Using Standard Units

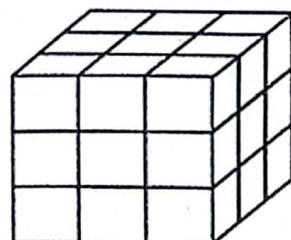


Explore and Discover!

This is 1 cubic cm box.



The figure at the right contains 27 cubes. Its volume is 27 cubic cm or 27 cm^3



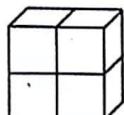
Let us study the following solid figures.
You can count the cubes to find the volume of a box.



1 cubic unit



2 cubic units



4 cubic units

The volume of the box above is 4 cubic units.

If 1 cubic unit is equal to 1 cubic cm, then the volume is 4 cubic cm or 4 cm^3 . A cubic centimeter (cm^3) is a standard unit for measuring volume. A cubic meter (m^3) is another one.

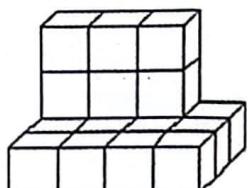


Get Moving!

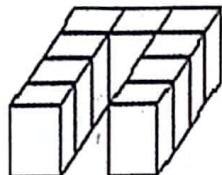
Find the volume of each solid figure. Write the answer in your notebook.

Use 1 cube = 1 cubic cm

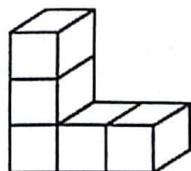
1. a.



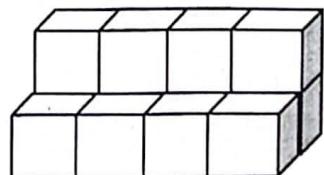
b.



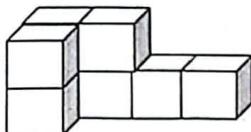
c.



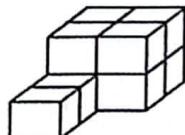
d.



e.



f.



2. Draw cubes to visualize the given volume of the following solid figures.

a. $V = 12$ cubic cm

a. $V = 15$ cubic cm

b. $V = 24$ cubic cm

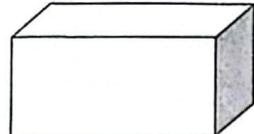


Keep Moving!

Visualize the volume and explain your answer. Write the answer in your notebook.

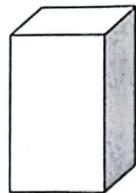
1.

a.



$$V = 18 \text{ cubic cm}$$

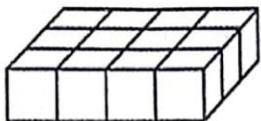
b.



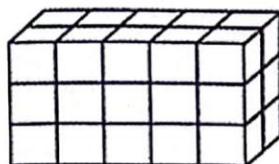
$$V = 12 \text{ cubic units}$$

2. Find the volume. One  is one cubic unit.

a.



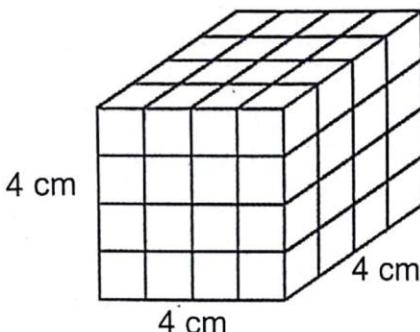
b.



Apply Your Skills!

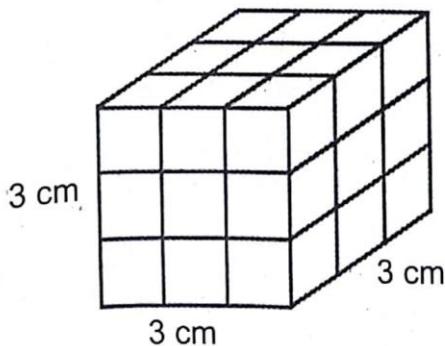
Answer the following.

1. The diagram below shows a large cube made from 1 cubic cm.



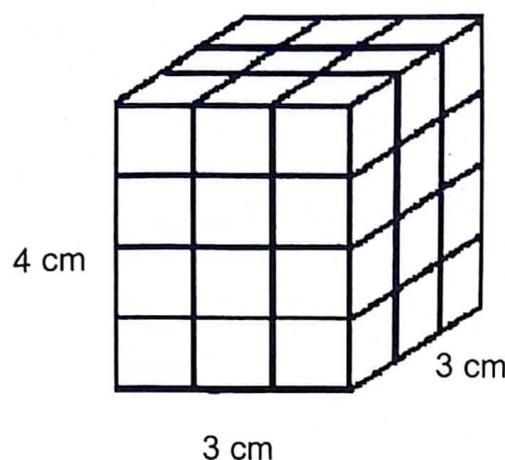
- a. How many small cubes are there in each layer of the large cube?
b. What is the volume of the large cube?

2. Look at the cube below.



- a. What is the volume of the cube?
b. If the top layer of the cube is cut off, what is the volume of the remaining solid?

3. Find the volume of this solid figure.



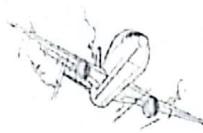
4. On a grid paper, draw solids with the following volumes:

a. 12 cm^3

b. 15 cm^3

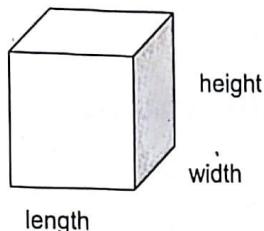
c. 20 cm^3

Lesson 71: Finding the Volume of a Rectangular Prism



Explore and Discover!

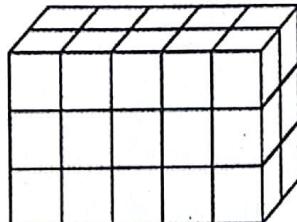
A **rectangular** prism is a solid figure that has six faces, twelve edges and eight vertices. **Vertex** (vertices in plural form) is the corner of a shape. **Edge** is a segment where two faces of a prism meet. Some rectangular prisms have faces that are shaped like rectangles and squares.



$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$
$$\text{side} = 3 \times 3 \times 3 = 27 \text{ cubic units}$$

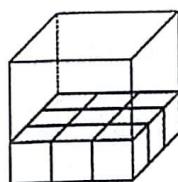
Answer: There are 27 cubic units.

The box below is in the shape of a rectangular prism. It contains cubes arranged in rows, columns, and layers. What is the volume of the prism?

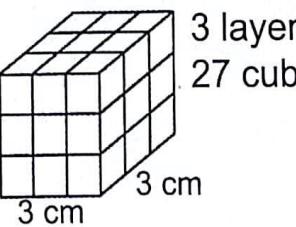


How many rows of cubes are there?
How many columns of cubes are there?
How many layers of cubes are there?

Study the following examples. Below is a cube. A **cube** also has six faces, twelve edges, and eight vertices. Each face is shaped like a square with equal lengths of sides.

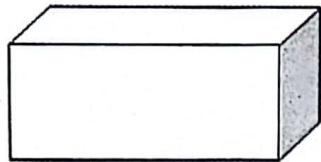


3 cm



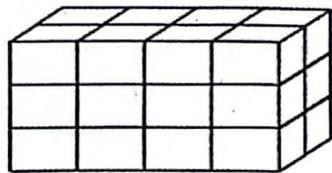
3 rows of 3 cubes
9 cubes in all
3 layers of 3 rows of 3 cubes
27 cubes in all

Study these examples:



length (4 units)

height (3 units)
width (2 units)



4 rows of 2 cubes
3 layers of 4 rows of 2 cubes
24 cubes in all

How do you find the volume?

You count the number of cubes to get the volume of the rectangular prism.

By counting, there are 24 cubes in all.

You can also multiply the number of rows by the number of columns and by the number of layers to find the volume.

$$\begin{aligned}V &= 4 \text{ rows} \times 2 \text{ columns} \times 3 \text{ layers} \\&= 24 \text{ cubes}\end{aligned}$$

Let V be the volume of a rectangular prism. If ℓ is the length, w is the width, and h is the height of the rectangular prism, then

$$\begin{aligned}V &= \ell \times w \times h \\&= 4 \times 2 \times 3 \\&= 24 \text{ cubic units}\end{aligned}$$

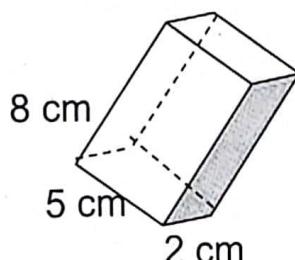
Therefore, the volume of the rectangular prism is 24 cubic units.



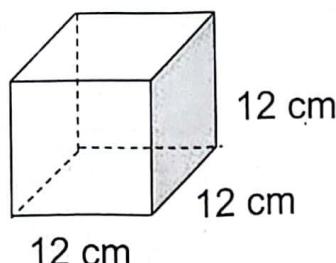
Get Moving!

Use the formula to find the volume of each prism below. Write the answers in your notebook.

1.

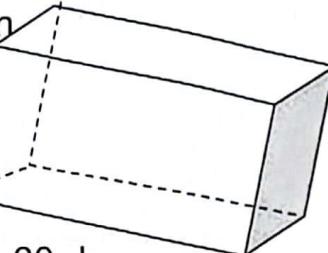


2.

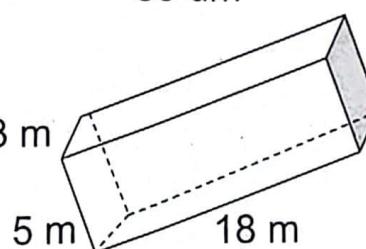


3. 10 dm

25 dm



4.



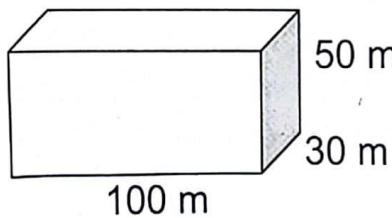
Keep Moving!

1. Complete the table. Check your answers using a calculator.

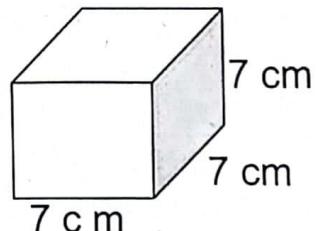
Box	Length	Width	Height	Volume
A	10 cm	6 cm	8 cm	
B	25 mm	18 mm	20 mm	
C	5 m	4 m	3 m	

2. Find each volume using the appropriate formula.

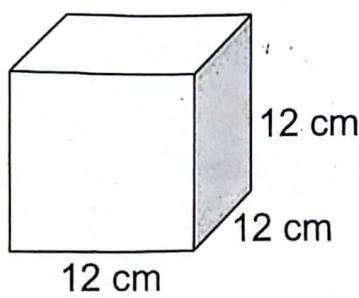
a.



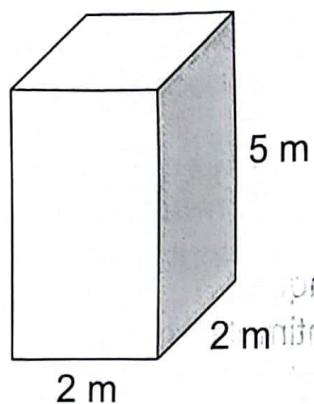
b.



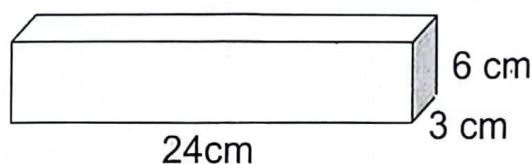
c.



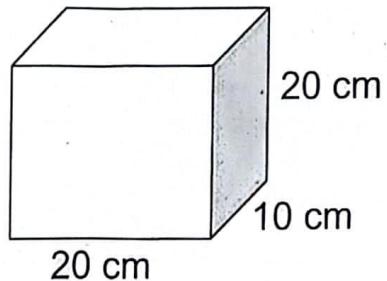
d.



e.



f.



Apply Your Skills!

Solve the following problems in your notebook.

1. A toy box is in the shape of a rectangular prism. It is 35 cm long and 15 cm high. If its width is 20 cm, what is its volume?
2. The length of a rectangular prism is 6 cm and the width is 4 cm while it stands 10 cm. What is its volume?
3. A wooden box is 24 cm long, 18 cm wide, and 9 cm high. How much space does it enclose?
4. A refrigerator has a square base with each side that measures 60 cm and stands 122 cm. Find the volume of the refrigerator.

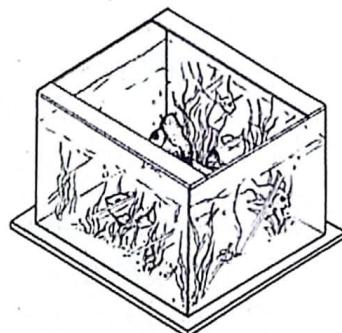
Lesson 72. Solving Routine and Nonroutine Problems Involving the Volume of a Rectangular Prism



Explore and Discover!

An aquarium has a length of 120 centimeters, a width of 60 centimeters, and a height of 100 centimeters. How much water is needed to fill the aquarium?

How will you solve the problem? You can solve the problem following these steps.



Steps	Answer
Understand:	
1. Know what is asked in the problem.	The amount of water needed to fill the aquarium
2. Know the given facts.	$\ell = 120 \text{ cm}$, $w = 60 \text{ cm}$, $h = 100 \text{ cm}$
Plan:	
3. Determine the operation or formula to use.	Multiplication: $V = \ell \times w \times h$
Solve:	
4. Show the solution using the formula.	$\ell = 120 \text{ cm}$, $w = 60 \text{ cm}$, $h = 100 \text{ cm}$ So, $V = \ell \times w \times h$; Substitute 120 for ℓ , 60 for w , and 100 for h $= 120 \text{ cm} \times 60 \text{ cm} \times 100 \text{ cm}$ $= 720\,000 \text{ cm}^3$
Check and look back:	
• Check your answer. • State your answer.	You need $720\,000 \text{ cm}^3$ of water to fill the aquarium.



Get Moving!

A. Read the problem. Then, answer the questions that follow.

Amy has a box measuring 25 cm long, 20 cm wide, and 20 cm high. If she will store rice in it, how many cubic cm of rice will it contain?

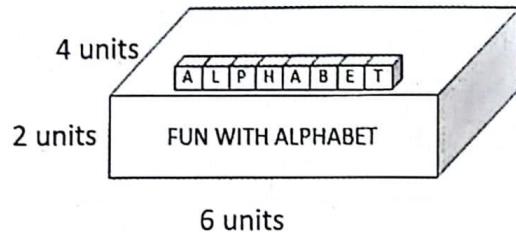
1. What is asked in the problem?
2. What facts are given?
3. What operation will be used?
4. How is the solution done?
5. What is the answer?

B. Use any strategy to solve each problem.

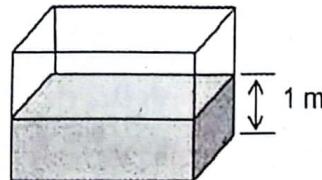
1. Renato went to a children's shop to buy his daughter a box of letter cubes.

Each letter cube
is a 1-unit cube.

How many letter cubes are there
in a box which measures 6 units
by 4 units by 2 units?



2. A 4m x 2m x 2m - water tank is filled with water as shown:



How much water is still needed to completely fill the tank?

3. Cora gave her mother a diamond ring. Since the ring was so expensive, it needs to be placed in a locked jade cubical box with an edge of 9 cm. Find the volume of the jewelry box.
4. Carlo is the country's representative to the First World's Rubic Organizing Contest in London, England. The official size of the rubic's edge is 10 cm. What is the volume of the rubic's cube?



Keep Moving!

Solve the following problems in your notebook:

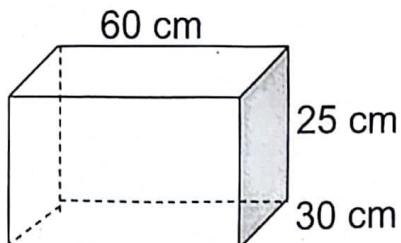
1. Box A measures 12 cm on each edge. It is full. Box B measures 10 cm on each edge. It is empty. Half of the contents of Box A is emptied into Box B. How many cubic centimeters space remain in Box A?
2. A 5 cm x 3 cm x 5 cm container is half-filled with salt. How much salt is still needed to completely fill the container?
3. A container box measures 4 dm on each edge. How much space can it hold?
4. How many different solid figures can you form using 24 pieces of 1 cm^3 cubes? Illustrate:



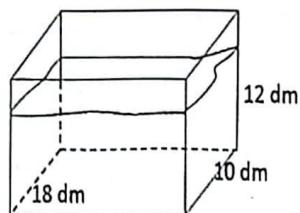
Apply Your Skills!

Challenge yourself with more problems.

1. An open box is 60 cm long, 30 cm wide, and 25 cm high. Find the volume.



2. The width, height, and the volume of a rectangular prism are 5 cm, 3 cm, and 120 cm^3 , respectively. Find the length of the prism.
3. Myra owns an aquarium which measures $10 \text{ cm} \times 18 \text{ cm} \times 12 \text{ cm}$. How much water does she need to fill the aquarium up to a height of 7 cm?
4. A rectangular box has a volume of 2860 cm^3 . What could be the dimension of its rectangular base if its height is 40 cm?



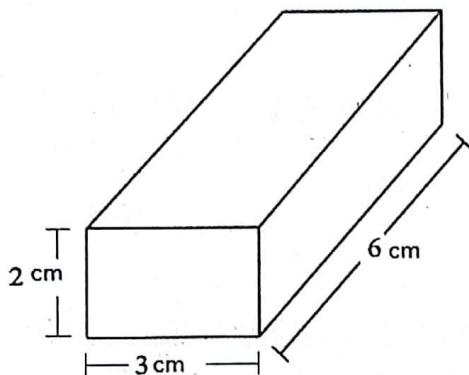
Lesson 73: Creating Problems Involving the Volume of a Rectangular Prism



Explore and Discover!

Study the problem.

Marvin has a rectangular prism with the dimensions shown in the diagram below.



Can you create a problem about Marvin's rectangular prism?
You can create a problem by using the steps below:

1. Familiarize yourself with the concept. Think of an application to everyday life situations.
2. Think of the type of problem you want to create and the formula to be used. Relate the problem to a real-life situation.
3. Read some problems and study their solutions.
4. Make your own styles/strategies to justify your solution.

Below are the examples of problems that you can create:

- a. What is the volume in cubic cm of Marvin's rectangular prism?
- b. Marvin's rectangular prism measures 2 cm long, 3 cm wide, and 6 cm high. What is its volume?

Below is the solution to the problem.

$$\begin{aligned}V &= l \times w \times h \\&= 2 \text{ cm} \times 3 \text{ cm} \times 6 \text{ cm} \\&= 36 \text{ cm}^3\end{aligned}$$

Thus, the volume of the rectangular prism is 36 cubic cm.



Get Moving!

Make a problem involving the volume of a rectangular prism with the corresponding answer based on the given situation. Write the answer on your answer sheet.

1. An antique wooden chest is in the form of a cube. Its edge measures 10 cm.

Problem:

Answer:

2. A closet measures 3 m long, 4 m wide, and 2 meters high.

Problem:

Answer:

3. A flower box is 5 m long, 1 m wide, and 20 cm high.

Problem:

Answer:

4. Caneta's family made a fish pond in their backyard measuring 4 meters long, 3 meters wide, and 4 meters deep. They sold the soil for Php50 per cubic meter.

Problem:

Answer:



Keep Moving!

Make a problem involving the volume of a rectangular prism. Write your answer on your answer sheet.

1. A rectangular seed box which measures 25 dm long, 10 dm wide, and $\frac{1}{2}$ dm high is to be filled with soil.
2. The DPWH men dug a canal which measures 4 m long, 1 m wide, and 2 m high.
3. An aquarium which is to be filled with water, measures 60 cm long, 45 cm wide, and 30 cm high.

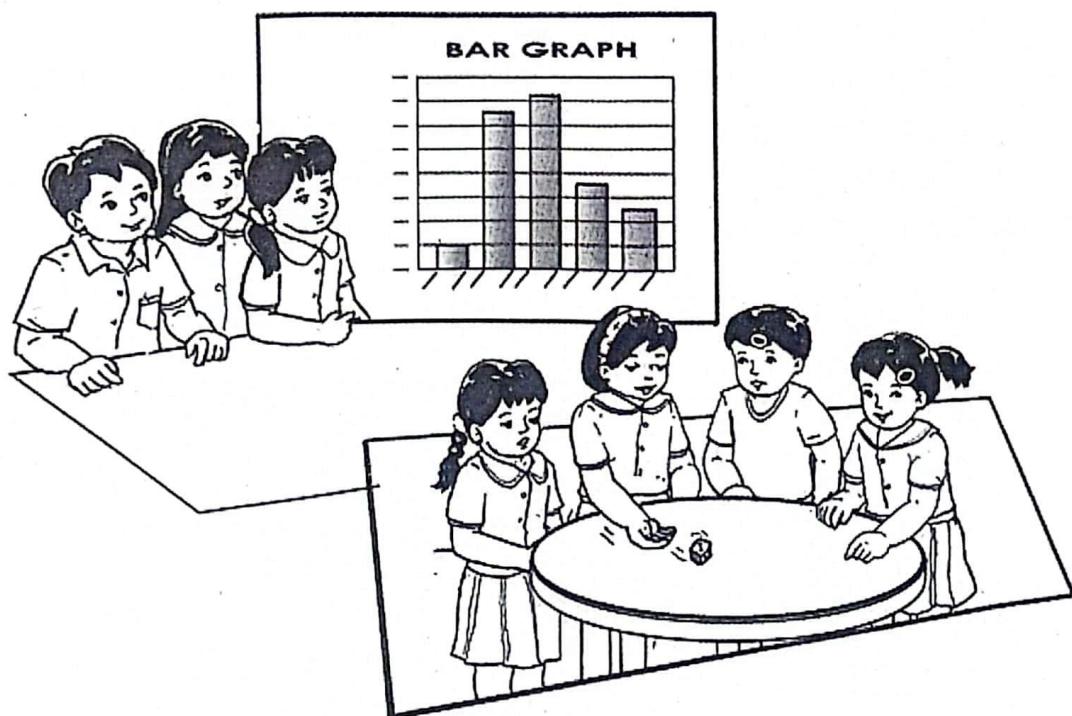


Apply Your Skills!

Make a problem involving volume. Write the answer to each problem on your answer sheet. You may use a shoebox, water tank, aquarium, and other rectangular prisms for the problem.

CHAPTER 10

GRAPHS AND PROBABILITY EXPERIMENT



This chapter deals with statistics and probability. When you collect data and present them using tables and graphs, you think of statistics. When you watch your favorite team play basketball in a league, and guess whether your team will win or not; you think of probability. In this chapter, you will learn to interpret and construct single and double vertical and horizontal bar graphs, and explore probability experiments. Lessons on problem solving and creating problems are included as application of your knowledge and skills on statistics and probability.

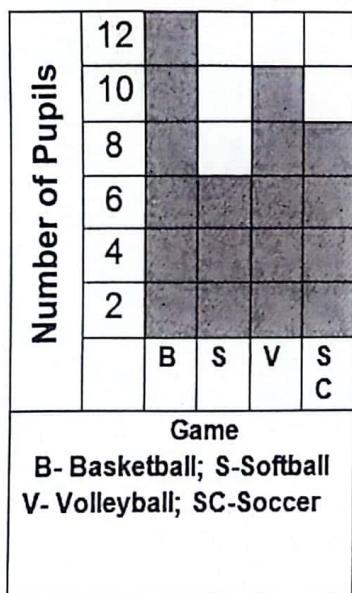
Lesson 74: Interpreting Data Presented in Single Vertical and Horizontal Bar Graphs



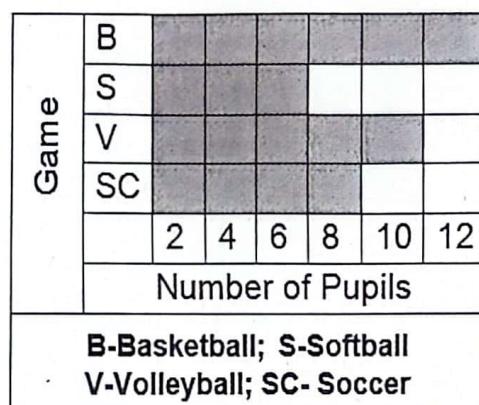
Explore and Discover!

Single bar graphs can be vertical or horizontal. Below are examples of vertical and horizontal bar graphs. They have two axes, the horizontal axis and the vertical axis. A **bar graph** is used to compare data from different groups or periods. **Data** is a collection of gathered information. The graph is about favorite sports.

Our Favorite Games



Our Favorite Games



Study the following questions about the single bar graph.

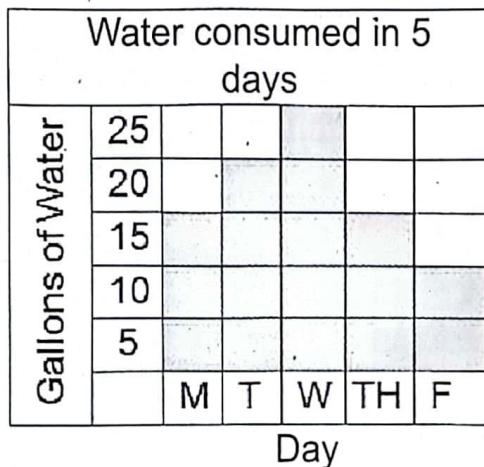
1. What is the title of the bar graph? (Our Favorite Games)
2. In the vertical bar graph, what information is placed along the horizontal axis? (Games) on the vertical axis? (Number of Pupils)
3. In the horizontal bar graph, what information is placed along the horizontal axis? (Number of Pupils) the vertical axis? (Games)
4. What sport is the favorite of most students? (Basketball)
5. How many students like softball? (6 students)

6. What sport is the second choice? (Volleyball)
7. How many more students like basketball than soccer? (4 more students)
8. What is the total number of students who like soccer, softball, and basketball? (26 students)



Get Moving!

Study the vertical bar graph below. Then, answer the questions that follow. Write the answers in your notebook.



Questions:

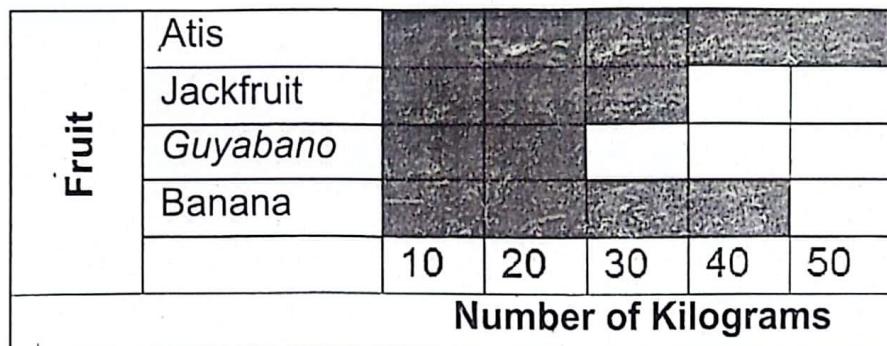
1. What is the title of the bar graph?
2. What is found in the horizontal axis?
3. What is found in the vertical axis?
4. How many gallons of water were consumed on Monday and Tuesday?
5. How many more gallons of water were consumed on Wednesday than on Tuesday?
6. What days had the same water consumption?
7. What was the total consumption for 5 days?
8. What was the average amount of water consumed for 5 days?
9. Why do you think Wednesday had the greatest amount of water consumed?
10. What do you think will happen if we consume much water a day?



Keep Moving!

Read and interpret the bar graph. Answer the questions that follow. Write your answer in your notebook.

Fruits Harvested in Kilograms



Questions:

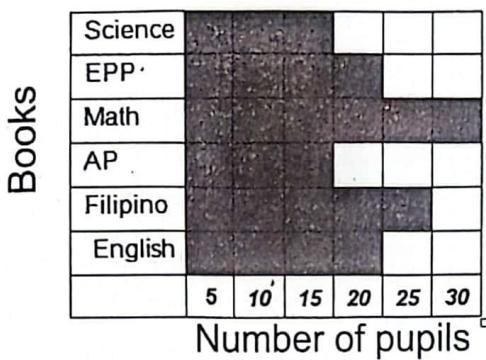
1. What is the title of the bar graph?
2. What is found in the horizontal axis?
3. What is found in the vertical axis?
4. How many kilograms of atis were harvested?
5. How many kilograms of jackfruit were harvested?
6. Which fruit was the least harvested in kilograms?
7. Which fruit was the most harvested in kilograms?
8. How many kilograms more of atis were harvested than banana?
9. How many kilograms more of banana were harvested than guyabano?
10. How many kilograms of fruits were harvested in all?



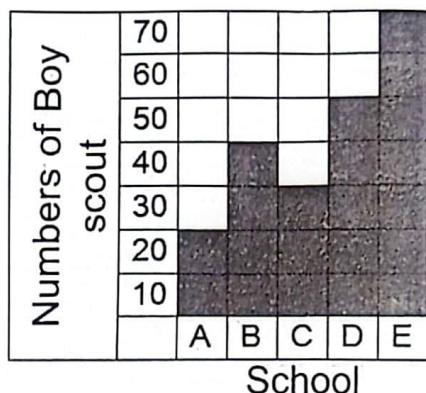
Apply Your Skills!

Using the vertical and horizontal bar graphs below, interpret the data by answering the questions that follow. Write your answer in your notebook.

Borrowed Books in August



Registered Boy Scouts
in Five Schools



Questions:

1. What is the title of the horizontal bar graph?
2. How many Science books were borrowed in August?
3. What is the least borrowed book?
4. How many more Math books were borrowed than Filipino books?
5. What is the total number of books borrowed in August?
6. What is the title of the vertical bar graph?
7. What is found in the horizontal axis? in the vertical axis?
8. Which school has the least number of registered boy scouts?
9. Which school has the most number of registered boy scouts?
10. How many boy scouts are there in five schools?

Lesson 75: Constructing Single Vertical and Horizontal Bar Graphs



Explore and Discover!

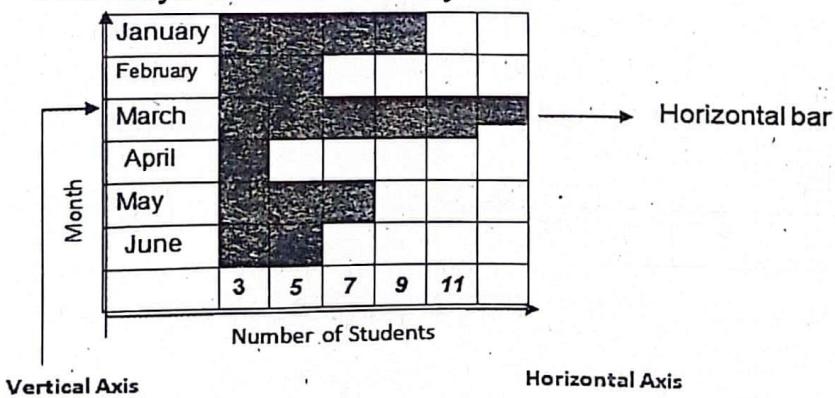
The data given below is about the "Birthdays of Students by Month." How will you construct a single horizontal bar graph for the data?

Number of Students	Month
9	January
5	February
11	March
3	April
7	May
5	June

You can construct a horizontal bar graph by following the six steps below:

- Step 1: Draw the vertical and horizontal axes.
- Step 2: Label the horizontal and the vertical axes
- Step 3: Find the highest number in the data.
- Step 4: Make a scale from 0 to the highest number in the table.
- Step 5: Draw a horizontal bar to represent the number of students in each month.
- Step 6: Write the title for the bar graph.

Birthdays of Students by Month



- A vertical bar graph is drawn in a similar manner.
The horizontal bar in Step 5 is replaced by a vertical bar.



Get Moving!

Construct a vertical and horizontal bar graph with the given data below. Do this in your notebook.

1

Kaing of Mangoes Harvested in Five Years	
Year	Number of Small Kaing of Mangoes
2005	5
2004	3
2003	4
2002	2
2001	3

2

Ten-year Old Children in Five Barangays	
Number of Children	Barangay
25	Masinop
10	Malinis
15	Mabato
20	Makabuhay
5	Makinang



Keep Moving!

Construct a vertical bar graph and a horizontal bar graph with the given data in the table below. Do this in your notebook.

A

Test Scores in Math	
Number of Students	Scores
5	90
4	85
2	80
1	70

B

Kinds of Students' Footwear	
Number of Students	Footwear
5	Sneakers
4	Sandals
2	Boots
1	Flip-flops



Apply Your Skills!

Read and analyze the data below. Then, construct a vertical bar graph and horizontal bar graph for each set of data. Do it in your notebook.

A. Ball pens sold daily

Number of Ball Pens	Day
40	Sunday
5	Monday
25	Tuesday
15	Wednesday
10	Thursday
20	Friday
15	Saturday

B. Snacks served in the canteen

Snacks	Number of Pieces
Puto	35
Sandwich	20
Bread	15
Cake	20
Suman	40

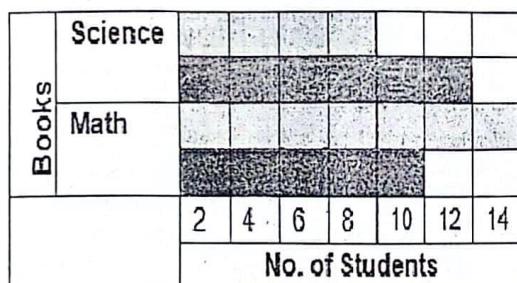
Lesson 76: Interpreting Data Presented in Double Vertical and Double Horizontal Bar Graphs

Explore and Discover!

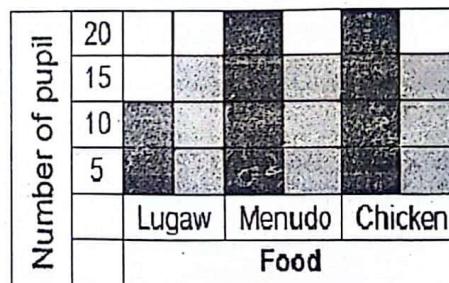
Double bar graphs help us to compare or present more than one kind of information instead of just one by using bars. Double bar graphs can be vertical or horizontal.

The graphs below are examples of double vertical and double horizontal bar graphs. These bar graphs have two axes, the horizontal axis and the vertical axis.

Book choices



Food choices



Key: Light Bar - Boys; Dark Bar - Girls

Key: Dark Bar - Boys; Light Bar - Girls

Double horizontal bar graph

1. What is the title of the double horizontal bar graph?
2. What information is placed along the horizontal axis? along the vertical axis?
3. What different groups of data are being compared?
4. What book is the most favorite of the students?
5. How many students like Math books?
6. How many more boys than girls like Math books?

Double vertical bar graph

1. What is the title of the double vertical bar graph?

- What information is placed along the horizontal axis? along the vertical axis?
- What different groups of data are being compared?
- How many pupils choose "Lugaw and Menudo"?
- How many pupils like chicken?
- How many more boys than girls like Menudo? Chicken?

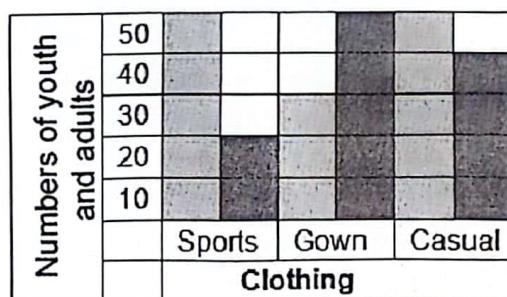


Get Moving!

Study the double horizontal and double vertical bar graphs below. Then, answer the questions that follow. Write your answer in your notebook.

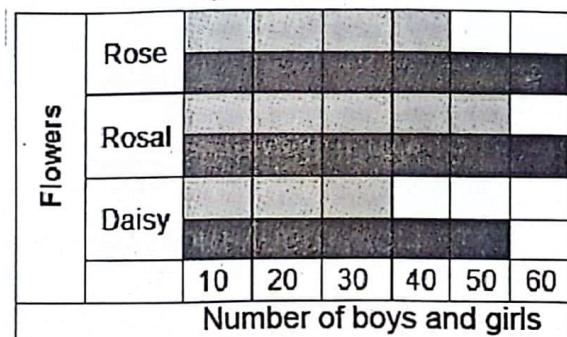
A

Favorite Clothing of Youths
and Adults



B

Favorite Flowers of
Boys and Girls



Key: Light Bar - Youth Dark Bar - Adult

Key: Light Bar - Boys Dark Bar - Girls

About the double vertical bar graph

- What is the title of the double vertical bar graph?
- What information is found in the vertical axis? horizontal axis?
- How many youths and adults chose casual clothing?
- How many more youths than adults prefer Sports clothing?
- How many more adults than youths like gown?

About the double horizontal bar graph

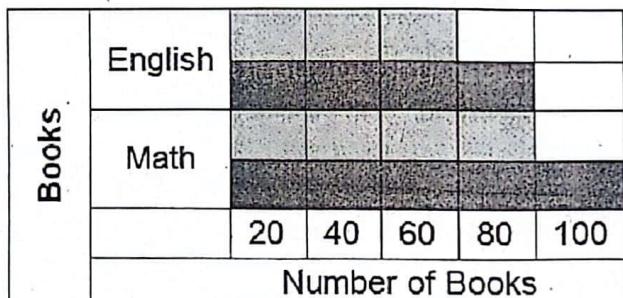
1. What is the title of the double horizontal bar graph?
2. What information is found in the horizontal axis?
vertical axis?
3. How many boys chose rose flower?
4. How many more girls than boys love rose?
5. How many more girls than boys like daisy?
6. What flower is the favorite of most boys?



Keep Moving!

Read and interpret the graph. Answer the questions that follow. Write your answers in your notebook.

School Books



Key: Light Bar-2013; Dark Bar- 2014

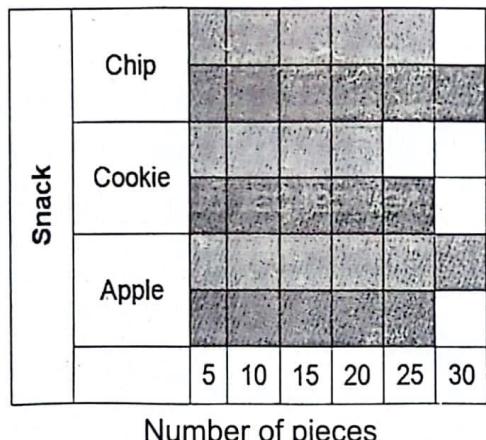
1. What is the title of the double horizontal bar graph?
2. What information is found in the horizontal axis?
3. How many pupils chose math book?
4. How many more Math books than English books were borrowed?
5. How many Math books were borrowed in 2013? 2014?
6. How many more books were borrowed in 2014 than 2013?



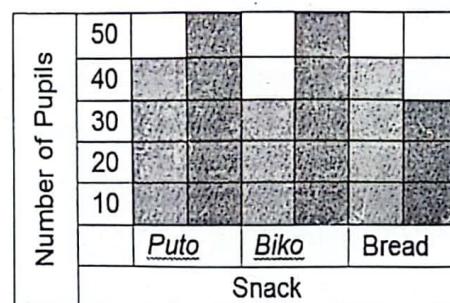
Apply Your Skills!

Using the double vertical and double horizontal bar graphs, interpret the data by answering the questions that follow. Write your answers in your notebook.

Available Snacks in Two Canteens



Favorite Snacks of Pupils



Key: Light Bar- Boys ; Dark Bar - Girls

Key: Light Bar- 1st Canteen; Dark Bar- 2nd Canteen

1. What is the title of the double horizontal bar graph?
2. What information is found in the horizontal axis?
3. How many kinds of food are available in the two canteens?
4. How many pieces of cookies are available in the first canteen?
5. How many more chips are available in the first canteen than in the second canteen?
6. What is the title of the double vertical bar graph?
7. What information is found in the horizontal axis?
8. How many kinds of snacks are there?
9. How many pupils choose puto?
10. How many boys choose bread?
11. How many more girls than boys like biko?
12. Which snack was chosen by most pupils?

Lesson 77: Constructing Double Vertical and Double Horizontal Bar Graphs



Explore and Discover!

The data below are the scores of some pupils in the Practice Test and Final Test. How will you construct a double vertical bar graph and a double horizontal bar graph for the given data?

Scores on the Practice Test and Final Test		
Students	Practice Test	Final Test
Jeff	60	70
Peter	75	90
John	55	55
Mary	80	95

With a partner, construct double vertical and double horizontal bar graphs for the data shown in the table above by following these steps.

- Step 1. Draw the vertical and horizontal axes.
- Step 2. Decide what appropriate information to put in the vertical and horizontal axes.
- Step 3. Label the horizontal and the vertical axes.
- Step 4. Find the highest number in the data.
- Step 5. Make a scale from 0 to the greatest number in the table.
- Step 6. Draw a bar to represent the given data. Have a legend for the graph.
- Step 7. Write a title for the graph.



Get Moving!

Construct double vertical and double horizontal bar graphs with the given data below. Do this in your notebook.

Favorite Books		
Books	Boys	Girls
Adventure	35	25
Science Fiction	15	20
Fairy tales	30	40
Biography	10	15
Others	5	10



Keep Moving!

Construct double vertical and double horizontal bar graphs with the given data below. Do this in your notebook.

Favorite Vegetables		
Vegetables	Boys	Girls
Ampalaya	4	8
Carrots	6	9
Squash	10	12
Beans	14	15
Malunggay	15	18



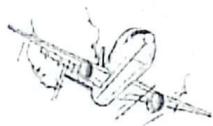
Apply Your Skills!

Read and analyze the data below. Then construct double vertical and double horizontal bar graphs for each set of data. Do it in your notebook.

Getting to School	
Number of Children	Mode
Girls - 9; Boys - 6	Taxi
Girls - 14; Boys - 2	Bus
Girls - 20; Boys 15	Tricycle

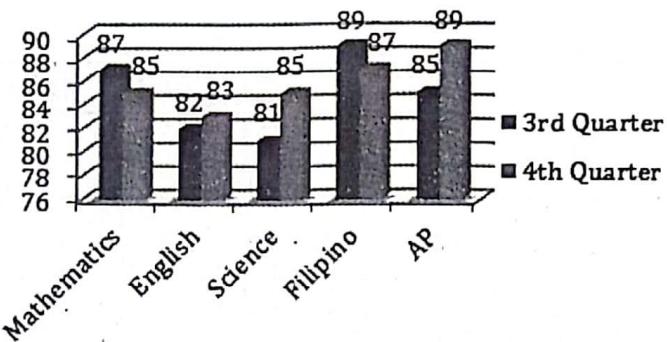
Fruit Choices of Children	
Number of Children	Fruits
Grade 3: 8 children; Grade 4: 5 chldren	Apple
Grade 3: 4 children; Grade 4: 7 children	Orange
Grade 3: 4 children; Grade 4: 5 children	Grape

Lesson 78: Solving Routine and Nonroutine Problems Using Data Presented in Single and Double Bar Graphs



Explore and Discover!

Leo's Grades



The graph presents Leo's grades in different learning areas for the 3rd and 4th quarters.

Use the data presented in the graph to solve the problems below.

1. Based on Leo's performance during the 3rd quarter, in which subject did he perform well?

What information do you need to answer the question?

Here, you need to know Leo's grades in all his learning areas during the 3rd quarter. Compare the grades, then, find out which grade is the highest.

The graph shows that during the 3rd quarter, Leo performed well in Filipino. His grade for that subject was 89.

2. How many points higher was Leo's grade in *Araling Panlipunan* during the 4th quarter than the 3rd quarter?

To answer this, what information should you know? What operation will you use?

Notice that in *Araling Panlipunan*, Leo got a grade of 89 during the 4th quarter and 85 during the 3rd quarter.

So, to solve how many points higher his grade was during the 4th quarter than the 3rd quarter, you subtract: $89 - 85 = 4$. So, Leo's grade in AP during the 4th quarter was 4 points higher than the 3rd quarter.



Get Moving!

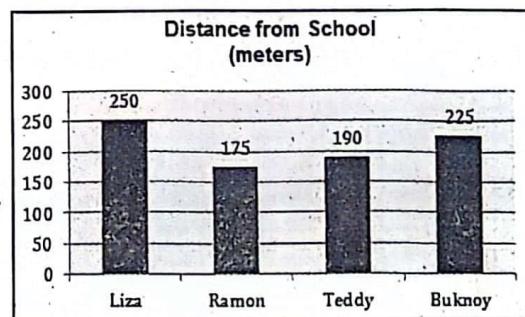
Use the data in the given bar graph in the previous page to answer the following questions:

1. By how many points did Leo's grade in Science increase from 3rd quarter to 4th quarter?
2. What was Leo's average grade during the 3rd quarter?
3. What was Leo's average grade for the 4th quarter?
4. Between 3rd and 4th quarters, when did Leo perform better?



Keep Moving!

Liza, Ramon, Teddy, and Buknay are classmates at Bagong Silang Elementary School. They are in Grade 4. They live near the school. They just walk going to school.



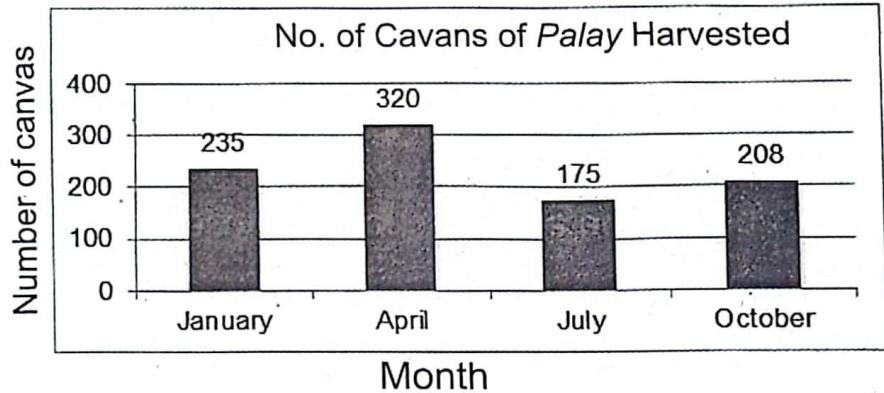
Use the data in the bar graph to solve the following problems:

1. How much farther does Liza walk than Buknay?
2. How much farther does Teddy walk than Ramon?
3. How much farther does Buknay walk than Ramon?
4. If you combine Liza's and Ramon's distance from the school and compare it against the combined distance walked by Teddy and Buknay, which combined distance is farther from the school?
5. Find the average distance of the houses of the 4 classmates from the school.



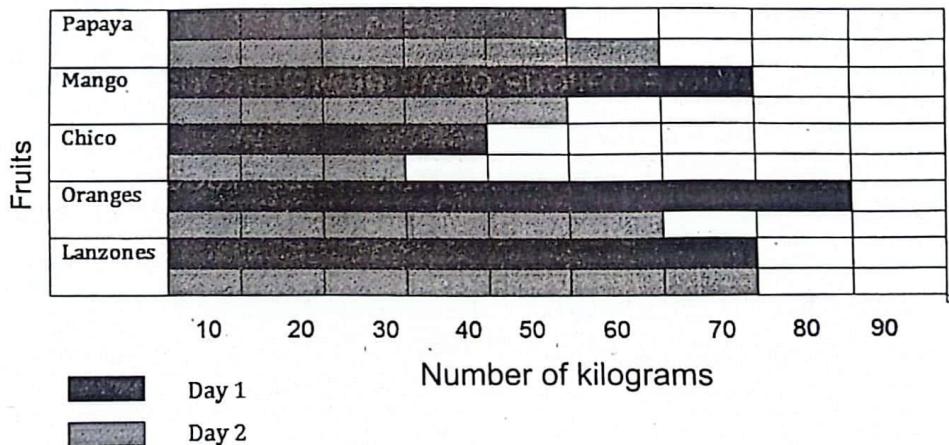
Apply Your Skills!

Use the data on the graph to solve the problems.



1. What month registered the highest harvest?
Why do you think it had the highest harvest?
2. What was the average harvest of palay?

Fruits Sold for Two Days

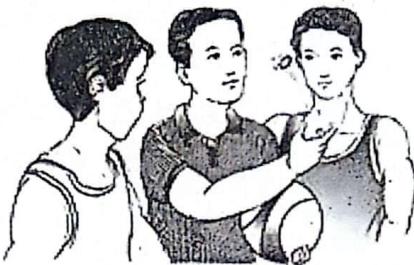


1. Which fruit was sold the most number of kilograms for 2 days?
2. How many kilograms of fruits were sold in Day 1?
3. How many kilograms of fruits were sold in Day 2?
4. Which day had more kilograms of fruits sold? By how many kilograms more?
5. How many kilograms of fruits in all were sold in two days?

Lesson 79: Simple Probability Experiments

Explore and Discover!

Before a volleyball game starts, the referee tosses a coin to determine which team will serve first. What is the chance that either team serves first?



Tossing a coin is a simple probability experiment to know the chance that either a head or a tail shows up. In tossing a coin, there are two possible outcomes, either a head or a tail. The head and the tail have equal chances to show up.

The result that either a *head* or a *tail* shows up is called a success. The experimental probability of having a tail or a head is given by this formula.

Probability = Number of successes (number in the frequency)

Number of trials (number of times the coin is tossed)

Example: $P(\text{head}) = \text{Probability of getting a head}$

$$P(\text{head}) = \frac{\boxed{}}{20}$$

where:

$\boxed{}$ represents the number of times the head showed up when a coin was tossed up 20 times.



Get Moving!

Activity 1

1. Get a 5-peso coin.
2. Toss the coin.
3. Put a mark in the tally column.
4. Do this experiment 20 times. Add the tally marks and write the number in the frequency column.



Side of coin	Tally	Frequency
Head		
Tail		

5. Express the probability using the given formula.

- Out of 20 times, how many times did the tail show up?
- Out of 20 times, how many times did the head show up?



Keep Moving!

Activity 2:

1. Get a die.
2. Roll the die. Put a mark in the tally column for the "number of dots" that landed on top.
3. Do this experiment 30 times. Add the tally marks for each "number of dots." Then, write the number in the frequency column.



Face of a Die	Tally	Frequency
1		
2		
3		
4		
5		
6		

4. Express the probability using the formula.

- Out of 30 times, how many times did each "number of dots" below land on top?

a. 1	c. 3	e. 5
b. 2	d. 4	f. 6

Activity 3:

1. Put three number cards in a bag. (0 1 2)
2. Draw one card from the bag without looking. Put a mark in the tally column for the number card. Put the card back into the bag.
3. Do this experiment 20 times. Add the tally marks and write the number in the frequency column

Number	Tally	Frequency
0		
1		
2		

4. Express the probability using a formula.



Apply Your Skills!

Activity 4:

Write 0 for impossible to happen, $\frac{1}{2}$ for equally likely to happen and 1 for certain to happen.

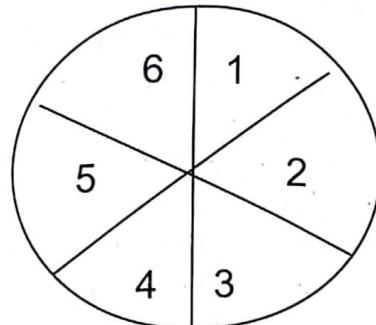
1. From tossing a coin what is the probability that a head shows up?
2. What is the probability that a green ball is drawn from a box of red and blue balls?
3. What is the probability that an even number of dots shows up if a die is rolled?
4. Without looking, what is the probability that a red marble is drawn from a box of red marbles?
5. From a class of 20 boys and 20 girls, what is the probability that a boy is chosen as the leader?

Lesson 80: Solving Routine and Nonroutine Problems on Simple Probability



Explore and Discover!

Arthur is spinning a spinner like the one shown at the right while he is playing with his friends. What is the probability that he spins a 4 on his next turn? You can solve the problem using the 4-step plan.



Understand:

- Know what is asked: The probability of getting a 4 when Arthur spins a spinner.
- Know the given facts: There are 6 equal sections in the spinner.

Plan: There are 6 equal sections. One of the sections is labeled with a 4. Use the formula to find the probability of getting a 4.

$$P(E) = \frac{\text{number of times an event can occur}}{\text{Total number of outcomes}}$$

where E refers to the event

Solve: If E is the event of getting a 4, then the formula becomes

$$P(4) = \frac{1}{6}$$

The probability that Arthur can spin a 4 is $\frac{1}{6}$

Check and Look Back:

- Since the spinner has 6 sections, the probability of occurrence of each section is $\frac{1}{6}$.
- Since one of the sections is labeled with a 4, the probability that you spin a 4 is $\frac{1}{6}$.



Get Moving!

Read each problem and then, solve.

1. Your teacher puts 5 cards numbered 1, 3, 5, 7, and 9 on her desk. Without looking, what is the probability that you will pick a 7 when asked by your teacher to pick one card?
2. The letters from the word MATH are placed in a hat. What is the probability that you select an A when you are choosing a letter without looking?
3. Five boys join a spelling contest. What is the probability that one of the boys wins?



Keep Moving!

Read each problem and then solve

1. What is the probability that you get a white chip from a box with 1 black chip, 1 white chip, and 1 red chip?
2. What is the probability that you get an 8 when you are rolling a number cube?
3. From a letter cube (A, B, C, D, E, and F), what is the probability that a B is on top when you roll the cube?
4. Mila and 3 other applicants apply for a job. What is the probability that Mila gets hired?



Apply Your Skills!

Challenge yourself with more problems!

1. What is the probability that you will draw 2 King cards from a complete deck of 52 cards?
2. What is the probability that the new school principal coming to your school is a male?
3. What is the probability that you get a black pen from a box of black pens?

Lesson 81: Creating Problems Involving Simple Probability



Explore and Discover!

Read the situation below. Create a problem on probability based on this information.

9 balls marked 1 to 9 placed in a box

Can you create a problem given the above information?
You can create a problem by using the following as guide.

- Familiarize yourself with the concept and its application to real-life situation.
- Think of the type of problem you will create.
- Read some problems and study their solutions.
Study the following examples of problems created for the situation.

Nine balls marked 1 to 9 are placed in a box. if you pick one ball at random, what is the probability that an 8 is taken out?

What is the probability that a ball marked 8 is taken out at random from a box of 9 balls marked 1 to 9?



Get Moving!

Each item contains information for you to create a problem.

1. Five boys for a running race: Allan, Luke, Wahab, Gabriel, and Alid.
2. Seven colored shirts: blue, red, black, orange, green, yellow, and brown; Rica will buy a T-shirt.



Keep Moving!

Create a problem from the following information.

1. There are fruits in a basket.
1 apple, 1 banana, and 1 mango
You need to eat only one kind of fruit.
2. A spinner with 10 sections labeled A to J



Apply Your Skills!

Challenge yourself with this activity!

Create two problems with the given information below.

A group consists of 2 Filipinos, 2 Africans, 2 Koreans, and 2 Americans. The teacher calls on a student to solve a given problem.

Glossary

Acute angle	An angle with a measure of less than 90°
Angle	A union of 2 rays with a common endpoint
Area	The number of square units in a plane figure
Average	The number obtained by dividing the sum of the addends by the number of addends
Bar graph	A graph that displays data using bars either vertically or horizontally. It compares data from different groups or periods.
Common denominator	A multiple common to two or more denominators
Common multiple	A number that is a multiple of 2 or more numbers
Commutative property	The order in which numbers are added or multiplied without changing the sum or product
Compatible numbers	Numbers that divide easily
Composite number	A whole number greater than zero that has more than 2 factors
Cube	A prism with equal square faces
Data	A collected information that has not been organized

Decimal	A number that names a whole quantity and/or fractional part
Double bar graphs	A device used to compare or present more than one kind of information instead of just one by using bars. Double bar graphs can be vertical or horizontal.
Endpoint	The point at the end of a segment or a ray
Equation	A mathematical sentence that states the equality of expressions
Equilateral triangle	A triangle with three equal sides
Estimate	A number that is close to another number
Experimental probability	The ratio of the number of successes to the number of trials/experiments
Factor	A number to be multiplied
Formula	An equation that states a rule by using variables
Fraction	A number that names a part of a whole, unit, or region
Greatest Common Factor (GCF)	The greatest number that is a factor of two or more numbers
Improper fraction	A fraction whose numerator is greater than or equal to its denominator

Intersecting lines	Lines that meet at a point
Isosceles triangle	A triangle with 2 equal sides
Least common multiple (LCM)	The smallest multiple common to 2 or more numbers
Line	A set of points that extends without end in opposite directions
Mixed number	A number that has a whole number and a fraction
Obtuse angle	An angle with a measure of greater than 90° and less than 180°
Outcome	A possible result in an experimental probability
Parallel lines	Lines that will never meet
Parallelogram	A quadrilateral with opposite sides parallel and equal in length
Pattern	A form by which things are arranged in an organized way
Perimeter	The sum of the sides of a polygon
Perpendicular lines	Lines that intersect forming right angles.
Prime factorization	A number written as a product of prime factors

Prime number	A whole number greater than 1 that can be divided exactly by itself and 1
Quadrilateral	A polygon with 4 sides and angles The answer in division
Quotient	The answer in division
Ray	A set of points that has one endpoint and extends in one direction
Rectangle	A parallelogram with four right angles
Rectangular prism	A solid figure that has six faces, twelve edges, and eight vertices.
Rhombus	A parallelogram with 4 equal sides
Right angle	An angle with a measure of 90°
Right triangle	A triangle with a right angle
Square	A rectangle with four congruent sides
Square prism	A prism whose end faces are squares
Term	A number in a sequence
Trapezoid	A quadrilateral with one pair of parallel sides
Vertex	The corner of a shape
Volume	The number in cubic units inside a space figure