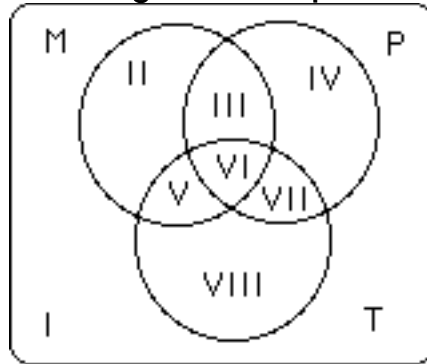


(use this diagram for questions 1 - 3)



$M = \{\text{students taking Mathematics}\}$
 $P = \{\text{students taking Philosophy}\}$
 $T = \{\text{students taking Theology}\}$

1. The set of all students taking only Mathematics is
 - a. II
 - b. M
 - c. $II \cup III$
 - d. V
 - e. $III \cup V \cup VI$

2. The set of all students who are taking neither Mathematics nor Theology is
 - a. $(V \cup VI)'$
 - b. I
 - c. P
 - d. $I \cup IV$
 - e. $I \cup P$

3. The set of students represented by region VII take
 - a. Philosophy or Theology
 - b. Philosophy and Theology only
 - c. Theology only
 - d. Philosophy and Theology
 - e. Mathematics or Philosophy

4. Consider the following sets:

$$U = \{a, b, c, d, e, f, g\}$$

$$A = \{b, d, f\}$$

$$B = \{a, b, c, e\}$$

Which of the following is true?

a. $A \cup B = U$

b. $A \cap B = \emptyset$

c. $A \cap B = U$

d. A is subset of $A \cap B$

e. $A \cap B$ is a subset of A

5. A bakery makes 200 eclairs a day. 120 have chocolate frosting, 90 have custard filling and 30 have both. How many eclairs have neither custard filling nor chocolate frosting?

a. 0

b. 10

c. 20

d. 30 e. 40

6. If $n(S) = 7$, $n(T) = 4$, $n(S \cup T) = 8$, what is $n(S \cap T')$?

a) 1

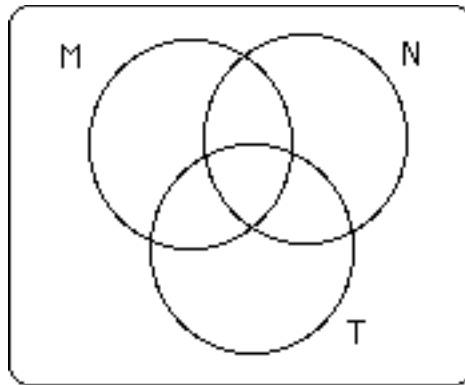
b) 2

c) 3

d) 4

e) 5

7.



M = news from Magazines
N = news from Newspapers
T news from Television

45 people were asked about how they get their news:

25 said from Magazines. 14 said Magazines and Newspapers

25 said from Newspapers 16 said Newspapers and Television

31 said from Television 10 said all three

18 said Magazines and Television

How many people use none of the media?

- a. 0 b. 2 c. 4 d. 5 e. 6

8. An ice cream shop serves 10 flavors of ice cream and 8 different drinks. A person chooses a flavor of ice cream and a drink. How many different choices can they make?

- a. 80 b. 18 c. 10 d. 8 e. 2

9. There are 10 different numerals. How many different 3-digit numbers can be formed when repetition of numerals is allowed?

- a) 10^3 b) $10!$ c) $P(10,3)$ d) $C(10, 3)$ e) $P(10,6)$

10. How many different 3-digit numbers can be formed when repetition of numerals is not allowed?

- a) 10^3 b) $10!$ c) $P(10, 3)$ d) $C(10, 3)$ e) $P(10,6)$

11. In how many different ways can the letters A, B, C, D, E, F be arranged if repetition of letters is not allowed and if none of the letters B, C, D, and E can be the first or the last letter in any of the arrangements?

- a. 24 b. 48 c. 720 d. 14 e. 40

12. A coin is tossed 5 times and the sequence of heads and tails is observed. How many outcomes have 3 or more tails?

- a. 16 b. $C(5,3)$ c. 5 d. 2^5 e. 60

In problems 13 and 14 assume that a jar contains 15 numbered pool balls;

8 of the balls are solid and 7 are striped. A sample of 6 balls is selected.

13. How many samples contain only solid balls?

- a) $P(7,6)$ b) $C(7,6)$ c) $8 \cdot 6$ d) $P(8,6)$ e) $C(8,6)$

14. How many samples contain 2 solid balls and 4 striped balls?

- a) $C(7, 2) \cdot C(8, 4)$ b) $C(7, 4) \cdot C(8,2)$ c) $C(8,2) \cdot 7 \cdot 6 \cdot 5 \cdot 4$
4
- d) $C(7, 4) \cdot 8$ e) $C(15, 6)$

15. A facilitator and a secretary must be chosen for a committee of 20 people. Everyone is eligible for a position, but no one is allowed to hold both positions. In how many ways can these positions be filled?

- a. 20 b. 40 c. 190 d. 380 e. 400

16. Calculate $P(12,3)$.

- a. $\frac{12!}{3!}$ b. 36 c. 132 d. 220 e. 1320

17. Calculate $\binom{200}{198}$

- a. 19900 b. $\frac{200!}{198!}$ c. $200 \cdot 198$ d. 39800 e. 398

18. The coefficient of the term x^2y^{10} in the binomial expansion of $(x + y)^{12}$ is

- (a) 12 (b) 20 (c) 44 (d) 66 (e) 132

19. In how many ways can a selection of one or more cards can be made from a hand of 5 cards?

- a. 63 b. 31 c. 21 d. 15 e. 5

20. An ice cream sundae can be made with a choice of one of 8 flavors of ice cream and a choice of as many of 5 toppings as desired. How many different sundaes can be made?

- (a) 256 (b) 40 (c) 13 (d) 1280 (e) 97