

Unit 1 study guide answer key

Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ $A = \{1, 2, 4, 6\}$

$B = \{3, 4, 5, 6\}$ $C = \{2, 3, 7, 8\}$

1 $A \cup B = \{1, 2, 3, 4, 5, 6\}$

$A = \{1, 2, 4, 6\}$

$B = \{3, 4, 5, 6\}$

2 $(A \cap B) \cup C = \{2, 3, 4, 6, 7, 8\}$ $A \cap B = \{4, 6\}$ $A = \{1, 2, 4, 6\}$

$B = \{3, 4, 5, 6\}$

$C = \{2, 3, 7, 8\}$

$A \cap B = \{4, 6\}$

3 100 people were interviewed

32 liked Dominos

47 liked Papa John's

62 liked Pizza Hut

17 liked Dominos & Pizza Hut

20 liked Pizza Hut & Papa John's

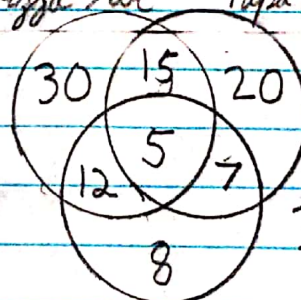
5 liked all 3 Restaurants

A) How many people liked Dominos and Papa John's, but not Pizza Hut? 35

B) How many liked none? 3

C) How many liked Pizza Hut, but not Dominos or Papa John's? 30

Pizza Hut Papa John's



3 liked none

Dominos

4 If $n(A)=20$, $n(B)=12$ and $n(A \cap B)=5$, then find $n(A \cup B)$.

$$n(A \cup B) = 20 - 5 + 12 = 27$$

5 If 20 people enter a room with 25 chairs, how many ways can they be seated?

$${}_{25}P_{20} = 1.2926E23$$

6 Find the # of distinguishable permutations that can be formed from letters of words:

A) MATHEMATICS 109600 unique letters 8
B) BANANA 15 unique letters 3

$$109600 = ({}_{8}P_{8}) + ({}_{8}P_{7}) + ({}_{8}P_{6}) + ({}_{8}P_{5}) + ({}_{8}P_{4}) + ({}_{8}P_{3}) + ({}_{8}P_{2}) + ({}_{8}P_{1})$$

$$({}_{3}P_{3}) + ({}_{3}P_{2}) + ({}_{3}P_{1}) = 15$$

7 In order to get a 100% on math homework, 20 of 30 questions must be answered correctly. How many ways can this be achieved?

$$({}_{30}C_{20}) + ({}_{30}C_{21}) + ({}_{30}C_{22}) + ({}_{30}C_{23}) + ({}_{30}C_{24}) + ({}_{30}C_{25}) + ({}_{30}C_{26}) + ({}_{30}C_{27}) + ({}_{30}C_{28}) + ({}_{30}C_{29}) + ({}_{30}C_{30}) = 53009102$$

8) An exam consists of 25 multiple choice questions

a) How many ways can a student score a 76?
(answer 19 out of 25 correctly)

b) How many ways can a student score at least a 76?
(answer 19, 20, 21, 22, 23, 24, or 25 correctly)

$$a) C(25, 19) = \boxed{177,100}$$

$$b) C(25, 19) + C(25, 20) + C(25, 21) + C(25, 22) + C(25, 23) + C(25, 24) + C(25, 25) = \boxed{245,506}$$

9) Subway offers a combo, which consists of a sandwich, drink, & chips. If there are 6 different sandwiches, 5 different drinks, & 3 different chips available, how many different combos are possible?

$$6 \cdot 5 \cdot 3 = \boxed{90}$$

10) Someone forgot the code to their bike lock. The lock can be opened with a 4 digit code, where each digit is a letter A, B, C, D, E, or F.

a) how many codes are possible if each digit can be used more than once?

b) how many codes are possible if each digit may only be used once

$$a) 6 \cdot 6 \cdot 6 = \boxed{216}$$

$$b) 6 \cdot 5 \cdot 4 = \boxed{120}$$

11) Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5, 6, 7\}$,
 $B = \{2, 4, 5, 7, 8\}$ Find $A \cap B^c$

$$A = \{1, 3, 5, 6, 7\} \quad B^c = \{1, 3, 6, 9, 10\}$$

$$\boxed{A \cap B^c = \{1, 3, 6\}}$$

12) Let $M = \{3, 6, 8\}$ $N = \{4, 8, 12\}$ $P = \{3, 4, 7\}$

a) $M \cup (N \cap P)$

b) $M \cap (N \cup P)$

a) $N \cap P = \{4\}$ $M = \{3, 6, 8\}$ $\boxed{M \cup (N \cap P) = \{3, 4, 6, 8\}}$

b) $N \cup P = \{3, 4, 7, 8, 12\}$ $M = \{3, 6, 8\}$

$$\boxed{M \cap (N \cup P) = \{3, 8\}}$$