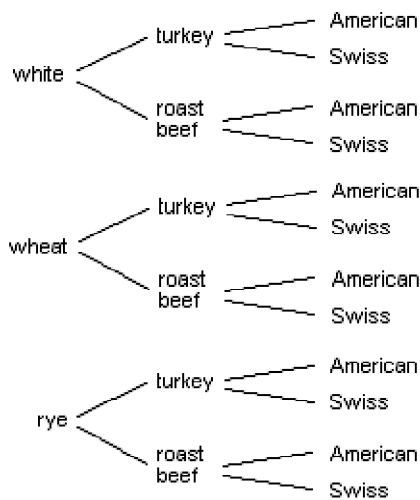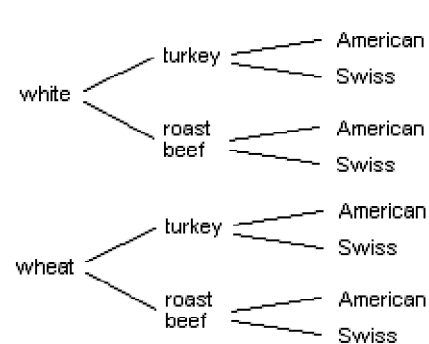# Probability Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ 1. A sandwich is made with only one type of bread, one type of meat, and one type of cheese. There are 3 types of bread: white, wheat, or rye; 2 types of meat: turkey or roast beef; and 2 types of cheese: American or Swiss. Draw a tree diagram to show the number of sandwich choices.
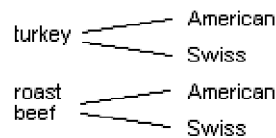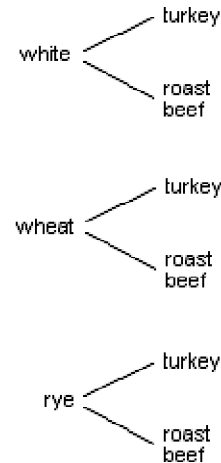
a.

```
              turkey ──── American
        white        ──── Swiss
              roast  ──── American
              beef   ──── Swiss

              turkey ──── American
        wheat        ──── Swiss
              roast  ──── American
              beef   ──── Swiss

              turkey ──── American
        rye          ──── Swiss
              roast  ──── American
              beef   ──── Swiss
```

c.

```
              turkey ──── American
        white        ──── Swiss
              roast  ──── American
              beef   ──── Swiss

              turkey ──── American
        wheat        ──── Swiss
              roast  ──── American
              beef   ──── Swiss
```

b.

```
        turkey ──── American
               ──── Swiss
        roast  ──── American
        beef   ──── Swiss
```

d.

```
                     turkey
        white
                     roast
                     beef

                     turkey
        wheat
                     roast
                     beef

                     turkey
        rye
                     roast
                     beef
```
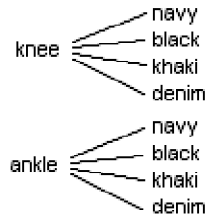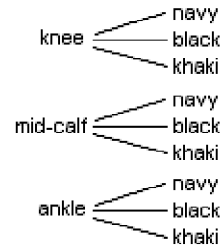
____   2.   You can order a skirt with the three different lengths (knee, mid-calf, ankle) and the four different colors (navy, black, khaki, denim). Draw a tree diagram to show the number of choices.
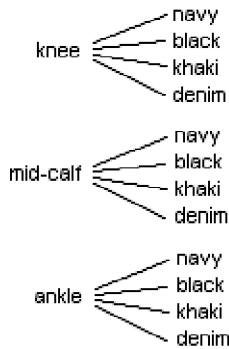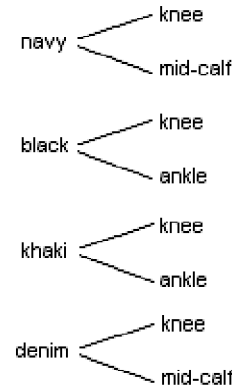
a.

```
              navy
           black
   knee
           khaki
              denim
              navy
           black
   ankle
           khaki
              denim
```

c.

```
              navy
   knee      black
              khaki
                 navy
   mid-calf    black
                 khaki
              navy
   ankle     black
              khaki
```

b.

```
              navy
           black
   knee
           khaki
              denim
              navy
           black
   mid-calf
           khaki
              denim
              navy
           black
   ankle
           khaki
              denim
```

d.

```
            knee
   navy
            mid-calf

            knee
   black
            ankle

            knee
   khaki
            ankle

            knee
   denim
            mid-calf
```

____   3.   A lunch menu consists of 5 different sandwiches, 2 different soups, and 5 different drinks. How many choices are there for ordering a sandwich, a bowl of soup, and a drink?
     a.   12 choices   b.   72 choices   c.   50 choices   d.   69 choices

____   4.   Ms. Wong is redecorating her office. She has a choice of 7 colors of paint, 4 kinds of curtains, 3 colors of carpet, and 2 styles of furniture. How many different ways are there to redecorate if she chooses two different colors of paint, one kind of curtain, one color of carpet, and one style of furniture?
     a.   168 ways   b.   1,008 ways   c.   1,176 ways   d.   23 ways

____   5.   Use the table.
     a.   How many possible pairs of jeans are there if each pair has one style and one color?
     b.   Suppose you have one pair of jeans of each possible style and color in the table. What is the probability of choosing a pair of black jeans at random?

Style	**Color**
regular	light blue
loose fit	indigo
boot cut	washed
slim fit	black
	blue

     a.   30 pairs; $\dfrac{1}{4}$ b.   9 pairs; $\dfrac{1}{20}$ c.   20 pairs; $\dfrac{1}{5}$ d.   4 pairs; $\dfrac{1}{5}$

_____ 6. There are many different license-plate systems being used in the United States. Which system provides for the greatest possible number of license plates?
   a.   License plates display three letters and three digits.
   b.   License plates display two letters and four digits.
   c.   License plates display five letters.
   d.   License plates display four letters and two digits.

_____ 7. A spinner that has 3 sections of equal area, numbered from 1 to 3, is spun two times in succession. Which is NOT part of the sample space?
   a.   (1, 3)   b.   (3, 3)   c.   (3, 2)   d.   (3, 4)

_____ 8. Find the sample space for tossing 2 coins. Then find P(exactly 1 head).
   a. $\dfrac{1}{8}$ b. $\dfrac{1}{2}$ c. $\dfrac{3}{4}$ d. $\dfrac{1}{4}$

Use the Counting Principle to find the probability.

_____ 9. choosing the 8 winning lottery numbers when the numbers are chosen at random from 0 to 9
   a. $\dfrac{1}{10,000,000}$ b. $\dfrac{1}{1,000,000,000}$ c. $\dfrac{1}{100,000,000}$ d. $\dfrac{1}{43,046,721}$

_____ 10. rolling a 4 on each of 4 number cubes
   a. $\dfrac{1}{1,296}$ b. $\dfrac{1}{24}$ c. $\dfrac{1}{324}$ d. $\dfrac{2}{3}$

_____ 11. Suppose you roll two number cubes and pick a letter of the alphabet at random. Find the probability you roll 2 even numbers and pick one of the vowels a, e, i, o, or u.
   a. $\dfrac{7}{104}$ b. $\dfrac{5}{104}$ c. $\dfrac{1}{6}$ d. $\dfrac{1}{104}$

_____ 12. Jason and Kyle both choose a number from 1 to 10 at random. What is the probability that both numbers are odd?
   a. $\dfrac{1}{3}$ b. $\dfrac{1}{2}$ c. $\dfrac{1}{4}$ d. $\dfrac{1}{8}$

_____ 13. Which describes independent events?
   a.   You grab two jelly beans from a jar at the same time.
   b.   You draw a card from a deck, replace it, and draw a second.
   c.   You draw a card and do not replace it. Then you draw another.
   d.   You study English every night, and then you get an A on the next test.

_____ 14. A drawer contains 4 red socks, 3 white socks, and 3 blue socks. Without looking, you select a sock at random, replace it, and select a second sock at random. What is the probability that the first sock is blue and the second sock is red?
   a. $\dfrac{3}{5}$ b. $\dfrac{7}{20}$ c. $\dfrac{3}{25}$ d. $\dfrac{7}{100}$

____ 15. Two urns each contain green balls and blue balls. Urn I contains 4 green balls and 6 blue balls, and Urn II contains 6 green balls and 2 blue balls. A ball is drawn at random from each urn. What is the probability that both balls are blue?

a. $\dfrac{2}{51}$ b. $\dfrac{3}{20}$ c. $\dfrac{1}{10}$ d. $\dfrac{4}{153}$

____ 16. Find the probability that 3 students chosen at random were all born on a Wednesday.

a. $\dfrac{3}{343}$ b. $\dfrac{1}{343}$ c. $\dfrac{1}{27}$ d. $\dfrac{1}{21}$

____ 17. A local weather forecaster is accurate 85% of the time when predicting precipitation for the day. What is the probability that she will make correct precipitation predictions 4 days in a row? Round to the nearest whole percent.

a. about 54%   b. about 53%   c. about 52%   d. about 47%

____ 18. The probability that Shania is on time for school is $\dfrac{1}{2}$. Find the probability that Shania arrives on time for school for the next 5 days. Express your answer as a percent, to the nearest tenth of a percent.

a. 50%   b. 15.6%   c. 11.4%   d. 3.1%

____ 19. On a 9-question true-or-false test you randomly guess at the answers. What is the probability that you get all 9 answers correct? What is the probability that you get all 9 answers wrong?

a. $\dfrac{1}{2}; \dfrac{1}{2}$ b. $\dfrac{1}{512}; \dfrac{511}{512}$ c. $\dfrac{1}{9}; \dfrac{8}{9}$ d. $\dfrac{1}{512}; \dfrac{1}{512}$

____ 20. A bag contains 6 purple marbles and 7 white marbles. One marble is drawn at random and not replaced. Then a second marble is drawn at random. What is the probability that the first marble is white and the second one is purple?

a. $\dfrac{1}{12}$ b. $\dfrac{42}{169}$ c. $\dfrac{7}{26}$ d. $\dfrac{13}{25}$

You select a card at random. Without replacing the card, you select a second card. Find the probability.

$\boxed{M}\ \boxed{A}\ \boxed{T}\ \boxed{H}\ \boxed{E}\ \boxed{M}\ \boxed{A}\ \boxed{T}\ \boxed{I}\ \boxed{C}\ \boxed{S}$

____ 21. P(M, then H)

a. $\dfrac{3}{11}$ b. $\dfrac{2}{21}$ c. $\dfrac{1}{55}$ d. $\dfrac{2}{121}$

____ 22. P(T, then a vowel)

a. $\dfrac{3}{55}$ b. $\dfrac{8}{121}$ c. $\dfrac{6}{121}$ d. $\dfrac{4}{55}$

____ 23. P(C, then T or S)

a. $\dfrac{3}{110}$ b. $\dfrac{4}{110}$ c. $\dfrac{3}{121}$ d. $\dfrac{4}{11}$

_____ 24. In how many different ways can you arrange 7 books on a shelf?
   a.   823,543 ways   b.   5,040 ways   c.   720 ways   d.   28 ways

_____ 25. There are 4 children in Maria's family. In how many ways can you list the children in all possible orders?
   a.   6 ways   b.   24 ways   c.   10 ways   d.   256 ways

_____ 26. How many permutations can be made using the letters S, T, U, D, Y, H, A, R, D?
   a.   1 permutation
   b.   362,880 permutations
   c.   9 permutations
   d.   456,225 permutations

_____ 27. How many 3-letter permutations are possible for the letters S, T, U, D, Y, H, A, R, D?
   a.   72 permutations
   b.   729 permutations
   c.   3,024 permutations
   d.   504 permutations

Simplify the expression.

_____ 28. $_4P_3$
   a.   120   b.   24   c.   6   d.   12

_____ 29. $_{12}P_5$
   a.   11,880   b.   95,040   c.   1,235,520   d.   7,920

_____ 30. $_6C_3$
   a.   120   b.   20   c.   15   d.   40

_____ 31. $_{17}C_4$
   a.   2,380   b.   680   c.   57,120   d.   4,760

_____ 32. In how many ways could you choose two different letters from the letters M, A, T, H?
   a.   12 ways   b.   24 ways   c.   6 ways   d.   18 ways

_____ 33. In how many ways could you choose two different letters from the letters C, O, U, N, T?
   a.   60 ways   b.   20 ways   c.   120 ways   d.   10 ways

_____ 34. The Burger Diner offers burgers with or without any or all of the following: catsup, lettuce, and mayonnaise. How many different burgers can you order?
   a.   8 burgers
   b.   3 burgers
   c.   12 burgers
   d.   7 burgers

_____ 35. A panel of judges must consist of four students and three teachers. A list of potential judges includes six students and five teachers. How many different panels could be created from this list?
   a.   30 panels   b.   150 panels   c.   25 panels   d.   300 panels

Does the problem involve *permutations* or *combinations*? Explain.

_____ 36. In how many different ways could a committee of 5 students be chosen from a class of 25 students?
   a.   Permutations; the order matters.
   b.   Permutations; the order does not matter.
   c.   Combinations; the order does not matter.
   d.   Combinations; the order matters.

_____ 37. In how many ways could six horses come in first, second or third in a race?
   a.   Combinations; the order does not matter.
   b.   Combinations; the order matters.
   c.   Permutations; the order does not matter.
   d.   Permutations; the order matters.

_____ 38. In your last 23 basketball games, you attempted 101 free throws and made 66. Find the experimental probability that you make a free throw. Write the probability as a percent, to the nearest tenth of a percent.
   a.   65.3%   b.   69.8%   c.   69.7%   d.   65.7%

_____ 39. A number cube is rolled with these results: 64 ones, 67 twos, 73 threes, 59 fours, 72 fives, and 71 sixes. What is the experimental probability of rolling an even number? Write your answer as a percent, to the nearest tenth of a percent.
   a.   51.9%   b.   48.5%   c.   53.6%   d.   46.8%

_____ 40. The results of a coin toss are shown. What is P(heads)?
   HTHHHTHTTHHTHTT
   THHTHTTHHHHTHTT
   a. $\dfrac{8}{15}$ b. $\dfrac{3}{5}$ c. $\dfrac{7}{15}$ d. $\dfrac{1}{2}$

_____ 41. A spinner with three congruent sections is spun with the results as shown. What is P(1)?
   1 3 3 2 1 2 1 1 3 3 2 1 1 1 2 2 2 3 3 1 3
   a. $\dfrac{1}{3}$ b. $\dfrac{8}{21}$ c. $\dfrac{13}{21}$ d. $\dfrac{3}{7}$