Probability 30

For events which are not mutually exclusive, the "complete" addition law must be used, because events A and B may happen at the same time. The **addition law** is:

P(A or B) = P(A) + P(B) - P(A and B)

Use the addition law to solve the following problems.

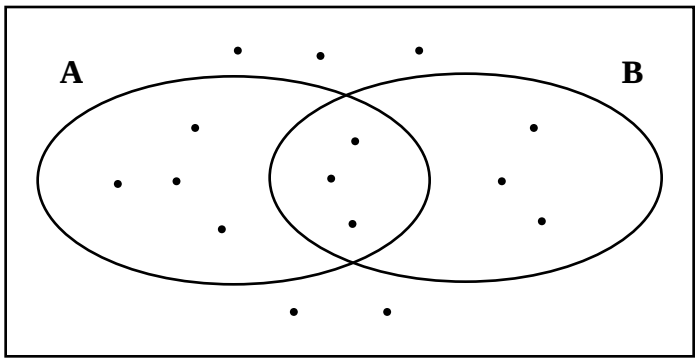
1) Two events, A and B, occur. P(A) = 0.6. P(B) = 0.3. P(A and B) = 0.1. Find the following probabilities. Note: P(~A) = P(NOT A) = 1 - P(A).

a) P(A or B) b) P(~A) c) P(~(A or B))

2) Ten cards are numbered from 1 to 10. What is the probability of drawing an even number or a number less than five? Use the addition formula.

3) A die is rolled. What is the probability of getting an odd number or a prime number (primes are 2, 3, and 5)? Use the addition formula.

4) A Venn diagram for two events is shown below. Find the following probabilities.



a) P(A) b) P(B) c) P(~B) d) P(A and B) e) P(A or B)

5) At a college, 15% of students failed English, 12% failed Math, and 5% failed both subjects.

a) Draw a Venn diagram for this situation.

b) What percentage failed English or Math? Use the addition law.

c) What percentage passed both subjects?

6) In a small school of 100 students, 35 students play basketball, 20 play soccer, 12 play both basketball and soccer. The students who play soccer or basketball do not play hockey. 15 students play hockey, but none of the hockey players play soccer or basketball.

a) Draw a Venn diagram to illustrate the sample space for this situation.

b) How many students play basketball only?

c) How many students do not participate in any of these three sports?

7) A card is selected from a shuffled deck. Use the addition law to find the probability of drawing a queen or a black.

P(queen or black) = P(queen) + P(black) - P(queen and black)

8) A card is selected from a shuffled deck. Use the addition law to find the probability of drawing a red card or a face card.

9) Two dice are rolled. Find the probability that the sum is even or less than five.

10) A small town has two TV stations, channel one and channel two. A survey found that 40% of the people watch channel one only, and 20% watched channel two only, and 8% watch both channels. Answer the following questions.

a) Draw a Venn diagram for this situation.

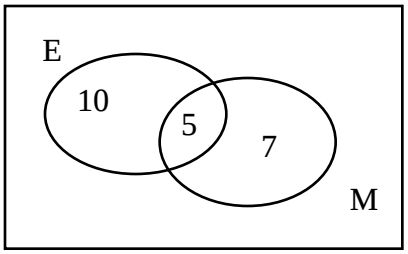
b) What percentage watch channel one?

c) What percentage watch channel two?

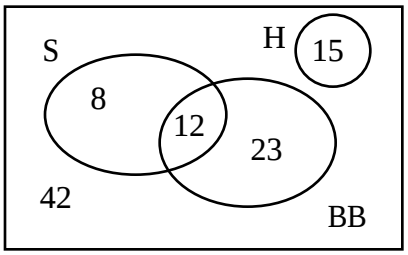
d) What percentage watch either channel one or channel two? (use addition equation)

e) What percentage do not watch either station?

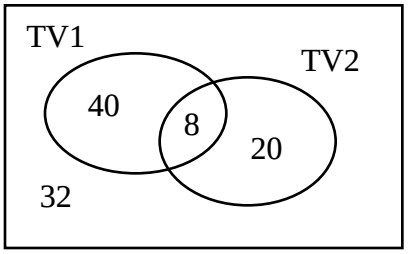
Answers: 1)a) 0.8, b) 0.4, c) 0.2, 2) 7/10, 3) 2/3, 4)a) 7/15, b) 2/5, c) 3/5, d) 1/5, e) 2/3, 5)a)



b) 22, c) 78, 6)a)



b) 23, c) 42, 7) 7/13, 8) 8/13, 9) 5/9, 10)a)



b) 48, c) 28, d) 68, e) 32.