# SM2 10.3: More Probability & Independence

Problems: You have an equally likely chance of randomly choosing any integer from 1 to 50. Find the probability of each of the following events.

1) Choosing an even number

2) Choosing a perfect square

3) Choosing a factor of 150

4) Choosing a two-digit number

5) Choosing a multiple of 4

6) Choosing a number less than but not equal to 35

7) Choosing a prime number

8) Choosing a perfect cube

You randomly draw two marbles out of a bag, _replacing the first marble_ before drawing the second marble.
The bag has 10 black, 8 red, 4 white and 6 blue marbles. Find the probability of each of the following events:

9) A white marble, then a red marble is selected

10) A red marble is NOT selected, then a blue marble

11) A green marble, then a green marble is selected

12) A blue or black marble is selected, then a white marble

13) Selecting a marble that is NOT black, then a blue

14) A green marble, then a blue marble is selected

15) A yellow marble and then a red marble is drawn

16) A color that is NOT yellow is drawn both times

Drawing a card from the cards on the left, determine the probability of each of the following events.
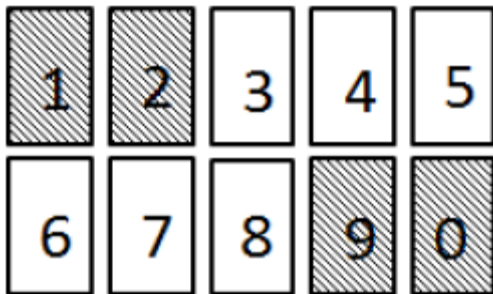
17) $P(Even\ or\ Shaded)$

18) $P(White\ or\ Odd)$

19) $P(Less\ than\ 4\ or\ shaded)$

20) $P(Greater\ than\ 5\ or\ shaded)$

21) $P(Factor\ of\ 10\ \ or\ white)$

22) $P(less\ than\ or\ equal\ to\ 2\ \ or\ shaded)$

Use the Venn diagram to find the probabilities of the given events.

Students in Gil's Class

Girls — Sports

6

14   9

11
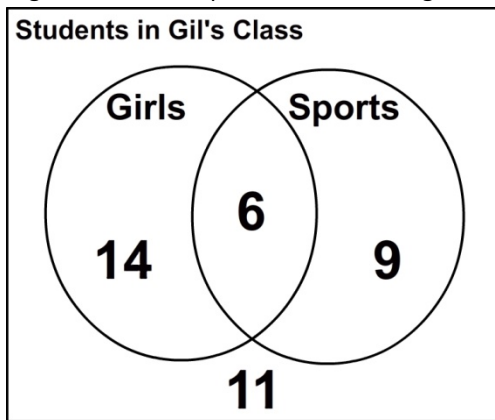
23) $P(Girl)$

24) $P(Boy)$

25) $P(Student\ is\ from\ Gil's\ class)$

26) $P(Girl\ and\ Plays\ Sports)$

27) $P(Girl\ or\ Plays\ Sports)$

28) $P(is\ not\ Girl\ and\ does\ not\ Play\ Sports)$

29) Are the events "being a girl" and "playing a sport" independent events? Show the work that supports your answer.

Find the marginal totals for the table. Then use the table to find the probabilities for each event.

There are 200 people whose gender and hair color have been counted

	Brown	Blonde	Red	Black	Other	Total
Male	42	11	11	13	23	
Female	47	16	10	13	14	
Total						200

30) $P(male)$

31) $P(red)$

32) $P(other)$

33) $P(blonde \cap male)$

34) $P(black\ and\ female)$

35) $P(brown \cap not\ male)$

36) $P(red\ and\ black)$

37) $P(female \cap not\ other)$

38) Are *being male* and *having blonde hair* independent events? Show your work.

39) Are *being female* and *having black hair* independent events? Show your work.

40) A photographer has taken 8 black and white photographs and 10 color photographs for a brochure. If 4 photographs are selected at random without replacing them, find the following probabilities.
    a. What is the probability of picking first 2 black and white photographs, then 2 color photographs?

    b. What is the probability that all the photographs are all black and white?

    c. What is the probability that all the photographs are color?

    d. What is the probability that all 4 are the same type (all black and white or all color)?

41) There are 7 blue pens, 3 black pens, and 2 red pens in a drawer. If you select three pens at random with no replacement, find the following probabilities.
    a. What is the probability that you will select a blue pen, then a black pen, then another blue pen?

    b. What is the probability that all three are red?

    c. What is the probability that all three pens are the same color?

42) Tammy's mom is baking cookies for a bake sale. When Tammy comes home, there are 22 chocolate chip cookies, 18 sugar cookies, and 15 oatmeal cookies on the counter. Tammy sneaks into the kitchen, grabs a cookie at random, and eats it. Five minutes later, she does the same thing with another cookie.
    a. What is the probability that neither of the cookies was a chocolate chip cookie?

    b. What is the probability that both cookies were the same flavor?

43) There are 2 Root Beers, 2 Sprites, 3 Mountain Dews, and 1 Gatorade left in the vending machine at school. The machines buttons are broken and will randomly give you a random drink no matter what button you push. Find the probability of each outcome.
    a. $P(root\ beer\ then\ root\ beer)$

    b. $P(root\ beer\ then\ mountain\ dew)$

    c. $P(sprite\ then\ gatorade)$

    d. $P(mountain\ dew\ then\ mountain\ dew\ then\ mountain\ dew)$

Determine whether or not the following events are independent.

44) If $P(A) = 0.7$, $P(B) = 0.3$ and $P(A \cap B) = 0.21$ are events A and B independent? Why or why not?

45) Janeen has a dozen cupcakes. Three are chocolate with white frosting, two are chocolate with yellow frosting, four are vanilla with white frosting and three are vanilla with yellow frosting.
   a. Fill in the table below from the information above.

	White	Yellow	Total
Chocolate			
Vanilla			
Total			

   b. Are chocolate cake flavor and white frosting color independent?