Math module grade 7 teacher's guide answer key

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The content of mathematics includes Numbers and Number Sense, Measurement, Geometry, Patterns & Algebra and Statistics and Probability. Numbers and number phrases as a component contain concepts of numbers, properties, operations, estimates, and their applications. Measurement as a strand involves the use of numbers and measurements to describe, understand and compare mathematical and concrete objects. It focuses on attributes such as height, mass and weight, capacity, time, money and temperature, as well as applications related to perimeter, area, surface, volume and angle measurement. Geometry as a strand includes properties of two- and three-dimensional figures and their relationships, spatial visualization, reasoning and geometric modeling and evidence. Patterns and Algebra as a strand studies patterns, relationships and changes between shapes and amounts. It includes the use of algebraic notations and symbols, equations, and most importantly, functions, to represent and analyze relationships. Statistics and probability as part is all about developing skills in collecting and organizing data using charts, tables, and charts; understanding, analysing and interpreting data; dealing with uncertainty; and making predictions about the results. The K to 10 Mathematics Curriculum provides a solid foundation for mathematics at grades 11 to 12. More importantly, it provides necessary concepts and life skills required by Filipino students as they move on to the next stage in their lives as students and as citizens of the Philippines. Source: Department of Education We are always on the process of uploading GRADE 7 Teachers Guide. As requested, here are the file links. The remaining files will be uploaded soon. Check this section from time to time. Download these files for free. No Adfly. Virus-free. Safer. Available GRADE 7 Teachers Guide MAPEH 7 T.L.E 7 Share on Facebook Tweet Follow Us Share DepEd Tambayan offers a compiled list of Grade 7 7 Guide (TG) 2019 – 2020. DepEd Tambayan strives to provide free funds to our fellow teachers. These downloadable resources can help you and reduce your time in doing paperwork so that your efforts can be focused in the actual educational process. Mabuhay ang mga guro! What is K to 12 Teacher's Guide? The purpose of the K to 12 Teacher Guide is to help teachers prepare work units that integrate listening, speaking, reading, writing, and learning. Teacher's Guide helps teachers to think about important goals of the curriculum, as well as the opportunities children need to achieve the goals successfully. K-12 Teacher's Guide helps teachers expand their range of teaching techniques. In addition, it encourages teachers to think about the best conditions for the development of literacy. K-12 Teacher's Guide (TG) and Learner's Material (LM) are resources used in preparing daily lessons. Additional resources include materials from the Learning Resources Management and Development System (LRMDS) portal, textbooks and other additional materials, whether digital, multimedia or online, including those of teachers. However, these materials should be used by teachers as resources, not as the curriculum. Assessment is a continuous, scheduled process using various forms of tasks to identify, collect, and interpret student performance information. It involves the processes of generating and collecting evidence of performance, evaluating this evidence, recording the findings and using this information to understand the development of the student and helping to improve the process of learning and teaching. The assessment must be both informal (assessment for learning) and formal (assessment of learning). In both cases, regular feedback should be given to students to improve the learning experience. Download these Teacher's Guide (TG) 2019 – 2020 files for free. No Adfly. No pop-ups. Virus-free. Safer. Faster. 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GRADE 7 MATH EDUCATION GUIDE Lesson I: SETS: AN INTRODUCTION Advance required concepts: Whole numbers Objectives: In this lesson, you are expected: 1. describe and illustrate a. well-defined sets; (b) subsets; (c) universal set; and d. the null set. 2. Use Venn charts to display sets and subsets. NOTE TO THE TEACHER: This lesson looks easy to teach, but don't be fooled. The introductory concepts are always crucial. What sets a set apart from each group is that a set is well defined. Emphasize this to the students. You vary the activity by indicating the students a different set of objects to group. You make this in a class activity by showing a poster of objects for the class or even making it into a game. The idea is that they create their own well-defined groups based on what they see as common characteristics of elements in a group. Lesson Right: A. I. Activity Below are some objects. Group them as they see fit and label each group. 2. Answer the following questions: a. How many groups are there? B. Does each object belong to a group? c. Is there an object that belongs to more than one group? Which one? NOTE TO THE TEACHER: You have to follow the opening activity hence, the problem below is important. Ultimately, you want students to apply the concepts of sets to the set of real numbers. The groups are called sets as long as the objects in the group share a attribute and are therefore well defined. Problem: Consider the set consisting of whole numbers from 1 to 200. Let this be set U. Form smaller sets consisting of elements of You that share another attribute. For example, let E be the set of all even numbers from 1 to 200. Can you form three more sets like that? How many elements are there in each of these Does any of these sets have all the elements in common? Have you thought of a set no element? TEACHER NOTE: Below are important terms, notes, and symbols that students should remember. As of now, be consistent in your notes as well as not to confuse your students. Give numerous examples and non-examples. Important terms to remember The following are terms that you should remember from this point. 1. A set is a well-defined group of objects, called elements that have a common characteristic. For example, 3 of the above objects belong to the set of headgear or plain hats (ladies hat, baseball cap, helmet). 2. Set F is a subset of set A if all elements of F are also elements of A. For example, the even numbers 2, 4 and 12 all belong to the series of whole numbers. Therefore, the even numbers 2, 4 and 12 form a subset of the sequence of whole numbers. F is a good subset of A if F does not contain all elements of A. 3. The universal setU is the set that contains all the objects that are pending. 4. The null set is an empty set. The null set is a subset of a set. 5. The cardinality of set A is the number of elements in A. Notations and symbols In this section you will learn some of the notes and symbols related to collections. 1. Uppercase letters will be used to name sets, and lowercase letters will be used to refer to each element of a set. For example, let H be the set of all objects on page 1 that cover or protect the head. We write H = {women's hat, baseball cap, helmet} 3. This is the list or grid method of naming the elements of a set. Another way to write the elements of a series is to use a descriptor. This is the line method. For example, H = {x| x covers and protects the head}. This is read as the set H contains the element x such that x covers and protects the head. 2. The symbol or { } is used to refer to an empty set. 3. If F is a subset of A, we write. We also say that A contains the set F and write it as . If F is a good subset of A, then we write. 4. The cardinality of a set A is written as n(A). II. Questions to Pondering (Post-Activity Discussion) NOTE TO THE TEACHER: It is important for you to go over your students' answers to the questions asked in the opening activity to process what they have learned for themselves. Encourage discussions and exchanges in the classroom. Don't leave questions unanswered. Let's answer the questions in the opening activity. 1. How many sets are there? There is the set of headgear (hats), the set of trees, the set of even numbers, and the set of polyhedra. But there is also a set of round objects and a set of pointed objects. There are 6 well defined sets. 2. Is each item owned by a set? Yes. 3. Is there an object that is up to more than one Belongs? Which ones are these? All hats belong to the set of round objects. The pine trees and two of the polyhedra belong to the set of pointed III. Exercises Do the following exercises. Write your answers to the specified spaces: 1. Give 3 examples of well-defined sets. Possible answers: The set of all factors of 24, The set of all first year students in this school, The set of all girls in this class. 2. Name two subsets of the set of whole numbers using both the number or grid method and the line method. Example: Listing or scheduling method: E = {0, 2, 4, 6, 8, ...} O = {1, 3, 5, 7, ...} Rule method: E = {2x | x is a whole number} O = {2x+1 | x is an integer} F A F A 4. 3. Let B = {1, 3, 5, 7, 9}. List all possible subsets of B. { }, {1}, {3}, {5}, {7}, {9}, {1, 3}, {1, 5}, {1, 7}, {1, 9}, {3, 5}, {3, 9}, {5, 7}, {5, 7}, {5, 9}, {7, 9}, {1, {1, {1, {1, {7, 9}, {1, {1, {1, 3, 5}, {1, 3, 7}, {1, 3, 9}, {3, 5, 7}, {3, 5, 9}, {5, 7, 9}, {1, 5, 7} , {1, 5, 9}, {1, 7, 9}, {3, 7, 9}, {1, 3, 5, 7}, {1, 3, 5, 9}, {1, 5, 7, 9}, {3, 5, 7, 9}, {1, 3, 7, 9}, {9}, {1, 3, 5, 7, 9} – 32 subsets in total. 4. Answer this question: How many subsets does a set of n elements have? There are 2n subsets in total. B. Venn Diagrams NOTE TO THE TEACHER: A lesson on sets will not be complete without the use of Venn Diagrams. Please note that in this lesson, you only introduce the use of these diagrams to display sets and subsets. The extensive use of the Venn Diagrams will be introduced in the next lesson, which is on set operations. The key is for students to be able to verbalize what they see depicted in the Venn Diagrams. Sets and subsets can be displayed with Venn charts. These are diagrams that use geometric shapes to show relationships between sets. Consider the Venn diagram below. Let the universal set you all elements the sets A, B, C and D. Each shape represents a set. Note that although no elements appear in any form, we can suspect or guess how the sets are related to each other. Note that set B is in set A. This indicates that all elements in B are included in A. The same goes for set C. Set D is, however, separate from A, B, C. What does it mean? Exercise Draw a Venn diagram to show the relationships between the following pairs or groups of sets: D A C 5. 1. E = {2, 4, 8, 16, 32} F = {2, 32} Sample answer 2. V is the set of all odd numbers W = {5, 15, 25, 35, 45, 55,....} Sample answer 3. R = {x| x is a factor of 24} S = { } T = {7, 9, 11} Sample answer: NOTE TO THE TEACHER: End the lesson with a good summary. Summary In this lesson, you learned about sets, subsets, the universal set, the null set, and the cardinality of the set. You've also learned to use the Venn diagram to show relationships between collections. E F V W TR S 6. Lesson 2.1: Union and of sets Time: 1.5 hours Required concepts: Whole numbers, definition of sets, Venn diagrams Objectives: In this lesson is expected of you: 1. describe and define a. union of sets; (b) crossing of sets. 2. performing the set operations a. a. of the series; (b) crossing of the sets. 3. Use Venn diagrams to represent the union and intersection of sets. Note to the teacher: Below are the opening activities for students. Emphasize that, as with the whole number, edits are also used on sets. You combine two sets or subsets. Emphasize to students that when counting the elements of a union of two sets of elements that are common in both sets, only one count is counted. Les Correct: I. Activities A B Answer the following questions: 1. Which of the following shows the association of set A and set B? How many elements are there in the association of A and B? 7. 1 2 3 2. Which of the following shows the intersection of set A and set B? How many elements are there at the intersection of A and B? 1 2 3 Here's another activity: Please V = { 2x | x , 1 x 4} W = {x2 | x , -2 x 2} What elements can be found at the intersection of V and W? How many are there? What elements can be found in the association of V and W? How many are there? Remember how to use Venn Diagrams? Based on the diagram below, (1) determines the elements belonging to both A and B; (2) determine which elements belong to A or B or both. How many elements are in each set? 8. NOTE TO THE TEACHER: Below are important terms, notes, and symbols that students should remember. As of now, be consistent in your notes as well as not to confuse your students. Give numerous examples and non-examples. Important terms/symbols to remember The following are terms that you should remember from this point. 1. Allow A and B to be set. The association of sets A and B, referred to as A B, is the set containing the elements that are in A or B, or in both. An element x belongs to the association of sets A and B if and only if x belongs to A or x belongs to B. This tells us that A B = {x I x is in A and x is in B} Venn diagram: Note to the teacher: Explain to the students that in general, the inclusive OR is used in mathematics. So, as we say, elements belonging to A or B, includes the possibility that the elements belong to both. In some cases, both are explicitly mentioned when referring to the intersection of two sets. Advise students that from here, OR inclusive is used. 2. Allow A and B to be set. The intersection of sets A and B, indicated by A B, is the set with these elements in both A and B. An element x belongs to the intersection of sets A and B if and only if x belongs to A and x belongs to B. This tells us that A B = {x| x is in A and x is in B} U A B A B 10 0 1 1 2 25 3 6 A B 9. Venn diagram: Sets whose intersection is an empty set are called disjointed sets. 3. The cardinality of the association of two sets given by the following equation: n (A ∪ B) = n (A) + n (B) – n (A ∩ B). II. Questions to Pondering (Post-Activity Discussion) NOTE TO THE TEACHER It is important for you to go over your answers in the opening activities to process what they themselves have learned. Encourage discussions and exchanges in the classroom. Don't leave questions unanswered. Below are the correct answers to the questions asked in the activities. Let's answer the questions in the opening activity. 1. Which of the following shows the association of set A and set B? Why? Set 2. This is because it contains all the elements that belong to A or B or both. There are 8 elements. 2. Which of the following shows the intersection of set A and set B? Why? Set 3. This is because it contains all the elements that are in both A and B. There are 3 elements. In the second activity: V = {2, 4, 6, 8} W = { 0, 1, 4} Therefore, V W = 4 } 1 element and V W = { 0, 1, 2, 4, 6, 8 } has 6 elements. Please note that the element { 4 } is counted only once. On the Venn diagram: (1) The set containing elements belonging to both A and B consists of two elements {1, 12 }; (2) The set containing elements belonging to A or B or both consists of 6 elements {1, 10, 12, 20, 25, 36 }. NOTE TO THE TEACHER: Always ask for the cardinality of the sets if it is possible to obtain such a number, if only to emphasize that n (A B) ≠ n (A) + n (B) U A B 10. due to the possible intersection of the two sets. In the exercises below, use every opportunity to emphasize this. Discuss the answers and make sure students understand the why of each answer. III. Exercises 1. Certain sets A and B, Set A Students who play the guitar Set B Students who play the piano Ethan Molina Mayumi Torres Chris Clemente Janis Reyes Angela Dominguez Chris Clemente Mayumi Torres Ethan Molina Joanna Molina Nathan Cruz Nathan Santos determine which of the following shows (a) union of sets A and B; and (b) crossing sets A and B? Set 1 Set 2 Set 3 Set 4 Ethan Molina Chris Clemente Angela Dominguez Mayumi Torres Joanna Cruz Mayumi Torres Ethan Molina Chris Clemente Mayumi Torres Janis Reyes Chris Clemente Ethan Molina Nathan Santos Ethan Molina Chris Clemente Angela Dominguez Mayumi Torres Joanna Cruz Janis Reyes Nathan Santos Answers: (a) Set 4. There are 7 elements in this set. (b) set 2. There are 3 elements in this set. 2. Do the following exercises. Write your answers to the specified spaces: A = {0, 1, 2, 3, 4} B = {0, 2, 4, 6, 8} C = {1, 3, 5, 7, 9} Answers: Given the sets above, determine the elements and cardinality of: a. A B = {0, 1, 2, 3, 4, 6, 8}; n (A B) = 7 b. A C = {0, 1, 2, 3, 4, 5, 7, 9}; n (A C) = 8 c. A B C = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}; n (A B C) = 10 d. A B = {0, 2, 4}; n a B= 3 e.B C = Ø; n (B C) = 0 f. A B C = Ø; n (A B C) = 0 g. (A B) C = {0, 1, 2, 3, 4, 5, 7, 9}; n (A B) C) = 8 11. NOTE TO THE TEACHER: In Exercise 2, you find the formula for the cardinality of the union of 3 Introduce. But it is also instructive to give students the opportunity to discover this on their The formula for finding the cardinality of the association of 3 sets is: n (A B C) = n (A) + n (B) + n (C) – n (A B) – n (A C) – n (B C) + n (A B C). 3. Let W = { x | 0 < x < 3 }, Y = { x | x > 2}, and Z = {x | 0 x 4 }. Determine in point (a) (W Y) Z; (b) W Y Z. Answers: Since at this point students are more familiar with whole numbers and fractions greater than or equal to 0, use a partial real number line to show the elements of these sets. (a) (W Y) Z = {x | 0 < x 4} (b) W Y Z = {x | 2 < x < 3} TEACHER NOTE: Finish with a good summary. Get more exercises on finding the union and the intersection of sets of numbers. Summary In this lesson you learned about the definition of association and the intersection of collections. You've also learned how to use Venn diagrams to represent the unions and the intersection of sets. 12. Lesson 2.2: Addition of a set time: 1.5 hours Of Pre-required concepts: collections, universal set, empty collection, association and intersection of collections, cardinality of sets, Venn diagrams About the lesson: The addition of a collection is an important concept. There will be times when one has to take into account the elements that are not found in a particular set A. You should know that this is when you need the addition of a set. Objectives: In this lesson, you are expected to: 1. Describe and define the addition of a collection; 2. to find the addition of a particular series; 3. Use venn diagrams to show the addition of a collection. WATCH THE TEACHER View the concept of the universal set before introducing this lesson. Emphasize to the students that there are situations where it is more useful to have the elements in the universal set that are not part of set A. Lesson Right: I. Problem In a population of 8 000 students, 2 100 are freshmen, 2 000 are sophomores, 2 050 are Juniors, and the remaining 1 850 are either in their fourth or fifth year in college. A student is selected from the 8 000 students and he/she is not a sophomore, how many possible choices are there? Discussion definition: The supplement of set A, written as A', is the set of all the elements found in the universal set, U, which are not found in set A. The cardinality n (A') is given by n (A') = n (U) – n (A). Examples: 1. Leave You = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} and A = {0, 2, 4, 6, 8}. U A' A 13. Then the elements of A' are the elements from You that are not found in A. Therefore A' = {1, 3, 5, 7, 9} 2. Leave = {1, 2, 3, 4, 5}, A = {2, 4} and B = {1, 5}. Dan A' = {1, 3, 5} B' = {2, 3, 4} A' B' = {1, 2, 3, 4, 5} = U 3. Please Note = {1, 2, 3, 4, 5, 6, 7, 8}, A = {1, 2, 3, 4} and B = {3, 4, 7, 8}. Dan A' = {5, 6, 7, 8} B' = {1, 2, 5, 6} A' B' {5, 6} 4. Leave U = {1, 3, 5, 7, 9}, A = {5, 7, 9} and B = {1, 5, 7, 9}. Then, A B = {5, 7, 9} (A B)' = {1, 3} 5. Let yourself be the set of whole numbers. If A = {x | x is a whole number and x > 10}, then A' = {x | x is a whole number and 0 x 10}. The opening asks for how many possible choices there are for a student who was selected and known as a non-Sophomore. Let You be the set of all students and n (U) = 8 000. Let A set all sophomores then n (A) = 2 000. Set A' consists of all students in You who are not sophomores and n (A') = n (U) – n (A) = 6 000. Therefore, there are 6000 possible choices for that selected student. NOTE TO THE TEACHER: Note how students identify the elements of a set's supplement. Teach them that one way to check is to take the union of a set and its supplement. The union is the universal series U. That is, A A' = U. Let them also remember that n (A A') = n (A) + n (A') – n (A') = n (A) + n (A') = n (U) since A A' = and thus n (A A') = 0. Use Venn diagrams in the activity below to show how the different sets relate to each other, making it easier to identify unions and intersections of collections and additions of collections or additions or unions and intersections of collections. Also pay attention to the language you use. In particular, (A B) is read as the supplement of the association of A and B 14. that A'B is read as the association of the supplement of A and the supplement of B. II. Activity The table lists the names of high school students according to the definition of each set. A Like Singing B Like Dancing C Like Acting D Like Any Jasper Faith Jacky Miguel Joel Charmaine Leby Joel Jezryl Jasper Ben Joel Billy Ethan Camille Tina After the survey is completed, you will find the following sets: a. U = b. A B' = c. A' C = d. (B D) = e. A' B = f. A' D' = g. (B C)' = The easier way to find the elements of the specified sets , by using a Venn diagram with the relationships of You, sets A, B, C and D. Set D does not share members with A, B and C. However, these three sets share a number of members. The venn diagram below is the correct picture: 15. A B C Joel Jacky Jasper Ben Leby Charmaine Jezryl Faith Miguel Billy Ethan Camille Tina U Now, it is easier to identify the elements of the required sets. a. U = {Ben, Billy, Camille, Charmaine, Ethan, Faith, Jacky, Jasper, Jezryl, Joel, Leby, Miguel, Tina} b. A B' = {Faith, Miguel, Joel, Jacky, Jasper, Ben, Billy, Ethan, Camille, Tina} c. A' C = {Jasper, Jacky, Joel, Ben, Leby, Charmaine, Jezryl, Billy, Ethan, Camille, Tina} d. (B D)' = {Faith, Miguel, Jacky, Jasper, Ben} e. A' B = {Leby, Charmaine, Jezryl} f. A' D' = {Leby, Charmaine , Jezryl, Ben} g. (B C)' = {Ben, Billy, Camille, Charmaine, Ethan, Faith, Jacky, Jasper, Jezryl, Leby, Miguel, Tina} NOTE TO THE TEACHER Below are the answers to the exercises. Encourage discussions between students. Pay attention to the language they use. It is important that students correctly use the words or phrases If necessary, use Venn diagrams. III. Exercises 1. True or false. If If answer is false, give the correct answer. Please Please = the set of the months of the year X = {March, May, June, July, October} Y = {January, June} Z = {September, October, November, December} 16. a. Z' = {January, February, March, April, May, June, July, August} Where b. X' Y' = {June, Juli} False. X' Y' = {February, April, August, September, November, December} c. X' Z' = {January, February, April, May, June, July, August, September, November} Where d. (Y Z)' = {February, March, April, May} False. (Y Z)' = {February, March, April, May, August}. NOTE THE TEACHER The next exercise is a great opportunity for you to develop student reasoning skills. If the supplement of A, the supplement of B and the supplement of C all contain the element a then a is outside all three sets, but within U. If B' and C' both b but A' contain, then A b. This kind of reasoning should be clear to students. 2. Place the elements in their respective sets in the diagram below based on the following elements assigned to each set: U A B C a b b b g h i j 17. U = {a, b, c, d, e, f, g, h, i, j} A' = {a, c, d, e, g, j} B' = {a, b, d, e, i} C' = {a, b, c, f, h, h, i, j} NOTE TO THE TEACHER: In exercise 3 there are many possible answers. Invite students to show all their work. This is a good opportunity for them to argue and justify their answers. Involve them in meaningful discussions. Encourage them to explain their work. Help them decide which diagrams are correct. 3. Draw a Venn diagram to show the relationships between the U, X, Y, and Z sets, given the following information. 🗘 You, the universal set contains set X, set Y and set Z. 🗘 X Y Z = U 🗘 Z is the complement of X. 🗘 Y' contains some elements of X and the set Z May June June July July x Y January December December D February 18 August. NOTE THE TEACHER End with a good summary. Summary In this lesson you learned about the addition of a particular set. You have learned how to describe and define the addition of a set, and how it relates to the universal set, you and the given set. X Z Y U 19. Lesson 3: Problems with Sets Time: 1 hour Condition Concepts: Operations on sets and Venn Diagrams Objectives: In this lesson you are expected: 1. solving word problems with sets using Venn diagrams 2. apply set edits to solve a variety of word problems. NOTE THE TEACHER This is an important lesson. Don't skip it. This lesson reinforces what students have learned about sets, fixed operations, and the Venn diagram in problem solving. Lesson Right: I. Activity Try to solve the following problem: In a class of 40 students, 17 have driven a plane, 28 have driven a boat, 10 have driven a train, 12 both a plane and a boat, 3 have only driven a train and 4 have only driven a plane. Some students in class have not driven any of the three forms of transport and

Therefore, the additive is inverse of 24, or The result shows that the product of two negative integers is a positive integer. 40. NOTE THE TEACHER The above argument can be generalized to obtain the product (-a)×(b). The evidence can be presented to more advanced students. It is important to note that the product's definition of two negative integers is not based on the same model as the whole-number product (i.e. repeated addition). The basis for the definition of the product of two negative numbers is the preservation of the properties or axioms of whole numbers (distribution right, identity and reverse property). Generalization: Multiply two negative integers if and are positive integers, then . Rules in Multiplying Integers: In multiplying integers, find the product of their positive equivalents. 1. If the integers have the same signs, their product is positive. 2. If the integers have different signs, their product is negative. III. Exercises A. The product of: 1. (-8) (4) 3. (-5) (3) (2) 4. (-7) (4) (-2) 5. (3) (8) (-2) 6. (9) (-8) (-9) 7. (-9) (-4) (-6) B. How can a person distribute 10 apples fairly between 8 children, so that each child has the same share? To resolve the dilemma, link the letter in column II to the number that matches the numbers in column I. Column I Column II 1. (6) (-12) C 270 2. (-13) (-13) P-72 3. (19) (-17) E 300 4. (-15) (29) K -323 5. (165) 0. 0. 6. (-18)(-15) M 0 7. (-15) (-20) 16. 1988, p. (-5) (-5) (-5) J -125 9. (-2) (-2) (-2) (-2) U 169 10. (4) (6) (8) I 192 Replies: 1. 60 2. –32 3. –30 4. 56 5. –48 6. 648 7. –216 41. C. Problem solving 1. Jof has twenty P5 coins in her coin bag. If her niece took five of the coins, how many were taken? Answer: PhP25 2. Mark can type 45 words per minute, how many words can Mark type in 30 minutes? Answer: 1 350 words 3. Give a computational equation that will solve the next one. The messenger came and delivered 6 checks worth of PhP50 each. Are you richer or poorer? How many? B. The messenger came and took away 3 checks worth of PhP120 each. Are you richer or poorer? How many? c. The messenger came and delivered 12 accounts for PhP86 each. Are you richer or poorer? How many? d. The messenger came and took 15 notes for PhP72 each. Are you richer or poorer? How many? Answers: a. Richer by PhP300 b. Armer by PhP360 c. Armer by PhP1,032 d. Richer by PhP1,080 NOTE TO THE TEACHER Give additional problems and exercises, if only to strengthen the rules for multiplying integers. Summarize by also highlighting the different types of problems in this lesson. Summary This lesson emphasized the meaning of multiplication to set the rules for multiplying integers. To multiply integers, you first find the product of their positive equivalents. If the integers have the same signs, their product is positive. If the integers have different signs, their product is negative. Answer: CREATE APPLE JUICE ___ 5 _____ 4 ___ 3 _____ 7 ___ 4 _____ 1 _____ 1 ___ 9 _____ 7 ___ 8 ___ 2 _____ 10 ___ 6 ___ 7_ Lesson 4.4: Fundamental Operations on Integers: Division of Integers Time: 1 hour Condition Concepts: Addition and subtraction of integers, multiplication of integers Objective: In this lesson you are expected: 1. find the quotient of two integers 2. problems with the distribution of integers. NOTE THE TEACHER This is a short lesson because the drawing rules for the distribution of integers are the same as when integer multiplication. The distribution should be understood as the reverse effect of multiplication, so that the rules are the same with regard to the sign of the quotient. Lesson correct: I. Activity Answer the following questions: What is (-51) ÷ (-3)? What is (-51) ÷ 3? What is 51 ÷ (-3)? What are the rules for dividing integers? II. Questions/Points to Think We have learned that subtraction is the reverse effect of Addition, Similarly, Division is the reverse effect of Multiplication. Example 1.Find the quotient of (-51) and (-3) Solution: Since the distribution multiplication, determine which number multiplied by (-3) produces (-51). If we ignore the signs for the meantime, we know that we also know that in order to get a negative product, the factors must have different signs. Hence (-51) ÷ ÷ = 17 Example 2. What is Solution: Therefore NOTE THE TEACHER This exercise emphasizes the need to remember the drawing rules for dividing integers. 43. Example 3.Show why 273 ÷ (–21) = –13. Solution: (-13) × (-21) = 57 Therefore, 273 ÷ (-21) = –13 NOTE THE TEACHER It is important to give more examples to students. Always ask students to explain or justify their answers. Generalization The quotient of two integers with the same characters is a positive integer, and the quotient of two integers that have as opposed to characters is a negative integer. However, distribution by zero is not possible. NOTE TO THE TEACHER Since we have introduced division as the reverse effect of multiplication, it is now easy to demonstrate why distribution per 0 is not possible. What is (-10) ÷ 0? Because distribution is the opposite of multiplication, we need to find a number such that when multiplied by 0 gives -10. But, there is no such number. In fact, no number can be divided by 0 for the same reason. When multiple operations need to be performed, the GEMDAS rule applies. Example 4. Perform the specified operations 1. 2. 3. Solution: 1. 3. Exercises: A. Calculate the following 1. 2. 3. 4. 5. B. What was the original name for the butterfly? To find the answer, you can find the quotient of each of the following. Then write the letter of the problems in the box that corresponds to the quotient. Answers: 1. –12. –73 3. 26 4. –4 5. 8 44. Answer: Flutterby C. Solvethe following problems: 1. Vergara's store earned P8,750 a week, How much is her average earning in a day? Answer: PhP1,250.00 (8750 ÷ 7 = 1250) 2. Russ worked in a factory and earned 15 days P7,875.00. How much does he make in a day? Answer: PhP525.00 (7875 ÷ 15 = 525) 3. There are 336 oranges in 12 baskets. How many oranges are there in three baskets? Answer: 84 oranges (336 ÷ 12 × 3 = 84) 4. A teacher must distribute 280 pieces of grave paper equally among his 35 pupils. How many pieces of grave paper does each student get? Answer: 8 (280 ÷ 35 = 8) 5. A father has 976 square meters much; He has to distribute it to his four children. What is each child's share? Answer: 244 square meters (976 ÷ 4 = 244) D. Complete the three-by-three magic square (i.e., the sum of the numbers in each row, in each column and in each of the diagonals are the same) using the numbers -10, -7, -4, -3, 0, 3, 4, 7, 10. What is the sum for each row, column, and diagonal line? 9 37 -15 -8 -8 28 -16 12 -48 R (-352) ÷ 22 L(128) ÷ - 16 (168) ÷ 6E(144) ÷ -3 (108) ÷ 9B (-315) ÷ (- 35) (-147) ÷ 7T F (-120) ÷ 8U T (-444) ÷ (-12) Y 45. Answer: The sum of all numbers is 0. That is why every a sum of . Put 0 in the middle square. Put each number and are negative on either side of 0. One possible solution is 7 10 3 –4 0 4 –3 –10 –7 Summary Division is the reverse operation of multiplication. Using this it is easy to see that the quotient of two integers with the same characters is a positive integer, and the quotient of two integers that have as opposed to characters is a negative integer. 46. Lesson 5: Properties of operations by integers Time: 1.5 hours Condition Concepts: Addition, subtracting, multiplying and dividing integer's objectives In this lesson you are expected to: 1. states and illustrates the different properties of the operations on integers a. closure d. distributive b. associative f. inverse f. inverse 2. rewrite given expressions according to the given property. NOTE TO THE TEACHER: Surgeries on integers are some of the difficult subjects in elementary algebra, and one of the least mastered skills of students based on research. The various activities presented in this lesson will hopefully provide students with a tool for creating their own procedures in solving equations related to integers. These are the basic rules of our system of algebra and they will be used in all subsequent mathematics. It is very important that students understand how to apply each property when solving mathematical problems. In activities 1 and 2, try to test the students' ability to give corresponding meaning to the various words exhibited and later relate to these terms on the lesson. In addition, students can show some creativity in activity 2. Lesson correct: I. A. Activity 1: Try to think about this . . . 1. Give at least 5 words synonymous with the word property. Activity 2: PICTIONARY GAME: DRAW AND TELL! 47. The following questions will be answered if you go along to the next activity. What properties of real numbers were shown in the Pictionary Game? Give an example and explain. How are these traits seen in real life? NOTE TO THE TEACHER Activity 3 gives a visual presentation of the properties. Activity 3: SHOW AND TELL! Determine what kind of property of real numbers is illustrated in the following images: A. Fill in the blanks with the correct numerical values of the motorcyclist and cyclists. ____ _____ If a represents the number of motorcyclists and b represents the number of cyclists, show the mathematical statement in the diagram below. _____ + ____ = _____ + ___ Expected answer: a + b = b + a guide question: What operation is used to illustrate the diagram? Adding What happened to the terms in both sides of the equation? The terms were exchanged. Based on the previous activity, which property is applied? + 48. Commutative of addition: For integers a, b, a + b = b + a If the operation is replaced by multiplication, does the same property apply? Give an example to prove your answer. 2 • 3 = 3 • 2 6 = 6 Commutative property of multiplication: For integers a, b, ab = ba Define the property. Commutative property Changing the order of two numbers that are either either added or multiplied, the result does not change. Give a real life situation in which the commutative property can be applied. An example is preparing fruit juices - even if you use the powder first for water or vice versa, the product will still be the same. It's still the same fruit juice. Test the property on subtraction and division operations using simple examples. What did you find out? Commutative property does not apply to subtraction and distribution as shown in the following examples: 6 – 2 = 2 – 6 6 ÷ 2 = 2 ÷ 6 4 ≠ -4 3 ≠ B. Fill in the blanks with the correct numeric values of the set of mobile phones, ipods, and laptops. ____ ___ ___ + is the same + + 49. If a represents the number of mobile phones, b represents the ipods and c represents the laptops, show the mathematical instruction in the diagram below. (___ + ____ + +___ = ____ + (__ + _____) Expect answer: (a + b) + c = a + (b + c) Guide questions: What operation is used to illustrate the diagram? Addition What happened to the groupings of the given sets that match both sides of the equation? The groupings were changed. Based on the previous activity, which property is applied? Associative property of addition for integers a, b, and c, (a + b) + c = a + (b + c) If the operation is replaced by multiplication, does the same property apply? Give an example to prove your answer. (2 • 3) • 5 = 3 • (2 • 5) 6 • 5 = 3 • 10 30 = 30 Associative property of multiplication for integers a, b and c, (a• b)c = a b• c) Define the property. Associative property Changing the grouping of numbers that are added or multiplied does not change their value. Give a real life situation in which associative ownership can be applied. An example is preparing instant coffee - even if you combine coffee and creamer than sugar or coffee and sugar then creamer the result will be the same - 3-in-1coffee. Test the property on subtraction and division operations using simple examples. What did you find out? Associative power does not apply to subtraction and subtraction as shown by the following examples: (6 – 2) – 1 = 6 – (2 – 1) (12 ÷ 2) ÷ 2 = 122 ÷ ÷ <2> <3> (2 ÷ 2) 4 – 1 = 6 – 1 6 ÷ 2 = 12 ÷ 1 3 ≠ 5 3 ≠12 50. C. Fill in the blanks with the correct numeric values of the orange set and the set of strawberries. ____ ___ ____ ___ If a representative represents the multiplier at the front, b represents the set of oranges and c represents the set of strawberries, show the mathematical instruction in the diagram below. ____ _ (__ _ _ Distributive Property For integers a, b, c, a(b + c) = ab + ac For integers a, b, c, a b ac Define the property. Distributive Property When two numbers are added/deducted and then multiplied by one factor, the result will be the same +2 × equal to +2 × 51. when each number is multiplied by the factor and the products are then added/deducted. In the said property, we can add/subtract the numbers within the brackets and then first multiply or multiply and then add/subtract them? Give an example to prove your answer. In the example, we can first add or subtract the numbers within the brackets and then multiply the result. or we can multiply each term individually and then add/subtract the two products together. The answer is the same in both cases, as shown below. Give a real life situation where the distributive property can be applied. Your mother gave you four 5-peso coins and your grandmother gave you four 20-peso notes. You now have PhP20 worth of 5-peso coins and PhP80 worth of 20-peso bill. You also have four sets of PhP25 each consisting of a 5-peso coin and a 20-peso bill. D. Fill in the spaces with the correct numeric view of the given illustration. ____ ____ ____ Answer: a + 0 = a guide question: Based on the previous activity, which property is applied in the presented images? Identity Property for Addition a + 0 = a -2(4 + 3) = (-2 • 4) + (-2 • 3) -2(7) = (-8) + (-6)) -14 = -14 or -2(4 + 3) = -2(7) -2(7) = -14 -14 = -14 52. What is the result if you have something represented by adding a number to nothing represented by zero? The result is the non-zero number. What do you call zero 0 in this case? Zero, 0 is the additive identity. Define the property. Identity Property for Addition states that 0 is the additive identity, that is, the sum of a number and 0 is the specified number. Is there a number multiplied by a number that will result in that same number? Give examples. Yes, the number is 1. Examples: 1•2=2 1•3=2 1•4=2 What property is illustrated? Define. Identity Property for Multiplication says that 1 is the multiplicative identity - the product of a number and 1 is the given number, a 1 = a. What do you call a 1 in this case? One, 1 is the multiplying identity E. Give the correct mathematical explanation of the given illustrations. To do this, please refer to the guide questions below. Guide questions: How many cabbages are there in the crate? 14 cabbage in PLUS REMOVE E 53. Using integers, represent put in 14 cabbage and remove 14 cabbage? What will be the result if you add these performances? (+14) + (-14) = 0 Based on the previous activity, which property is applied in the images presented? Inverted property for a + (-a)= 0 What is the result if you add something to the negative? The result is always zero. What do you call the opposite of a number in terms of character? What is the opposite of a number number by one? Additive reversed. The additive inverse of the number a is -a. Define the property. Reverse property for addition - states that the sum of a number and the additive is reversed or negative, zero. What do you mean by reciprocal, and what is the other term used for it? The reciprocal is 1 divided by that number or the fraction a 1, where a represents the number. The reciprocal of a number is also called the multiplying inverse. If you multiply some say 5 with its multiplicative inverse, what is the result? 5 • = 1 What property is illustrated? Define this property. Reverse property for multiplication - states that the product of a number and the multiplying inverse or reciprocal, is 1. For each number a, the multiplicative reverse is a 1. Important terms to remember The following are terms that you should remember from this point. 1. Closing pan Two integers that are added and multiplied remain as integers. The set of integers is closed under addition and multiplication. 2. Commute The order of two numbers that are added or multiplied does not change the value. 3. Associative property Changing the grouping of numbers that are added or multiplied does not change their value. 4. Distributive property 54. When two numbers are added/deducted and then multiplied by one factor, the result is the same when each number is multiplied by the factor and the products are then added/deducted. 5. Identity Property Additive Identity - states that the sum of a number and 0 is the given number. Zero, 0 is the additive identity. Multiplicative identity - states that the product of a number and 1 is the given number, a • 1 = a. First, 1 is the multiplying identity. 6. Reverse property in addition - states that the sum of a number and the additive reversed, is zero. The additive inverse of the number a is -a. In Multiplication - states that the product of a number and the multiplying inverse or reciprocal, is 1.De multiplicative inverse of the number a is a 1. Formats and symbols In this segment, you'll learn some notations and symbols related to real number properties applied in integer operations. Closure Property under addition and multiplication a, b I, then a+b I, a • b I Commutative property of addition a + b = b + a commutative property of multiplication ab = ba Associative property of addition (a + b) + c = a + (b + c) Associative property of multiplication (ab) c = a (bc) Distributive property a(b+ c) = ab + ac Additive identity property a + 0 = a Multiplicative identity property a • = a Multiplicative inverse property • = 1 Additive inverse property a + (-a) = 0 55. NOTE TO THE TEACHER: It is important for you to examine and discuss your students' answers to the questions asked in each activity and exercise in order practice what they have learned themselves. Remember application as part of the learning process is essential to find out if the students gained knowledge of the concept or not. It is also appropriate to encourage brainstorming, dialogue and arguments in the classroom. After the exchanges, make sure all questions are resolved. III. Exercises A. Complete the table: Which property of the real number justifies each statement? B. Rewrite the following expressions using the given property. 1. 12a – 5a Distributive Property (12-5)a 2. (7a)b Associative Property 7 (ab) 3. 8 + 5 Commutative Property 5 + 8 4. -4(1) Identity Property -4 5. 25 + (-25) Inverse Property 0 C. Fill in the spaces and determine which properties have been used to resolve the equations. 1. 5 x (-2 + 2) = 0 Additive Inverse, Zero Property 2. -4 + 4 = 0 Additive inverse 3. -6 + 0 = -6 Additive identity 4. (-14 + 14) + 7 = 7 Additive inverse, Additive Identity 5. 7 x (0 + 7) = 49 Additive Identity Given Property 1. 0 + (-3) = -3 Additive Identity Property 2. 2(3 - 5) = 2,3 - 2(5) Distributive property 3. (- 6) + (-7) = (-7) + (-6) Commute 4. 1 x (-9) = -9 Multiplication identity property 5. -4 x - = 1 Multiplication Inverse Property 6. 2 x (3 x 7) = (2 x 3) x 7 associative property 7. 10+ (-10) = 0 Additive inverse property 8. 2(5) = 5(2) Commute 9. 1 x (-) = - Multiplication identity property 10. (-3) (4 + 9) = (-3)(4) + (- 3)(9) Distributive property 56. NOTE TO THE TEACHER Try more of the kind of exercises in Exercise C. Combine properties so you can test how well your students have understood the lesson. Summary The lesson on properties or real numbers explains how numbers or values are arranged or related in a comparison. It further clarifies that no matter how these numbers are arranged and what processes are used, the composition of the equation and the final answer is still the same. Our society is like these equations - composed of different numbers and operations, different people with different personalities, perspectives and experiences. We can choose to look at the differences and forever emphasize our advantage or superiority over the others. Or we can focus on the commonality of people and work entirely for the common good. A peaceful society and harmonious relationship begin with recognizing, appreciating and fully maximizing the positive qualities that we as a people have in common. 57. Lesson 6: Rational numbers in the number line time: 1 hour Condition Concepts: Subsets of real numbers, goal of integers: In this lesson, you, the students, are expected to 1. rational numbers too 2. illustrate rational numbers on the number line; 3. Arrange rational numbers on the number line. NOTE TO THE TEACHER: Ask students about the relationship of the rational numbers set to the set of integers and the set set (Lesson 4). This lesson challenges students in their numerical estimation skills. How accurately can they find rational numbers between two integers, perhaps, or between two numbers? Lesson Right I. Activity Determine whether the following numbers are rational numbers or not. - 2, , 1 11, 43, 16, -1.89, Now, try to locate them on the actual number line below by plotting: II. Ask To Think About the following examples and answer the following questions: a. 7 ÷ 2 = 3 1/2 , b. (-25) ÷ 4 = -6 1/4 c. (-6) ÷ (-12) = 1/2 1. Are quotients integers? Not always. Consider 10 7. 2. What kind of numbers are they? Quotients are rational numbers. 3. Do you represent them on a number line? Yes. Rational numbers are real numbers and therefore they can be found in the real number line. 0-1-2-3 1 2 3 4 NOTE THE TEACHER: Give as many rational numbers as the class can allow time. Give them in different forms: integers, fractions, mixed numbers, decimals, repeating decimal places, etc. Remember what rational numbers are... 3 1/2, -6 1/4, 1/2, are rational numbers. The word rational is derived from the word ratio which means quotient. Rational numbers are numbers that can be written as a quotient of two integers, where b ≠ 0. Below are more examples of rational numbers: 5 = 5 1 0.06 = 6 100 1.3 = From the example we can see that an integer is also a rational number and therefore integers are a subset of rational numbers. Why is that? Let's look at your work sooner. Among the specified numbers, - 2, , 1 11, 43 , 16 , - 1.89, the numbers and 43 are the only ones that are not rational numbers. Neither can be expressed as a quotient of two integers. However, we can express the other as a quotient of two intergers: 2 2 1, 16 4 4 1 , 1.89 189 100 Of course 1 11 is already a quotient in itself. We can find rational numbers on the real number line. Example 1. Find 1/2 on the number line. A. Since 0< 1/2 < 1, plot 0 and 1 on the number line. B. Get the center of the segment from 0 to 1. The center now corresponds to 1/2 Example 2. Find 1.75 on the number line. A. The number 1.75 can be written as 7 4 and, 1 < 7 4 < 2. Divide the segment from 0 to 2 into 8 equal parts. B. The 7th mark of 0 is the point 1.75. 1.7510 2 10 2 0 1 1/2 0 1 59. Example 3. Find the point on the number line. Note: -2 < < -1. Dividing the segment from -2 to 0 into 6 equal parts, it is easy to plot. The number is the 5th mark from 0 to the left. Go back to the opening activity. You were asked to locate the rational numbers and put them on the real number line. Before doing that, it is useful to arrange them in order from least to largest. To do this, you take all the numbers out in the same shape - as similar fractures or as decimals. Because integers are easy to find, they don't have to take any other form. It's easy to see that - 2< < < < 111 < 4 p.m. explain why? Therefore, plotting them by approaching their location gives III. Exercises 1. Find and plot the following on a number line (use only one number line). a. 10 3 e. -0,01 b. 2,07 f. 7 1 9 c. 2 5 g. 0 d. 12 h. 1 6 2. Name 10 rational numbers that are larger than -1, but less than 1, and rank them from least to the largest on the real number line? Examples are: 1 10, 3 10, 1 2, 1 5, 1 100, 0, 1 8, 2 11, 8 37, 9 10 12 2 0 -2 -1 0 NOTE TO THE TEACHER: You will be given a number line to work on. Plot the numbers on this number line to serve as your answer key. 60. 3. Name a rational number x that matches the descriptions below: a. 10 x 9, Possible answers: x 46 5, 48 5, 9.75, 9 8 9 , 9,99 b. 1 10 x 1 2 Possible answers: x 46 5, 48 5, 9.75, 9 8 9 , 9.99 c. 3 x Possible answers: x 3.1, 3.01, 3.001, 3.12 d. 1 4 x 1 3 Possible answers : x 13 50 , 0.27, 0.28, 299 1000 , 3 10 e. 1 8 x 1 9 Possible answers: x 3 25, 0.124, 17 144 , 0.112 NOTE TO THE TEACHER: Sworn this lesson with a summary and an example of what students are expected to learn about rational numbers, their properties, edits and applications. Summary In this lesson you learned more about what are rational numbers and where they can be found in the real number line. By turning all rational numbers into equivalent forms, it is easy to regulate them in order, from least to the largest or vice versa. NOTE TO THE TEACHER: In this exercise you allow students to use the calculator to check if their choice of x falls within the given range. You, as always also encourage them to use mental calculation strategies as calculators are not readily available. Most importantly, students have a way to check their answers and won't just rely on you to give the right answers. 61. Lesson 7: Forms of rational numbers and addition and subtraction of rational numbers: 2 hours required concepts: definition of rational numbers, subsets of real numbers, fractions, decimals Objectives: In this an operation performed on two elements. The area model allows for at most shading or cutting in two directions. 3 5 1 2 3 10 Kim ate 3 10 of the whole pizza. 73. 2. Miriam made 8 chicken sandwiches for some street kids. She cut each sandwich into 4 triangular pieces. If a child can only take a piece, how many children can she feed? The equation is 8 1 4 32. Since there are 4 quarters in one sandwich, there will be 4 x 8 = 32 triangular pieces and so 32 children can be fed. How can you multiply or divide rational numbers without using models or drawings? NOTE THE TEACHER: Below are important rules or procedures that students should remember. From now on, be consistent in your rules so that your students are not confused. Give numerous examples. Important rules to remember The following are rules you should remember. From here, the symbols to be used for multiplication are one of the following: , x, or x. 1. To multiply rational numbers in fractional form, simply multiply the counters and multiply the denominators. In symbol, where: b and d NOT equal to zero, (b ≠ 0; d ≠ 0) 2. If you want to divide rational numbers into fraction form, take the reciprocal of the second fraction (called the divisor) and multiply them by the first fraction. 74. In symbol, where: b, c, and d are not equal to zero. Example: Multiply the following and write your answer in the simplest form a.b. Divide: = III. Exercises. Do the following exercises. Write your answer to the available spaces: 1. Find the products. Express in the lowest terms (i.e. the counter and denominators have no common factor except 1). Mixed numbers are also acceptable: a. = 5 9 f. = 51 2 25 1 2 b. 7 = 14 3 4 2 3 g. = 1 10 c. = 2 25 h. = 1 36 d. = 325 9 36 1 9 i. = 4 9 e. = 5 12 j. = 3 10 The easiest way to solve for this number is to change mixed numbers in an incorrect fraction and then multiply them. Or use prime factors or the largest common factor, as part of the multiplication process. Take the reciprocal van, which then multiply by the first fraction. Using prime factors, it is easy to see that 2 can be weighed out of the counter then cancelled with the denominator, 4 and 3 as the remaining factors in the counter and 11 as the remaining factors in the denominator. 75.B. Divide: 1. 20 = 30 6. = 10 9 1 1 9 2. = 5 9 7. = 79 12 6 7 12 3. = 7 40 8. = 7 6 1 1 6 4. = 69 80 9. = 10 33 5. = = 2 4 1 2 10. = 6 C. Solve the following: 1. Julie spent hours carrying out her assignment. Ken did his assignment for times as many hours as Julie did. How many hours did Ken spend on his assignment? 35 6 5 5 6 hours 2. How many third are there in 6 fifth? 18 5 3 3 5 3. Hanna donated her monthly allowance to the Iligan survivors. If her monthly allowance is P3,500, how much did she donate? P1400.00 4. The registration for this school year is 2 340. As his sophomores and his seniors, how many are freshmen or juniors? 1 365 students are freshmen or juniors 5. At the end of the day, a store had 2/5 of a cake leftovers. The four employees took home the same amount of leftover cake. How much of the cake did each employee take home? 110 of the cake. B. Multiplication and Distribution of rational numbers in decimal form NOTE TO THE TEACHER The emphasis here is on what to do with the decimal point when multiplying or dividing rational numbers in decimal form. Don't get stuck on the rules. Give a deeper explanation. Think: 6.1 0.08 6 1 10 8 100 488 1000 0.488 76. The decimal places indicate the powers of 10 used in the denominators, hence the rule to determine where the comma in the product should be indicated. This unity will draw on your previous knowledge of multiplication and distribution of whole numbers. Think of the strategies you've learned and developed when working with whole numbers. Activity: 1. Give students different examples of multiplication phrases with the answers given. Place the decimal point in an incorrect place and ask students to explain why the decimal place should not be placed there and explain where it should be placed and why. Example: 215.2 x 3.2 = 68,864 2. Five students ordered buko cake, and the total cost is P135.75. How much did each student have to pay if he shared the cost equally? Questions and points to ponder: 1. When multiplying rational numbers in decimal form, pay attention to the importance of knowing where to imitate the decimal point in a product of two decimal numbers. Do you see a pattern? Take the sum of the decimals in each of the multiplicand and multiplier and that is the number of places in the product. 2. When dividing rational numbers into decimal desals, how do you determine where you place the decimal point in the quotient? The number of decimal places in the quotient depends on the number of decimal places in the dealer and the dividend. NOTE TO THE TEACHER Answer to the questions and points to consider is to be worked out when you discuss the following rules. Rules for multiplying rational numbers in decimal form 1. Arrange the numbers in a vertical column. 2. Multiply the like multiplying whole numbers. 3. From the rightmost end of the product, move the decimal point to the left the same number of places as the sum of the decimal places in the multiplicand and multiplier. Rules in in Rational numbers in decimal form 1. If the dealer is a whole number, divide the dividend by the dealer who applies the rules of a whole number. The position of the decimal point is the same as that in the dividend. 2. If the dealer is not an integer, make the dealer an entire number by moving the decimal point in the dealer to the rightmost end, making the number appear a whole number. 77. 3. Move the decimal point in the dividend to the right the same number of places as the decimal point was moved to make the dealer a whole number. 4. Finally, the new dividend is distributed by the new dealer. Exercises: A. Perform the specified operation 1. 3.5 ÷ 2 = 1.75 6. 27.3 x 2.5 = 68.25 2. 78 x 0.4 = 31.2 7. 9.7 x 4.1 = 39.77 3. 9.6 x 13 = 124.8 8. 3,415 ÷ 2.5 = 1,366 4. 3.24 ÷ 0.5 = 6.48 9. 53.61 x 1.02 = 54.6822 5. 1.248 ÷ 0.024 = 52 10. 1948.324 ÷ 5.96 = 326.9 B. Finds the numbers that give the products shown when multiplied. 1. . 3. . 5. . x_______ x______ x___________ 10. 6 2 1 . 6 2 1 . 9 8 2. . 4. . x ____ x _____ 1 6 . 8 9 . 5 NOTE TO THE TEACHER Give a good summary of this lesson highlighting how this lesson was intended to deepen their understanding of rational numbers and better develop their skills in multiplying and sharing rational numbers. Summary In this lesson, you learned to use the field model to illustrate multiplication and distribution of rational numbers. You also learned the rules for multiplying and sharing rational numbers in both the fraction and the decimal places. You solved problems by multiplication and distribution of rational numbers. Answers: (1) 5,3 x 2 ; (2) 8,4 x 2 or 5,6 x 3; (3) 5,4 x 4; (4) 3,5 x 3; (5) 3.14 x 7 NOTE TO THE TEACHER: These are just some of the possible pairs. Be open to accept or consider other pairs of numbers. 78. Lesson 9: Properties of operations by rational number time: 1 hour Pre-required drafts: Operations on rational numbers Objectives: In this lesson, you are expected to become 1. Describe and illustrate the different properties of the operations on rational numbers. 2. Apply the properties when performing operations to rational numbers. NOTE TO THE TEACHER: Generally, rational numbers seem difficult among students. The following activity should be fun and can help your students realize the importance of the properties of operations on rational numbers. Lesson correct: I. Activity Choose a pair 2 14 3 5 0 1 13 40 13 12 1 3 3 20 In the box above, choose the correct rational number to be placed in the rooms to make the comparison a better place. 1. [13 12] 2. = [1 3] 3. = 0 [0] 8. 2 5 ___ 3 4 3 20 [1 2] 4. 1 x [ ] = 9. = _____ [3 20] 5. + [0] = 10. = [13 40] Answer the questions: 1. What is the missing number in point 1? 2. How do you compare the answers in points 1 and 2? 3. What about point 3? What's the missing number? 79. 4. In point 4, what do you multiply by 1 get? 5. What number must be added in point 5 to get the same number? 6. What is the missing number in points 6 and 7? 7. What do you say about the grouping in points 6 and 7? 8. What do you think the answers are in points 8 and 9? 9. What operation did you apply in Article 10? NOTE THE TEACHER The follow-up problem below could make the points raised in the previous activity clearer. Problem: Consider the given phrases: a.b. = * Are the two expressions equal? If so, is the property pictured. Yes, the expressions in point (a) are the same and so are the expressions in point b). This is due to the commutative property of addition and multiplication. With the Commutative property you will change the order of the addends or factors and the resulting sum or the resulting product, respectively, will not change. PLEASE NOTE THE TEACHER Discuss the following characteristics among your students. These properties make adding and multiplying rational numbers easier to do. PROPERTIES OF RATIONAL NUMBERS (ADDITION & MULTIPLICATION) 1. CLOSURE PROPERTY: For two defined rational numbers. , their sum and product is also rational. For example: a. = b. 2. COMMUTATIVE TRAIT: For two defined rational numbers , i. = ii. = 80. For example: a.b. 3. ASAEST OWNERSHIP: For three defined rational numbers i. ii. For example: a.b. 4. DISTRIBUTIVE PROPERTY of multiplication over addition for rational numbers. If are a defined rational numbers, then for example: 5. DISTRIBUTIVE PROPERTY of multiplication over subtraction for rational numbers. If there are defined rational numbers, then for example: 6. IDENTITY ADDITION: Adding 0 to a number will not change the identity or value of that number. + 0 = For example: 81. Multiplication: Multiplying a number by 1 does not change the identity or value of that number. For example: 7. ZERO MULTIPLICATION PROPERTY: Each number multiplied by zero is equal to 0, i.e. For example: II. Ask to think (Post-Activity Discussion) NOTE TO THE TEACHER Answer every question in the opening Activity thoroughly and discuss the concepts clearly. Invite students to express their ideas, their doubts, and their questions. At this stage they really should be able to verbalize what they understand or don't understand so that they can properly address any misconceptions they have. If necessary, give additional examples. Let's answer the questions in the opening activity. 1. What is the missing number in point1? » 2. How do you compare the answers in points 1 and 2? » The answer is the same, the order of the numbers is not important. 3. What about 3? What's the missing number? » The missing number is 0. When you multiply a number by zero, the product is zero. 4. In point 4, what number do you multiply by 1 to get? » When you multiply a number by one, the answer is the same. 5. 5. added to in point 5 to get the same number? » 0, When you add zero to a number, the value of the number does not change. 6. What do you think the missing number is in points 6 and 7?» 7. What do you say about the grouping in points 6 and 7? » The groups are different, but do not affect the sum. 8. What do you think the answers are in points 8 and 9? » The answer is the same in both items. 9. What operation did you apply in Article 10? » The distributive property of multiplication over addition 82. III. Exercises: Do the following exercises. Write your answer in the available spaces. A. List the property justifying each of the following statements. 1. Commuting 2. 1 x = Identity property for multiplication 3. Distributive Property of Multiplication on Addition 4. Associative Property 5. 2 7 1 5 2 3 1 2 7 1 5 2 3 Identity housing for multiplication 6. Identity property for addition 7. 1 2 5 6 4 3 Closing House 8. = Commute 9. 1 4 Distributive Property of Multiplication on Subtraction 10. 2 15 5 7 0 0 Zero multiplication B property. Find the value of N in each expression 1. N + N = 0 2. = N = 6 7 3. = + N = 12 30 83. 4. 0 + N = N = 6. N = N = 1 6 7. N = 8 23 8. = N N = 8 9 NOTE TO THE TEACHER You would like to add more exercises. If you are sure that your students have mastered the attributes, remember to finish your lesson with a summary. Summary This lesson is about the properties of operations on rational numbers. The properties are useful because they simplify calculations of rational numbers. These properties are where under the operations addition and multiplication. Please note that for the Distributive property of Multiplication over Subtraction, Subtraction is considered as part of addition. Think of subtraction as the addition of a negative rational number. Number.

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