

1) A jar contains one nickel, one dime, and 2 quarters. Two coins are drawn out, one after the other, without replacement. The values of the coins are recorded in the order that they are drawn out. If the value of the second coin drawn out is EQUAL TO OR HIGHER than that of the first coin drawn out, then (and only then) a third coin is drawn out, and its value is noted. How many elements are in the corresponding sample space? Examples: one element might be NDQ - draw a nickel, then a dime, then a quarter. Another might be QD.

- a) 12 b) 11 c) 13
 d) 10 e) 9 f) none of the above

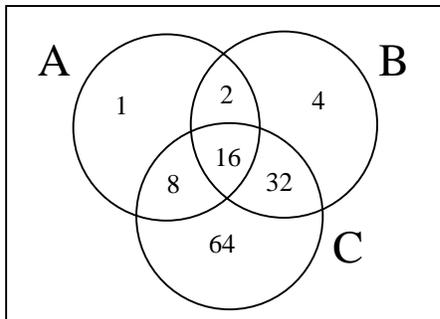
2) An urn contains 4 blue balls and 3 red balls. Three balls are drawn out, one after the other, without replacement. What is the probability of getting a red, then a blue, then a red?

- a) 36/343 b) 24/343 c) 4/35
 d) 1/8 e) 12/35 f) none of the above

3) Two of the cokes in a six pack of cokes are contaminated with ammonia. You select, at random, two of the six cokes and drink them. What is the probability that you have consumed a coke (one or more) containing ammonia.

- a) 3/5 b) 11/15 c) 8/15
 d) 3/10 e) 2/3 f) none of the above

4) Consider the following Venn diagram for sets A, B, C. Shown in this diagram are the number of elements in each indicated subset. Let $F = B \cap ((A \cap C)')$. Find $n(F)$, the number of elements in F .



- 16) An urn contains 5 red balls and 3 green. Two balls are selected from the urn, one after the other without replacement. Given that two balls of the same color were drawn out, what is the probability that they are both red?
- a) $10/13$ b) $5/8$ c) $1/2$
d) $5/14$ e) $13/28$ f) none of the above
- 17) A multiple choice test consists of 4 questions, each question with 5 choices for an answer, and each question has exactly 1 correct answer. A student takes the test and marks each question completely at random (with each choice for an answer being made independently of the other choices for answers). What is the probability that the student gets exactly one problem correct?
- a) $12/625$ b) $20/256$ c) $256/625$
d) $4/3125$ e) $4/625$ f) none of the above
- 18) A fish hatchery tags one of the new, genetically engineered silver streak salmon in its stock. Then the hatchery delivers $3/5$ of its entire stock of silver streak salmon to Moon Lake. The remaining $2/5$ are delivered to Clear Lake*. Of those silver streak salmon delivered to Moon Lake, $1/4$ will eventually make it to the open ocean. Of those silver streak salmon delivered to Clear Lake, $7/8$ will eventually make it to the open ocean. Given that the tagged salmon made it to the ocean, what is the probability that it was originally delivered to Moon Lake?
- *With probability $3/5$ the tagged salmon is delivered to Moon Lake (and with probability $2/5$ to Clear Lake).
- a) $3/4$ b) $1/4$ c) $9/16$
d) $3/10$ e) $3/20$ f) none of the above
- 19) A vase contains 3 red flowers and 6 blue flowers and 1 yellow flower. Completely at random, a flower is drawn out. Let $X = \# \text{blue flowers} - \# \text{red flowers}$ remaining in the vase (i.e. number of blue flowers minus the number of red flowers still in the vase after one flower is drawn out). Find $E(X)$.
- a) 3.1 b) 2.7 c) 2
d) 3 e) 2.6 f) none of the above

24) Suppose $Pr[A] = .7$ and $Pr[B] = .2$, and that A and B are independent events. If possible, find $Pr[A \cup B]$.

a) .56

b) .9

c) .76

d) .06

e) Can't be determined
from the given information.

f) none of the above

25) Six tomatoes sit on a window ledge. One tomato has no worms in it. Two tomatoes each have one worm in them. And three tomatoes each have two worms. Two tomatoes are selected at random. Let X = the **total** number of worms in the two chosen tomatoes. Find $Pr[X = 2]$.

a) $1/3$ b) $1/15$ c) $1/6$ d) $4/15$ e) $2/15$

f) none of the above