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MDM4U Unit 5: Probability

#### 5.4 Probability Involving Counting Techniques (Day 2)

Example 1: To win the grand prize in a fundraising draw, you need to match seven numbers from 1 to 15, without regard to order. combinations

a) What is the probability of winning the grand prize?

The grand prize?
$$P(A) = \frac{1}{6435}$$

b) What is the probability of winning second prize, which requires matching six of the seven winning numbers?

n(S) = 6435

Example 2: A shipment of 12 calculators contains 3 that are defective. A customer buys 5 of the calculators. What is the probability that:

a) All 5 are working?

b) 3 are working but 2 are defective?

b) 3 are working but 2 are defective?
$$B = 3 \text{ working}, 2 \text{ defective}$$

$$N(B) = {}_{9}C_{3} \times {}_{3}C_{2} = 252$$

$$P(B) = 252 = {}_{2}2 \times {}_{3}C_{2} = 252$$

Example 3: Four people are needed to help at a party. Determine the probability that you and 2 of your 3 friends will be chosen for this job if the four people are randomly selected from a

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### MDM4U Unit 5: Probability

Example 4: Ten juniors and twelve seniors decide to rent a 16-passenger van and a 6-passenger car to drive to a concert in a nearby city. If the group is distributed randomly between the vehicles, what is the probability that:

a) There are no juniors in the car?

$$P(A) = \frac{924}{74613} = \frac{4}{323}$$
or 1.2%

b) There are exactly 5 juniors in the car?
$$B = 5 \text{ juniors in car}$$

$$n(3) = {}_{10}C_5 \times {}_{12}C_1 \times {}_{16}C_16$$

$$= 3024$$

$$P(3) = \frac{3024}{74613} = \frac{144}{3553} \text{ or}$$
$$= 4.17.$$

c) Steve (junior) and Sally (senior) are both in the van?
$$C = 5 + eve \text{ and Sally in van} \qquad P(C) = 38760$$

$$R(C) = 20 + 4613$$

$$R(C) = 20 + 4613$$

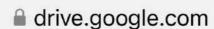
d) Either Steve (junior) or Sally (senior) are in the van (but not both)

D = either Steve or Sally in van

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MDM4U Unit 5: Probability







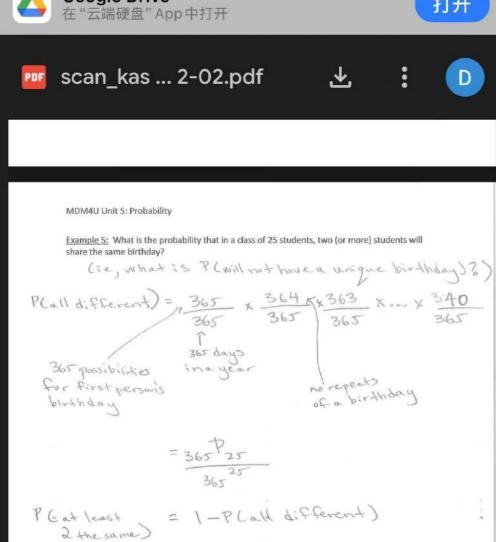












P(at least = 1-P(alt different)  
= 1- 
$$\frac{365}{365}$$
  
= 1-0.4313  
= 0.5687

of the probability that at least two students will have the same birthday is 56.87%.

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