



## Answer key math 10 unit 3

1. D EPED C O PY 10 Department of Mathematics Education Republic Philippines This book has been collaborated developed and reviewed by educators from public and private schools, colleges and/or universities. We encourage teachers and other educational stakeholders to send their feedback, comments and recommendations to the Department of Education action@deped.gov.ph by e-mail. We appreciate your feedback and recommendations. Learner Module Block 3 All Rights Reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 2.2.2015. D EPED C O PY Mathematics - 10th Degree Learners Module First Edition 2015 Republic Act 8293, Section 176 states that: No copyright can be the work of any Philippine government. 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This material contains eight (8) module 3 - Polynomic Equation Module 3 - Polynomic Equation Module 4 - Circles Module 5 - Plane Coordinates Geometry Module 6 - Permutations and Combinations Module 7 - Probability Composite Events Module 8 - Instrument Position with Different Activities, provided in each module, you can find this material attractive and complex as it develops its critical thinking and problem solving skills. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 4.4.2015. D EPED C O PY Block 3 Module 6: Permutations and Coverage... 276 Module Map... 277 Preliminary assessment ...... 278 Learning objectives and objectives ...... 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No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 5.5.2015. Activity 328 1 ...... 328 Activity 2 ...... 330 Activities 3 ...... 332 Activity 4 ...... 334 Activity 5 Activity 5 Activity 6 ...... 337 Activity 6 ...... 338 Activity 8 ...... 341 1 activity ...... 341 Activity 2 ...... 343 Activity 3 ...... 344 Activity 4 ...... 344 5 Glossary ...... 353 Links and sitelinks used in this module ...... 354 All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 6.6.2015. D EPED C O PY 275 I. INTRODUCTION Take a look at the photos below. Have you ever wondered why some locks, such as those shown below, have codes? Do you know why the shorter code is a strong personal password in your computer account? Have you ever realised that there is possible ways to perform most tasks or activities, such as planning seating possible race results? Have you ever known that there are many possible choices when choosing from a set, such as deciding which combination to serve in the catering service, or deciding which dishes to order on the menu? Did you know that awareness of this can help you shape conclusions and make wise decisions? Learn the answers to these questions and discover the wide range of perstatus and combinations through this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 7.2015. EPED C O PY 276 II. LESSONS AND COVERAGE This module will examine and determine how many available ways to perform certain tasks or select some objects from a collection. Learn about this in the following lessons: Lesson 1 – Permutation Lesson 2 – Combinations In these lessons you will learn: Lesson 1  $\Box$  Illustrate The Rebuilt of Objects;  $\Box$  Set a formula for finding the number of restatations of nobjects;  $\Box$  separate the rebuilding from the combination of n objects taken at the same time, n ≥ r; □ get a formula to find the number of combinations of objects taken at the same time; □ address problems related to persimmons and combinations. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 8.8.2015. D EPED C O PY 277 Here is a simple map of lessons that will be included in the following module: Find n objects taken r during time problems with permutations found n object combinations taken r during problems related to combinations of problems with permutations and combinations permutations combinations permutations combinations of the back contral Office. First edition, 9.9.2015. EPED C O PY 278 III. PRE-ASSESSMENT Part I Find out how much you already know about the topics in this module. Select the letter that you could not answer correctly, and find the correct answer when you go through this module. 1. The selection of the subset of the set is pavyzdys. A. combination C. integration B. Differentiation D. restata 2. Which of these situations or activities is related to the restructures? A. Matching T-shirt and pants B. forming triangles of 5 points on board the plane, not three of which are collinear C. assigning telephone numbers to subscribers D. by forming a committee of the members of the club 3. Positive lower numbers n and all positive integers are \_\_\_\_\_. A. powers n C. n - factors B. multiple n D. n factor 4. Two different objects, some of which are identical, are called \_ . A. Distinguishes the perstructible C. round restructures B. unique combinations D. round combinations 5. How many different 4-digit even numbers can be formed from digits 1, 3, 5, 6, 8 and 9 if repeating digits is not allowed? A. 1 680 B. 840 C. 420 D. 120 6. How many ways can 8 people sit around a round table if two of them insist on sitting side by side? A. 360 B. 720 C. 1440 D. 5040 7. Find the number of distinguishing conversions of the word PASS. A. 4 B. 12 C. 36 D. 144 8 letters. Ms. Santos asked Renz to draw all the diagonals, which his teacher declared correct. What was the polygon presented? A. Pentagon C. nonagon B. hexagon D. decagon All rights reserved. No part of

this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 10 2015. EPD C O PY 279 9. Ms. De Leon wants to produce various sets of test issues in her essay test. If she plans to do this by putting together 3 of the 5 questions she has prepared, how many different sets of questions could she build? A. 10 B. 20 C. 60 D. 80 10. If P(9, r) = 3024, what is r? A. 2 B. 4 C. 5 D. 6 11. In the city fiesta singing contest with 12 contestants, how many ways can the organizer host the first three singers? A. 132 B. 990 C. 1320 D. 1716 12. What is P(8, 5)? A. 56 B. 336 C. 1400 D. 6720 13. If P(n, 4) = 5040, then n = 0.4. A 12 B. 10 C. 9 D. 8 14. Depending on x = P(n, n) and y = P(n,160 D. 40 320 16. If the combined lock must consist of 5 different digits, how many methods code can be formed from digits from 0 to 9? A. 15 120 D. 1 000 000 17. How many ways can 4 men and 3 women arrange consecutive shootings if men and women have to stand alternately? A. 5040 B. 720 C. 144 D. 30 18 The room has 10 chairs in a row. How many ways can 5 students sit in chairs in a row? A. 720 B. 600 C. 252 D. 120 19. Which combination does not notice in these situations? A. Selection of 2 songs from 10 audit work B. Setting the schedule of the student group, which must accept exactly 8 subjects C. when some points are connected on board the All Rights Reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 11 2015. EPED C O PY 280 20. If w = C(5,2), x = C(5,3), y = C(5,4) and z = C(5,5), and in a plane from which none are colinear, we are awarded 5 points, which means the total number of polygons that can be drawn? A. x + y C. x + y + z B. w + x + y += 8, r = 3 D. n = 9, r = 2 23. If C(n, 4) = 126, what is n? A. 11 B. 10 C. 9 D. 7 24. If C(12, r) = 792, which of the following value is a possible r value? A. 8 B. 7 C. 6 D. 4 25. The catering service offers 3 types of main course, 4 types of vegetable dish and 4 types of dessert. How many possible ways can a food tool consist of a meal consisting of 1 soup, 2 main dishes, 1 vegetable dish and 2 desserts? A, 140 B, 336 C, 672 D, 1512 26, How many ways can the 7-student committee? A, 10 584 B, 1764 C, 210 D, 84 27, Jane wants to solve the equation system through elimination by combining any two equations. The number of equations is equal to the number of variables. She understands that she has 10 possible ways to start her own decision. How many equations does she have? A. 6 B. 5 C. 4 D. 3 28. The breakfast buffet includes 11 different foods. The customer is asked to receive a certain number of items. If the customer has 462 possible ways as a result, which of the further will he possibly do? A. Select 4 of 11 points B. Select 6 of 11 points. Select 7 of the 11 All-Rights Reserved items. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 12 2015. D EPED C O PY 281 Part II Read and understand the situation below, then answer the question or do what you need. Let's say you graduated from high school, but you didn't have enough money to continue your college education. You decided to work temporarily and save on your school. You turned to Mr. Aguino's restaurant and you were hired. A few days later, you noticed that the restaurant business was not doing very well, and Mr. Aguino asked for your opinion. What you noticed was that the food served in the restaurant was not varied. 1. Prepare a list of various foods that can be served (soup, meat / chicken dishes, fish, vegetables, fruits, desserts, drinks). Consider health and nutritional values. 2. What mathematical concepts in the situation. 4. Write the equation(s) or expressions describing the situation. 5. Solve formulated equations and problems. 6. Provide a sample menu for the day and explain the reason for your choice. Given that there will be several possible combinations, also explain why you should prepare certain dishes more often or less frequently. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 13 2015. D EPED C O PY 282 Rubric about problems formulated and solved score descriptors 6 Poses a more complex problem with two or more correct possible solutions and transmits ideas accurately. shows a comprehensive understanding of the relevant concepts and/or processes, and provides explanations if necessary. 5 Poses a more complex problem and accurately communicates ideas, thoroughly understands the right concepts and/or processes 4 Poses a complex problem and completes all the relevant parts of the solution and accurately communicates ideas, shows detailed concepts and/or processes 3 Poses a complex problem and accurately transmits ideas, shows the perception of basic concepts, although ignores or misunderstands less important ideas or details 2 Poses a problem and completes some important parts of the solution and accurately transmits ideas, but shows little understanding, can not create an approach Source : D.O. #73, s. 2012 IV. LEARNING GOALS AND GOALS After passing this module, you should be able to demonstrate an understanding of the basic concepts of the combine, especially permutations and combinations. In addition, you should be able to use precise calculation methods to formulate conclusions and make decisions. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 14 2015. D EPED C O PY 283 Start Tutorial 1 of this module evaluating your knowledge of the basic computing technique called basic calculation principle. These knowledge and skills will help you understand the permutations of objects. As you go through this lesson, keep in mind the following important question: How does the conclusions and make wise decisions? To answer this, perform each activity that follows. If you are having difficulties, seek help from your teacher and peers. Your teacher has checked your work. A. A close friend invited Anna to his birthday Anna has 4 new blouses (strips, ruffles, long sleeves) and 3 skirts (red, pink and black) in her wardrobe for such occasions. 1. Assuming that any skirt can be paired with any blouse, how many ways can Anna choose her outfit? List the options. 2. How many pairs of blouses and skirts is possible? 3. Show me another way to find the answer 1 in this 1. B. Let's say you secured your bike using a combined lock. Later, you realized that you forgot the 4-digit code. You just remembered that the code contains the digits 1, 3, 4 and 7. 1. List all available codes from the given digits. 2. How many available codes are there? 3. What can you say about your list? Activity 1: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 15 2015. D EPED C O PY 284 Questions: a. How have you judged the different opportunities that have been asked in two situations? What methods do you use? B. What do you list all the options requested? How did you make sure your list was finished? What method(s) did you do to provide an exact number? Why do you think you need to know how many possible ways a particular task can be performed? You will learn how you go through this lesson. Answer these questions. 1. Ten runners join the race. How many possible ways can they be arranged as first, second and third place? 2. If Jun has 12 t-shirts, 6 pairs of trousers, and 3 pairs of shoes, how many options can be dress up for the day? 3. How many ways can Aling Rosa organize 6 potted plants in a row? 4. How many options can be formed from the number 1, 3, 4, 6, 8 and 9 if no repeating of the digits is allowed? Activity 2: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 16 2015. EPED C O PY 285 5. If there are 3 roads from city A to city B and 4 roads from city A to city C, how many ways can you move from city A to city C and back to city A, through city B, without passing through the same road twice? 6. Suppose that there are 12 elected members of the Board of Directors in a given association. How many ways can the president, vice president, secretary and treasurer be selected from the board? 7. How many ways can you put 9 different books on the shelf if there is enough space for only 5 books? 8. You want to order lunch from the school canteen, which offers student meals consisting of 1 cup of rice, 1 meat dish and 1 vegetable dish. How many choices do you have for your food if there are 3 meat meal choices and 2 vegetable meal choices? How many ways can 5 people take care of consecutive shootings? 10. The owner of the dress store has 8 new dresses, which she wants to display in the window. If there are 5 dummies in the screen window, how many ways can she dress them up? Questions: a. How will you find the answer to each question? What kind of principle have you previously learned? B. Show and explain how you responded to each item. Have you been able to determine the exact number of ways to perform each of the tasks or activities described in your activities described in your activities have similarities or are in a way different. from others. How are they different? You will learn how you go through the other sections of this module. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 17 2015. D EPED C O PY 286 Take a look at 10 2 operational situations. Determine whether it is important to perform an entity selection activity or task, layout, or order; i.e. whether a different procedure or agreement means a different outcome. Write your answers on manila paper and be prepared to share them in class. Questions: 1. In which 2 operational situations is it important to choose a procedure or layout? 2. Please substantially give an example to each situation. 3. When performing a specific task, when ordering or arranging is important, what do you call each possible agreement? Do this activity using four number cards with different digits. Follow all the instructions and write down all the answers on a clean sheet of paper. Then fill in the table and answer the following questions. A. Get two number cards using 1 piece at a time. Example: 1 2 ways 2 b. Illustrate or describe each layout. c. Count the number of measures you have taken. 2. a. Arrange cards using both parts at once. B. Illustrate or describe each layout. c. Count the number of measures you have taken using 1 card at a time out of 3 cards given. Activity 4: Activity 3: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 18 2015. EPED C O PY 287 2. A. Arrange the cards using 2 pieces at a time. B. Illustrate or describe each layout. c. Count the number of agreements you have made using 2 cards at a time out of 3 cards given. 3. a. Arrange cards using 3 pieces at a time. B. Illustrate or each agreement. c. Count the number of agreements you have made using all 3 cards at once. C. Get four number cards. 1. Repeat steps B.1 to 3. 2. a. Arrange objects using all 4 units at once. B. Illustrate or describe each layout. c. Count the number of objects (n) Number of objects taken at the same time (r) Number of available features 2 1 2 2 2 3 1 3 3 3 4 4 4 4 4 Questions: a. What do you call each agreement? B. Can you find any model of results? c. Can you think of other ways to find these answers? All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 19 2015. D EPED C O PY 288 How can I find a previous activity? Are you have also set up tasks that are important for layout or ordering. How can permutations help solve real problems or draw conclusions and solutions? You'll find out in another activity. Before you do this, first read and understand some important comments about the restatast, including the examples provided. How do I find objects in rebuilt? Let's say we have 6 different potted plants and we want to organize 4 of them in a row. How much can this be done? We can determine how these plants can be arranged in a row, if we organize only 4 of them at a time. Each possible layout is called a restructure. The restructure of 6 potted plants taken at the same time shall be denoted by P(6, 4), 6P4, P6,4 or 6 4 P Similarly, if there are n objects which will be located at the same time r, it shall be denoted by P(n, r). The restructure of n objects taken at the same time is denoted by P(n, r). In some books it is also denoted by P(n, r). The restructure of n objects taken at the same time r, it shall be denoted by P(n, r). part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 20 2015. D EPED C O PY 289 How do I find the number of restatations of objects taken at the same time? Consider the following illustrations: Example 1. Depending on the 4-letter word READ. How many ways can we organize our emails at 3 at a time? Solution: There are 3 positions to be filled in. We write horizontal signs: \_\_\_\_. On each horizontal mark we write how many choices we have when filling this position. There are 4 choices for the first position. After filling the first position, there are 3 choices left for the second position After completing the first and second positions, there are 2 choices left in the third position. So three entries on the horizontal characters would be 4 3 2 We apply the essential principle of calculation and multiply: 4 4 3 4 2 = 24. Thus, there are 24 possible ways to organize 4 letters read taking 3 of them at once. We also say that 4 read letters taken at 3 years have 24 permutations. One of them is R-E-D. Check this result. Let's take a look at the example above. Remember: n = 4, r = 3. 4 4 3 4 2 = n(n(n - 1)(n - 2) Report that the first factor is n and subsequent factors decrease by 1 each time. Look at the last factor: n - 2 = n - (3 - 1) = n - (r - 1) or n - r + 1. Please also note that there are r-factors in total, starting with example n. 2. The school club has 5 possible choices for president, secretary, treasurer and auditor. Assuming that each of them is qualified in any of these positions, how many ways can 4 officials be elected? Solution: P(5,4) = 5 < 4 < 3 < 2 = 120 ways Number of restated objects taken simultaneously, P(n, r), where  $n \ge r$  are: P(n, r) = n(n-1)(n-2) < 4 < (n - r + 1) All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 21 2015. D EPED C O PY 290 Please note that there are other factors. What principle was the formula derived? Can you now answer the problem earlier? Let's say we have 6 potted plants and want to organize 4 of them in a row. How much can this be done? What if there are 5 objects to be arranged and we organize them all every time? This means that n = 5 and r = 5. Example 3: How many ways can 5 people take care of consecutive shootings? Solution: n = 5, r = 5 P(5,5) = 5  $\triangleleft$  4  $\triangleleft$  3  $\triangleleft$  2  $\triangleleft$  1 (5 factors) = 120 possible photos We used all numbers n = 5 to 1 in the third example. Another way to write 5 4 = 3 2 = 1 is 5! (read as 5 factors) Sounds like, 4! = 4 3 = 2 4! = 24 8! = 8 47 = 6 43 = 2 4! = 24 8! = 8 42 = 2 8! = 8 47 = 6 43 = 2 4! = 2 8! = 8 42 = 2 4! =P(n, r) = n(n - 1)(n - 2) < (n - r + 1) = )! ()!1)(2)... (1) (((rn rnrnnn ) + 1) = )! (rn n + 1) = )! (rn n + 1) = )! ()!1)(2)... (1) (((rn rnrnnn ) + 1) = )! (rn n + 1) = (rn n + 1) = )! (rn n + 1) = (rn n + 1) is, some are identical. Consider these examples. Example 4: Find the number of letters in the word EVEN. Solution: There is a word of 4 letters. Let's say that these letters are different first, then the number of the restructure is P(4,4) = 4!. However, we must take into account that 2 E is similar. We can not distinguish 2 E. How can we NVEE NVEE Can you think about other possible agreements? All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 23 2015. D EPED C O PY 292 These two E are now the same. so the two entries are also the same in each cell. Please note that for each rebuild, for example, E-V-E-N, there are 2, or 2! ways to organize the layout of the two E's without changing the other. Replication is removed by dividing 4! or 24 by ways to organize 2 E, which is 2! Thus, the number of individual or distinctive perstructures of 24 agreements, P, would be: P = (4,4) 2! P = 4! 2 = 24 2 = Example 5 of dividing perstrustates 12. Find the number of letters are different, there are P(10,10) = 10! restructures. However, we need to take into account that 3 S is similar, 3 T are similar, and 2 Is is also similar. 3 S rebuilt is P(3,3) = 3!. 3 T rebuilt is P(3,3) = 3! 2 T restata for P(2,2) = 2! So we have to split 10! up to 3! 2! to remove duplicates. So, P = 10! 3! 2! to remove duplicates. So, P = 10! 3! 2! = 50 400 restats This leads to another rule. The number of dividing buildings, P, n objects are similar, g objects are similar, r objects are similar, and so on, there is A = P = 1... n p g r All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 24 2015. D EPED C O PY 293 Let's now consider the arrangement of objects in a circle, which we call round restructures. Example 6: A. How many ways can 3 people sit around a round table? Solution: n = 3 (a) b) Notice that layout 1-2-3(a) is the same as 2-3-1 and 3-1-2; means that these 3 permutations are only one and the same. Please also note that the 1-3-2, 3-2-1 and 2-1-3 are also the same as shown in point (b). So round permutations. P. of 3 objects are: P = 6 3 = 3! 3 = 2! 1 2 3 1 3 2 All rights reserved: No part of this material may be reproduced or transmitted in any form or by any means. whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 25 2015. D EPED C O PY 294 We can also look at this this way: If there are 3 places around the round table, we can assign one of the persons to a fixed seat and determine the number of ways the other two can be arranged. In this way, we again avoid counting the agreement that has arisen solely as round restructures, P, of 4 objects are: P = 24 4 based on list = 4! 4 = 4 ! $34 \neq = 3$ ! Or simply, P = (n - 1)! = 3! = 6 The restatase of circular objects is P = (n - 1)! = 3! = 6 The restatase of circular objects is P = (n - 1)! = 3! = 6 The restatase of circular objects are: P = 24 4 based on list = 4! 4 = 4 ! $34 \neq = 3$ ! Or simply, P = (n - 1)! = 3! = 6 The restatase of circular objects is P = (n - 1)! = 3! = 3! = 6without the written permission of the DepEd Central Office. First edition, 26 2015. D EPED C O PY 295 Learn more about permutations through these sites. ml ns-permutations through these sites. ml ns-permutations through these sites. section to respond to the submitted activities. Resolve uncertainty in each item and answer the following questions: 1. P(6,6) = 6. P(8, r) = 6.20 2. P(7, r) = 1320 5. P(12, r) = 132restructures? B. What concepts or principles of mathematics have you applied to solve each restatation? c. Have you had difficulty finding answers? What technique or strategy can you come up with to facilitate your solution? How did you find your previous activity? Was it easy? I'm sure he was! Learn from your peers if you have the same answers or strategies for solving. If not, find out why. In other activities, the concept of permutations to solve real-life problems. Activity 5: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 27 2015. D EPED C O PY 296 Fully respond to every permutation problem. 1. The Teacher wants to assign 4 different tasks to his 4 students. How many possible ways can she do this? 2. Three major prizes are threatened in a given General Assembly. How many ways can I get the first, second and third prizes from a box with 120 names? 3. How many different ways can 5 bicycles be parked if there are 7 parking spaces? 4. How many distinctive restructures can I use all the letters of the word ELLIPSES? 5. There are 8 basketball teams vying for the top 4 standings in order to progress to the semifinals. Find the number of available top four teams ratings. 6. How many different ways can 12 people occupy 12 seats in the first mini-theatre queue? 7. Find a number of different ways that 6 families can sit around a round table with 6 chairs. 8. How many 4 digits can be formed from digits 1, 3, 5, 6, 8 and 9 if repetition is not allowed? 9. If there are 10 people and there are only 6 chairs, how many ways can they sit? 10. Find the number of distinguishing perties of the number 348 838 digits. Activity 6: RAFFLE DRAW All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 28 2015. D EPED C O PY 297 Fully respond to every permutation problem. 1. How many different ways can you arrange 8 figurines on the shelf? 2. There are 4 different books in mathematics and 5 different scientific books. How many ways can books be laid out on the shelf if there are no restrictions? b. Books of the same subject must be put together? c. if they are to be arranged alternately? 3. Five couples want their photos taken. How many ways can they take care of in a row if a. couples have to stay together? b. can they stand anywhere? 4. There are 12 people at the dinner meeting. How many ways can a host (one in 12) arrange their quests around the dining table if a century they can sit on any chair? b. 3 people insist on sitting side by side? 5. The master drew a line of numbers on the board and named some points on it. Then the teacher asked the class to list all the rays of the figure. The student answered a total of 30 rays and the teacher said it was correct. How many points has the number been named? How has the activity 7: All Reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 29 2015. D EPED C O PY 298 This chapter discussed the restatature, including a rebuilt with identical objects, circular restructure and its real-life programmes. You can go back to the previous chapters and compare your original ideas about the concept of restata. Have these things been clarified in more detail? Now that you've learned basic ideas about permutations. In this section you are going to think deeper and continue to test your understanding of permutations. After doing this, you should be able to answer an important guestion: How are permutations used to draw conclusions and make wise decisions? Fully answer these guestions. 1. How do I determine whether the situation or problem is related to restructures? 2. Separate the perstructure in general (n objects taken r at the same time), circular restructures, and separate the perstructures (some objects are similar). 3. a. Find the number of n objects in the restatations when they are positive, whole number n.b. Find the number of restatations for n objects when taken at the same time. c. Compare both (a and b). Explain why the answers still make sense. 4. Going back to the combination lock problem on page 285, let's say that the lock was 4 digits 1, 4, 7, 9, but you completely forgot the order in which they come. What are you going to do? How can you apply your knowledge of permutations here? Prepare. Activity 8: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Contral Office. First edition, 30 2015. D EPED C O PY 299 This chapter discussed how you understand permutations and how they are illustrated and used in real life. What new realizations do you have about restructures? How would you combine these realizations with real life? Write a record in the log that describes how much you have a life? Write a record in the restatas and their programs. Also add any subjects to the lesson where you still need explanations, and work with your teacher. Now that you have a deeper understanding of the topic, you are ready to perform the tasks described in the next section. Your goal in this section is to tailor your learning in real life situations. You will be given a practical task that will show your understanding of permutations. Perform these tasks by group. A. Provide 3 examples of real-life problems or situations related to permutatiations. In each example, 1. explain the problem or situation. 2. Solve the problem. 3. Discuss how you can use these sample situations in your particular in the formulation of conclusions and/or decision-making. B. It is at international summits that the main decisions of the world are taken. Let's say that you were generally responsible for seating in an international convention that invited representatives of 12 countries. They are prime ministers and/or presidents of the countries of Canada, China, France, Germany, India, Japan, Libya, Malaysia, the Philippines, South Korea, the USA and the United Kingdom. 1. If the seating position is to be circular, how many seating positions are available? 2. Create your own place plan for these 12 leaders based on your knowledge of their origin. Discuss why you handled them in this way. Activity 10: 9 activities: all rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 31 2015. D EPED C O PY 300 Rubric about problems formulated and solved score descriptors 6 Poses a more complex problem with two or more correct possible solutions and transmits ideas accurately. shows a comprehensive understanding of the relevant concepts and/or processes, and provides explanations if necessary. 5 Poses a more complex problem and communicates ideas accurately, demonstrates a comprehensive understanding of important concepts and/or processes 4 Poses a complex problem and completes all the relevant parts of the solution and accurately transmits ideas, shows a comprehensive understanding of fusion concepts, while overlooking or misunderstood less significant ideas or details 2 Poses a problem and completes some significant parts of the solution and accurately transmits ideas, but shows gaps in theoretical understanding 1 Poses a problem, but shows little understanding, can not create an approach Source : D.O. #73, s. 2012 In this section your task was to provide examples of real situations when illustrating the restructures. SUMMARY / SYNTHESIS This tutorial was about permutations and its application in real situations. The tutorial gave you the opportunity to identify situations that describe restatase and distinguish them from those who ignore it. You have also been given the opportunity to perform practical activities to better understand the topic. You have also been given the opportunity to formulate and solve the problems of permutations and to apply the knowledge to formulate conclusions and make decisions. Your understanding of this lesson as well as other math concepts previously learned will help you learn another topic, combinations. All rights reserved ID: 12355 None of the may be reproduced or transferred in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the Central Office of Deped. First edition, 32 2015. D EPED C O PY 301 Start with lesson 2 of this module by assessing your knowledge of the essential calculation principle and skills will help you understand the combinations that will further help you shape conclusions and make decisions. To do this, do every activity that follows. If you are having difficulties, seek help from your teacher and peers. Your teacher has checked your work. Fix each of the following questions: 1. If your school café offers pork, beef, chicken and fish main course, chop suey, pinakbet, and black beans vegetable dishes, banana and pineapple dessert, and tea, juices, and soft drinks, how many ways can you choose your dish consisting of 1 cup of rice, 1 main course, 1 vegetable dish, 1 drink, and 1 dessert? 2. You were instructed to take responsibility for the audits of the women's parts of the stage game. How many possible ways can you put up your most 5 female members if there were 15 hopes? 3. If ice cream is served in a cone, how many ways can Abby choose her three-flavored ice cream scoop if there are 6 possible flavors? 4. If each card of an Automated Shovel Machine of a particular bank has to have 4 different digits in its secret code, how many different available secret codes can there be? Activity 1: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 33 2015. EPD C O PY 302 5. How many possible restats are the letters of the word PHILIPPINES? 6. How many ways can a group of 6 people sit at a table if 2 of them insist on sitting side by side? 7. How many ways can 4 students sit in the classroom if there are 7 available places? 8. How many ways can 5 English books and 4 math books be placed on the shelf if books of the same subject are to be put together? 9. The family catering business prides itself on its offers for delicious dishes and other food requirements. If you have been one of the employees or key individuals in this business, how can you apply your knowledge of permutation and combination to further improve your business? 10. Due to the huge population of Mapayapa High School, one of the problems encountered is a large crowd through the gate in the early morning and during the afternoon of forgiveness. If you were one of the school administrators, what step can you suggest to solve this problem? A. How have several searched methods been found in each item? What concepts or principles of mathematics do you apply? How have you corrected these concepts or principles? B. Which situations are above restructures? Which one isn't? Why? All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 34 2015. D EPED C O PY 303 Could you find what was needed in every problem? Could you remember and apply different concepts or principles of mathematics to solve every problem? Why do you think it is important to be able to perform such mathematical tasks? You will learn how you go through this lesson. Continue to track tasks or activities and answer the following questions: 1. Specify 5 questions to answer from the 10 questions to answer from the 10 questions test 2. Opening the combined lock 3. Winning in competition 4. Student Affairs Committee 5 forms 7 people's choice. The formation of triangles from 6 different points, which do not have 3. points, is collie 6. For dinner at 7. Drawing of 6 numbers in the lottery, which contains numbers 1 to 45 8. Entering a PIN code 9 (personal identification number) for an ATM card. Choose 3 posters to hang from 6 different posters of 10. For a list of subgroup elements in a set, the list of items in the Which tasks and/or activities referred to above are relevant to the order or agreement? Provide an example illustrating each answer. B. In which tasks/activities does the order matter? Provide an example illustrating each answer. B. In which tasks/activities does the order matter? combinations and vou will learn more about them in other activities. Activity 2: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 35 2015. D EPED C O PY 304 Do this activity using 5 different fruits (mang, guava, banana, pomelo, avocado or any fruit available in your place). Follow all the answers on a clean sheet of paper. Then fill in the table and answer the following questions. A. Get 2 fruits (e.g. mang and banana). 1. a. Choose fruit 1 piece at once. Make all available choices. B. Illustrate or describe each selection. Example: mango bananas a 2 ways c. Count the number of different choices. 2. a. Choose fruits 2 pieces at once. B. Illustrate or describe each selection. c. Count the number of different choices. B. Get 3 fruits. 1. a. Choose fruit 1 piece at once. Make all available choices. B. Illustrate or describe each selection. c. Count the different choices you made using Object 1 at a time of 3 fruits at once. B. Illustrate or describe each selection. c. Count the number of your choices using 2 objects at once from 3 to 3 Fruit. 3. a. Select 3 fruits at once. B. Illustrate or describe each selection. c. Count the number of choices you have made using all 3 fruits at once. C. Get 4 fruits. 1. Repeat the same procedure for 5. fruits. Activity 3: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 36 2015. D EPED C O PY 305 Results: Number of objects (n) Number of objects taken at the same time (r) Number of available choices 2122333344443445555572. Provide an example to support your reply (1). 3. What do you call every unique choice? 4. Can you think of other ways to find these answers? How did you find your previous activity? Are you ready to learn about combinations? From the activity that you have performed, you have set up tasks that include an important layout or order (restatasy) and those that are not in order (combinations). You have recalled the essential principle of calculation and rebuilding, which are essential concepts for understanding combinations. In the next section of this learning module, keep an important guestion in mind: How can the concept of combinations. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 37 2015. D EPED C O PY 306 Let's say that your teacher has appointed you to be the head of your project team. You were given the freedom to choose 4 of your classmates to be your group mates. If you choose Aira, Belle, Charlie and Dave, is it any difference if you choose instead Charlie, Aira, Dave, and Belle? Of course not, because the list talks about the same people. Every choice you might be able to make is called a combination. On the other hand, if you choose Aira, Belle, Dave and Ellen, now this is another combination, and it differs from the first combination. The number of r combinations of objects taken at the same time is denoted by C(n, r), nCr, n rC 🗐 🛱 14 🙊 r n. In this learning material, we will use the first notation. How do I find the number of combinations of n objects taken at the same time? Let's say now that you are asked to form different triangles from 4 points plotted, say, A, B, C, and D, of which none are colliear. We can see that abc is the same as BCA and CBA. In the same way BCD is the same as CBD and DBC. This is another illustration of the combination. The different triangles that can be formed are ABC, ABD, BCD and CDA. So, there are 4 combinations. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 38 2015. D EPED C O PY 307 How can we find the number of combinations more systematically? Consider this: If the order of letters is important. we have the following options: ABC ABD BCD CDA ADB ADB BDC CAD BCA CDB DAC BAC BAD CBD DCA CAB DBA DBC CBA DAB DCB ACD Different order number 4 vertices taken 3 simultaneously is given P(4,3) = 4! (4 3)! three tops of it in any order, then if we take a closer look, we see that all triangles in the same column are identical. Thus, the actual number of combinations is C(4,3) = 24 6 or ()4, 6 3P or (3 4, ! 3)P. (Equation 1) Note that 6 or 3! There are ways to organize 3 objects taken all at once. We are divided by 3! remove duplicates. Note: There are 4 objects (A,B,C,D) Thus, the equation (1) becomes C(n,r) = n,P(r) r! . Because P(n, r) = )! (8 n - , then C(n, r) = n,P(r) r! = !! (r rn n = )! (! rna n - . All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 39 2015. D EPED C O PY 308 Keep in mind: The combination of objects taken at the same time is: C(n, r) = !! n r (n r), n ≥ r ≥ 0 Example 1. How many of the 8 people can form a committee of 4 members? Solution 1: (using the formula) n = 8, r = 4 C(n,r) = !()! n r n r coefficients N rebuilding of objects taken r at the time when the r objects are rebuilt All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. Edition, 40 2015. EPED C O PY combinations of materials and non-combinations ns-permutation.html anechka/math107/lecture 13.pdf All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 41 2015. D EPED C O PY 310 Your goal in this section is to apply the basic concepts of combinations. Use mathematical ideas and examples in the previous section to respond to the submitted activities. Take these situations out. Then answer the following questions: 1. Identify the three best winners of Science Quiz Bee 2. Forming lines of six points, of which there are no three, is collinear 3. Formation of triangles from 7 points, not three of which is collinear 4. Four people pose for photos at 5. Collect jigsaw puzzle 6. Specify 2 household chores that will be done before dinner at 7pm. 5 basketball players out of 10 team members for different positions 8. Choosing three of your classmates to attend your party at 9pm. Picking 6 balls from 12 balls bag 10. Formation of 5 members of the 20-man committee Questions: a. In the above paragraphs, indicate which situations illustrate the restructure and which illustrate the combination. B. How have you distinguished situations involving permutation from situations involving a combination? Could you distinguish between tasks and/or restated situations and tasks and/or situations related to the combination? Other activities will give you more exercise to improve your computing skills. Activity 4: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 42 2015. D EPED C O PY 311 Find unknown for each item. 1.C 8,3 = 6. C(10, r) = 120 2. C(n, 4) = 15,7. C(n, 2) = 78 3. C(8, r) = 28 8. C(11, r) = 165 4. C(9, 9) = 9. C(8,6) = 5. C(n, 3) 35 10. C(14,10) How to find find Was it easy? I think it was! Go to other activities to apply your knowledge of combinations in real situations. Fully solve these problems. (Select a partner.) 1. If there are 12 teams in a basketball tournament and each team has to play every other team in eliminations, how many elimination games will there be? 2. If there are 7 different points in the plane, of which there are no three, are colliear, how many different polygons can be formed? 3. How many different polygons can be formed? 3. How many different polygons can be formed? 3. How many different polygons can be formed? 4. 10 items in the math problem solving test, how many ways can you choose 5 to solve problems? 5. Problem number 4, how many ways can you choose 5 questions if you need to answer the question number 10? 6. How many ways can a committee of 5 juniors and 7 seniors in committee? 7. Out of a population of 50 households, how many ways can a researcher choose a size 10 sample? 8. The box contains 5 red balls, 7 green balls and 6 yellow balls. How many ways can you choose 6 balls if there should be 2 balls of each color? Activities: all rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition. 43 2015. EPED C O PY 312 9. Of the 7 biology books and 6 chemical books, how many ways can you choose 2 Biology and 2 Chemical Books are equally needed? 10. Mrs Rivera's business is the rental and sale of bathrobes. One day, she decided that she would show her store window 10 of the latest gowns to attract customers. If she only had 5 dummies and planned to change the set of bathrobes every 2 days, how many days would she have to pass before she ran out of the new set of screens? Have you succeeded in the operation? I'm sure you did! Go to other activities to see if you can solve this set of perstructures and combined problems. Solve these restructure and combined problems. 1. How many ways can you organize 5 math books of the same subject are kept together? 2. How many ways can 6 students in a 6-seat gueue if 2 students insist on sitting side by side? 3. In the gathering, the host ensures that each guest shakes hands with everyone else. If there are 25 guests, how many hand clicks will be done? Activity 7: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 44 2015. EPED C O PY 313 4. Let's say you're a sari-sari store owner and want to put 12 pieces of canned goods on the shelf in a row. If there are 3 identical meat loaf, 4 identical meat lo different ways can you show these goods? 5. Soloist is auditioning for music play. If she has to sing any of the 7 ready-made songs in three, how many ways can she make her choice? 6. Each participating group must perform 3 types of dances in the dance competition. If there are 4 choices for ballroom dancing, 8 choices for foreign dance, and 5 choices for hip-hop, how many possible ways can a dance group choose their own piece? 7. If 3 balls are accidentally taken from a jar containing 6 red balls and 8 green balls, how many possible ways can it happen that at least 2 selected balls are green? 8. The number line contains 10 set points. How many possible rays can be drawn using these points? 9. You move to a new house. You have a collection of books, but you can not take them all with you. How many ways can you choose 7 books on the shelf, if there is enough space for only 5 books? 10. Enzo's Pizza Parlor has seven different surfaces where the customer can order any number of these fillings. If you had dinner at the said pizza parlor, with how many possible toppings can you actually order your responded correctly to the exercises. This section discussed a combination, including his real-life programs. You were also able to separate the combination from the perbuilding. Now that you've learned basic ideas about the combination, let's deepen our understanding and study the next chapter. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 45 2015. D EPED C O PY 314 In this section you are going to think deeper and continue to test your understanding of combinations. After doing this activity, you should be able to answer an important guestion: How are combinations used to draw conclusions and make wise decisions? Fully answer these guestions. 1. How do I determine whether the situation is related to combinations? 2. To find the total number of 7 points, of which there are no three, joy answered: C(7,3) = !3!4 !4567 + = 123 567 + = 35 different polygons Is the joy right? Please substantiily confirm your answer. 3. (a) How many of the 12 members of the Board of Directors (BOD) can be elected from 12 parent candidates if the BDS is to be 8 parents? b) With 12 members selected, how many of them can elect 7 top positions (President, Vice President, etc.)? 4. DAMATH is a board game that includes mathematical skills in the Philippines Dama. The DAMATH tournament has 28 participants divided into 7 groups. Each group advance to the semi-finals, where they again compete against each other. The five players with the most wins go to the finals stage and play against each other. Let's say there are no connections. A. What is the total number of games to be played in the final round? Activity 8: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 46 2015, D EPED C O PY 315 c. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi-finalists come up? d. How many possible ways can the five best semi many matches will be played at all? This section discussed your understanding of combinations? How can these learning methods be applied in real life? Write a record in your journal describing how much you've learned about combinations and how they can be applied in real life. Also add parts of the lesson that are still confusing, if any. Work with these difficulties with your teacher. Now that you have a deeper understanding of the topic, you are ready to perform the tasks described in the next section. Your goal in this section is to tailor your learning in real life situations. You will be given a practical task that requires you to show your understanding of the combinations. In each situation 1. to formulate the problem. 2. Solve the problem. 3. Explain how this particular problem can help you formulate conclusions and/or make decisions. Activity 10: 9 activities: all rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 47 2015. D EPED C O PY 316 Rubric on problems formulated and solved score Descriptors 6 Poses a more complex problem with 2 or more correct possible solutions and accurately transmits ideas, shows a comprehensive understanding of the relevant concepts and/or processes and provides explanations if necessary. 5 Poses a more complex problem and completes all significant parts of the solution and accurately communicates ideas, shows a comprehensive fusion with related concepts and/or processes 3 robust a comprehensive fusion with related concepts and/or processes 3 robust a complete solution and accurately communicates ideas, shows a comprehensive fusion with related concepts and/or processes 3 robust a complete solution and accurately communicates ideas a complex problem and completes all the relevant parts of the solution and accurately communicates ideas a complex problem and completes all the relevant parts of the solution and accurately communicates ideas a complex problem and complex processes a complex proceses a complex processes a complex processes Poses a complex problem and completes the most important parts of the solution and accurately communicates ideas , demonstrates the perception of the basic concepts, while verse or misunderstanding less significant ideas or details 2 Poses a problem and completes some significant parts of the solution and accurately transmits ideas, but shows the gaps in theoretical understanding 1 Poses a problem, but shows little understanding, can not create an approach Source: D.O. #73, s. 2012 SUMMARY / SYNTHESIS describe combinations and distinguish them from those who do not. You have also been given the opportunity to do practical activities to better understand the topic, formulate related real-life problems. Your understanding of this lesson, together with other previously learned concepts of mathematics, will help you understand the next lesson, the probability. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 48 2015, D EPED C O PY 317 GLOSSARY Cyclic restatatures of N objects P is given around the circle P = (n - 1)!. Combinations - The number of options from a collection when the order is not important. The number of combinations of objects taken at the same time r is C(n, r) = !! (rrn n - , n  $\geq$  see Dividing rebuilds are the restructures of a set of objects, where p is similar, r is similar, r is similar, etc., p = !...!! rqp n . The basic principle of calculation is that if )! (rn n - , n  $\geq$  r. n-Factorial – positive numbers n and all positive positives lower than n.n! = n(n(n - 1)(n - 2) ... (3) (2) (1). LINKS AND WEB LINKS USED IN THIS MODULE: Links: Bennett, J. & amp; Chard, D., et al. (2005). Pre-Algebra. Texas: Holt, Rinehart and Winston. Bhowal, M. & amp; Barua, P. (2008). Stats: 2nd ed. New Delhi: Kamal Jagasia. Leithold, L. (2002). College algebra and trigonometry. Singapore: Pearson Education Asia Pte. Ltd. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or - electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 49 2015. EPED C O PY 318 McCune, S. (2010). Statistics. New York: Mc-Graw-Hill Companies, Inc., Kelly, W. and Donnelly, R. (2009). Humungous book of statistical problems. New York: Mc-Graw-Hill Companies, Inc., Kelly, W. and Donnelly, R. (2009). 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Jonathan Powell. www.bbc.co.uk/news/magazine-18237721 27 February 2014 Circular Restata. Weisstein, Eric W. From Mathworld - Wolfram's online resource. 26 February 2014 Combinations and are available on February 26, 2014. Do order matter- combinations and not combinations. Brent Hanneson. September 27, 2013. Www. beatthegmat.com/mba/2013/09/27/does-order-matter- combinations and not combinations and not combinations. Brent Hanneson. September 27, 2014. Www. beatthegmat.com/mba/2013/09/27/does-order-matter- combinations and not combinations. Brent Hanneson. September 27, 2013. Www. beatthegmat.com/mba/2013/09/27/does-order-matter- combinations. Brent Hanneson. September 27, 2014. Www. Beatthegmat.com/mba/2013/09/27/does-order-matter- combinations. Brent Hanneson. Septem The basic principle of calculation and permutations. . Opened on 25 February 2014 The importance of permutations and combinations in modern society. Valerie Hansen. Nov.7, 2005. Opened February 26, 2014 All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 50 2015. D EPED C O PY 319 Introduction It should be noted that science, which began with the games of chance, should have become the most important object of human knowledge. The most important issues in life are, for the most part, really just a problem of probability. Pierre Simon de Laplace Perhaps, you are familiar with the randomness of games, such as lotto. You have also learned that the probability theory is not just a random game? Probability is very useful in many fields of practical and important scientific, engineering, economic and social sciences. Why do you think the probability study is so important for scientific and technological progress? By studying this module, you will learn the reasons. 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reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 51 2015. EPD C PY 320 II. LESSONS AND COVERAGE Lesson 1 – Probability of complex events 🗆 Union and intersection of events 🗆 Mutually incompatible and mutually exclusive events Lesson 2 – Probability of independent events Lesson 3 – Conditional probability in these lessons you will learn: Lesson 1 🗆 Events and intersections 🗅 Illustrates the likelihood of a union of two events and the intersection of events and intersections and mutually incompatible events Lesson 2 🗆 illustrates independent and dependent events Lesson 3 🗆 Identify relative probabilities of independent events Lesson 3 🗆 Identify relative probability and intersection of events Probability of independent events The relative probability of conflicting and conflicting events All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 52 2015. EPED C O PY 321 III. PRE-ASSESSMENT Part I: Multiple choices Answer all these guestions best, what you can do. As far as possible, please provide your decision. Pay attention to items that you could not answer correctly, and find out the correct answer when you go through this module. 1. Brian likes to wear a colored shirt. He has 10 T-shirts in the closet. Three of them are blue, four are of different shades of red, and the rest are of mixed or different colors. What's the chance he'll wear a blue or red shirt? A. 7 4 10 10 S C. 3 7 10 10 S C. 3 7 10 10 S D 7 4 10 10 – 2. On the right side, the spinner is twisted. What is the probability of rotation that results in a number of less than 4 or a number? A. 1 4 B. 3 8 C. 4 8 D. 5 8 3. Jody has four powers of juice - one orange power, one pineapple, one from calamansi and one from guyabano. She chooses calamansi, what is the probability that she also prefers pineapple? A. 7 8 B. 3 4 C. 2 3 D. 3 8 4. A person throws the correct coin eight times and watches if the toss gives his head (H) or tail (T). Which of these sequences brings the head (H) to his next toss? I) T T (II) H H T H T H H A. I C. Neither I nor II B.II D. Or I or II All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 53 2015. EPED C O PY 322 5. The baby has 5 blocks in the box. One block is red, one yellow, one green, one blue, and the other black. The baby pulls out the block is red, one yellow, one green, one blue, and the other black. The baby pulls out the block is red, one yellow, one green, one blue, and the other black. he's bored and crawls away, what is the chance that 4 blocks are selected all of the same color? A, 455 B, 415 C, 445 D, 4256. The box contains 16 red balls and an unknown number of blue balls. One ball is drawn from each box. The probability that both balls are of the same color is 0.44. How many blue balls are in the second box? A. 4 B. 20 C. 24 D. 44 7. The family has two children. Let's say that the birth of each child is an independent event that it is just as likely that it will be a boy or a girl. Let b mark the event that the family has no more than one girl. Which of the further must be correct about events. D.C and D are independent events. B.C occurs in view of the fact that D does not occur. C.C and D are conflicting events. B.C and D are independent events. B.C and D are conflicting events. B.C and D are con randomly selected from the population, what is the probability that the first person likes to eat pizza, and the second - not? A. 0,42 + (1 – 0,42) D. 0,42 (1 – 0,42 child is born, the probability that he is a boy is 0.5, independent of all other times. Find the probability that the couple has at least two girls. A. 1 2 B. 5 16 C. 5 8 D. 4 15 All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 54 2015. D EPED C O PY 323 10. Samples of some street foods have been taken and tested for the presence of disease-causing bacteria or harmful chemicals. A random sample of 200 different types of street foods was investigated according to how they were prepared. The following table shows: Number of bacterial foods Number of foods with harmful chemicals Only number of foods with bacteria and harmful chemicals Only number of foods 105 C. 50 142 D. 68 142 b.) What is the probability that randomly selected food is both fried and contains harmful chemicals? A. 40 200 B. 58 105 C. 16 142 D. 8 58 11. The group's study of sports viewing habits over the past year revealed the following information: i. 28% watched Football II. 29% watched basketball and tennis all 10% watched football and tennis vii. 8% watched football and tennis vii. 8% watched basketball iii. 19% watched basketball and tennis viewing habits over the past year revealed the following information: i. 28% watched potball and tennis viewing habits over the past year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball year revealed the following information: i. 28% watched basketball y three sports last year? A. 24 B. 36 36 41 D. 52 All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 55 2015. D EPED C O PY 324 12. The probability that visiting a school clinic is not for dental reasons or for medical reasons or for medical reasons, and 40% - for dental reasons, and 40% - for dental and medical reasons, and 40% - for dental reasons or for medical reasons, and 40% - for dental reasons. What is the probability that a visit to a school clinic is for dental reasons, and 40% - for dental reasons or for medical reasons, and 40% - for dental reasons, and 40% - f medical records of a group of 937 men who died in 1999 and find that 210 men died from causes related to heart disease. In addition, 312 of the 937 men had at least one father with heart disease. In addition, 312 of the 937 men had at least one father with heart disease. died of causes related to heart disease, given that none of his parents had a heart disease. A. 102 625 B. 108 625 C. 312 625 D. 414 625 14. There are four batteries and one of them is defective. The two must be selected at random so that they can be used on a given day. Find the probability that the second selected battery is not defective, given that the first one was not faulty. A. 2 3 B. 1 4 C. 1 3 D. 1 2 15-16: a sample of 150 plastic tubes for impact resistance and shock resistance and shock resistance and shock resistance tests was selected. randomly. What is the probability that it has high impact resistance, given that it has high scratch resistance? A. 125 137 C. 137 150 D. 132 150 All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 56 2015. D EPED C O PY 325 16. What are the probability that it has high scratch resistance? A. 125 137 C. 137 150 D. 132 150 17. An the insurance agent offers a health plan to the employees of a large undertaking. Under this plan, individual employees can choose exactly two additional A, B and C scopes, or they cannot select any additional coverage. The proportions of the employees of the company who choose A, B and C insurance are 14, 13 and 5 12 respectively. Set up the probability that the randomly selected employee will not select any additional coverage. A. 7 9 B. 1 2 C. 47 144 D. 9 144 18. There are 24 dolphins in the ocean park. The warden marks 6 of them with small chips and returns them to the probability that exactly two selected dolphins are marked. Mark. 2 3 5 6 18 24 C B. 3 2 5 6 18 24 C. 3 2 5 6 18 24 P P 2 3 5 6 18 24 P P b.) What were your assumptions in part (a)? Please substantiily confirm your answer. Part II: Troubleshooting Read and understand the situations below to fix the problem. Show me the whole solution. 19. Varsity Try-Out. Let's say you apply as a tennis varsity player to a team. To be accepted, you need to play with the team's good player (G) and top player (G) and top player (T) in three games and win against both G and T in two consecutive games. You have to choose? Why? All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 57 2015. EPED C O PY 326 20. Food preference study. The school conducts a survey of the choice of food for its pupils at lunch and receives the following information: i. All students want to have at least one viand. ii. 70% of students want to have more than one viand iii. 20% of students want to have more than one viand. iv. Of those students who want to have more than one viand and that there is a fish. Show me your judgment. IV. LEARNING OBJECTIVES AND OBJECTIVES After passing this module, you should be able to demonstrate an understanding of the basic concepts of the probability. With these plausible knowledge and skills, you should be able to use probability to formulate conclusions and make decisions. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 58 2015. D EPED C O PY 327 Troubleshooting of the number rubric 1 2 3 4 Troubleshooting No strategy is selected or the chosen strategy will not solve the solution. There is little or no evidence that some relevant previous knowledge could have been supported, which indicates some relevant involvement in the task. The correct policy is selected based on the mathematical situation of the task. Planning or monitoring of the strategy is obvious. There is evidence to support the correct answer. An effective strategy is chosen and progress towards a solution is assessed. If necessary, changes to the strategies are being considered. Evidence of the mathematical analysis of the situation extended extension of the Involved. Note: At this level, the student must reach the correct answer. The reasoning arguments are based on a specific mathematical basis. There is no justification for the correct motives or motives. The arguments are constructed on a proper mathematical basis. There is a systematic approach and/or justification for the correct arguments. The decisions are based on the use of demersal arguments and formal evidence may be provided. Evidence shall be used to support and support an formal mathematical terms or symbolic notions. A certain approach shall be understood through oral and/or written reports and explanations. Attempts are being made to use the formal language of mathematics. One formal term of mathematics or symbolic notation is obvious. The transmission of the method is evident through methodical organized, consistent, sequence and marked response. The formal language of mathematics is used to share and explain ideas. At least two official mathematical terms or symbolic notations are obvious in any combination. The communication of the argument is supported by mathematical properties. The formal language of mathematics and symbolic notation are used to consolidate the thinking of mathematical terms or symbolic notationship is mathematic incorrect or lacks contextual importance. Mathematical connection. Appropriate contexts have been identified that link both the concepts of mathematics more deeply. Some examples may include one or more of the following examples: testing and accepting or rejecting hypotheses as an explanation has been attempted. Attempts are being made to create mathematical representation to reset the show and report problems, but it is not accurate. A valid and accurate mathematical view is constructed and improved to solve problems or portray solutions. The right mathematical-thematic image is designed to analyze relationships, expand thinking and explain or interpret a phenomenon. All rights reserved ID: 12355 No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 59 2015. D EPED C O PY 328 Start lesson 1 of this module by evaluating your knowledge and skills about the various concepts of mathematics related to computational methods and the probability of simple events, as well as you have previously studied. These knowledge and skills are important to understand the likelihood of complex events. As you go through this lesson, think about this guestion, Why do you think there is a probability study important for making decisions in real life? Consider the situation below. To answer the questions below, use your knowledge of probability. 1. Death is rolled once. Find the probability of getting a. a. 5. b. a. 6. c. Odd number. 2. The box contains 3 red balls, 5 yellow balls and 2 blue balls. If the ball is taken randomly from the box, what chance is the ball chosen by a century of yellow ball? b. Red ball? The above activities helped you remember your knowledge of the likelihood of simple events. If you roll to die, the number that you come up with can be 1, 2, 3, 4, 5 or 6. When death is rolled, it can also come down on one face like any other. Therefore, the probability of getting 5 is one of 6. Symbol, we use P (get 5) = 1 6. Always remember that 1 6 is likely to appear on any of the faces. Activity 1: All rights reserved. No part of this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 60 2015. D EPED C O PY 329 Activities such as die, coin tossing or random ball selection from a box that can be repeated over and over again and which have clearly defined results. A set of all experiment results is called a sample space. An event is a subset of a space sample. Simple events: Consider rolling to die. A. As number 5 is called a simple event. B. Getting a 6 is also a simple event. What about the event to get the odd number? Probability of event E expressed in P(E) is expressed in the 🕮 ways in which the event can occur in the number of possible results P E or < Image to this material may be reproduced or transmitted in any form or by any means, whether electronic or mechanical, including copying, without the written permission of the DepEd Central Office. First edition, 2015 2015.

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