

SAMPLE PAGES FOR

SOUTH CAROLINA
6TH GRADE MATHEMATICS

CHALLENGE THE

PALMETTO **A**CHIEVEMENT **C**HALLENGE **T**EST

BY

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Probability is the chance of something happening.

EXAMPLE

What are John's chances of being chosen to be first in line when there are 20 students in the classroom?

$$\frac{1}{20} \quad (1 \text{ chance out of } 20)$$

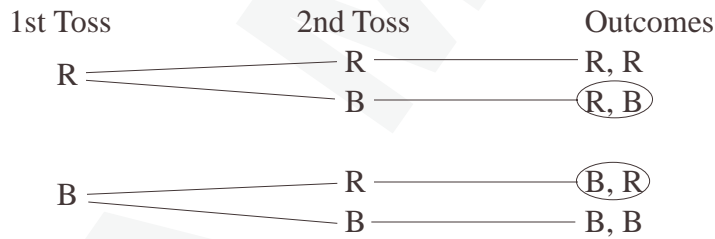
Change to percent by dividing top by bottom.

$$\begin{array}{r} .05 \\ 20 \overline{) 1.00} \\ \underline{-1.00} \\ 0 \end{array} = .05 = 5\% \text{ chance of being first}$$

Probability can also be done by a counting process. You use a tree diagram.

EXAMPLE

A wooden disk has one blue side and one red side. If it is tossed 2 times, what are the chances of it landing showing one red side and one blue?



There are 4 outcomes. **Two** of these contain a red and blue.

To find the total number of outcomes, you can use multiplication instead of the counting process.

EXAMPLE

How many total outcomes are there when you toss 3 of the colored (red/blue) disks?

There are 2 outcomes, (red or blue) for each disk. There are 3 disks. Multiply.

$$2 \times 2 \times 2 = (2 \text{ outcomes for each of } 3 \text{ disks})$$

8 outcomes

➤ Probability of an Event Happening

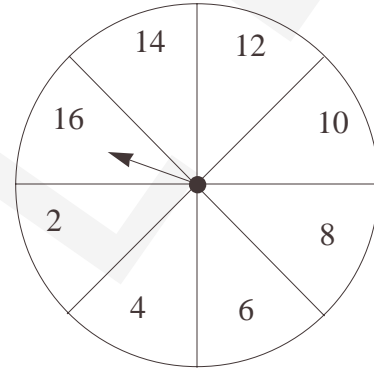
$$P_{\text{(probability)}} = \frac{\text{number of ways an outcome can happen}}{\text{number of possible outcomes}}$$

EXAMPLES

What is the probability (chance) that you would spin an even number?

$$P_{\text{(probability)}} = \frac{8 \text{ (8 even numbers)}}{8 \text{ (8 outcomes)}} = \frac{1.00}{1.00} = \frac{1}{1}$$

$$1.00 = 100\% \text{ (chance of spinning an even number)}$$



What is the probability of spinning a number larger than 8?

$$P = \frac{4 \text{ (numbers larger than eight)}}{8 \text{ (8 outcomes)}} = \frac{1}{2}$$

$$.50 = 50\% \text{ (chance of spinning a number larger than 8)}$$

(Probabilities can be shown as fractions or percents.)

PRACTICE

1. Draw a tree diagram to show all the possible outcomes when 2 coins are tossed.

2. Draw a tree diagram to show all the possible outcomes when you have a choice of chicken or steak with rice, fries, or baked potato.

3. Draw a tree diagram to show all the possible outcomes when you toss a penny and a die at the same time.

Use the following to answer 4–15.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
R G R G R B R W P Y Y

What is the probability (in fraction form) of choosing _____?

- 4. a red (R) star _____
- 5. a blue (B) star _____
- 6. a yellow (Y) star _____
- 7. a white (W) star _____
- 8. a green (G) star _____
- 9. a pink (P) star _____
- 10. a red (R) or pink (P) star _____
- 11. a blue (B) or yellow (Y) star _____
- 12. a white (W) or green (G) star _____
- 13. a green (G) or pink (P) star _____
- 14. a red (R) or green (G) star _____
- 15. a white (W) or yellow (Y) star _____

➤ *Probability of Dependent Events*

When two events are dependent, the first event's outcome will change the size of the sample and affect the probability of the second event.

EXAMPLE:

What is the probability of drawing 2 red marbles (one marble at a time) from a box that contains 3 red marbles and 2 black marbles? (Do not replace marble after first draw.)

$$\frac{3}{5} \begin{array}{l} \text{3 red marbles} \\ \text{5 total marbles in box} \end{array}$$

1. Find the probability of drawing a red marble on the first draw.

$$\frac{2}{4} \begin{array}{l} \text{2 red marbles} \\ \text{4 total marbles in box} \end{array}$$

2. Reduce the sample by 1 because one drawing has been made. The number of possible favorable (red) outcomes must be reduced by 1 since a red marble may have been drawn.

$$\frac{3}{5} \times \frac{2}{4} = \frac{6}{20} = \frac{3}{10}$$

3. Multiply the probabilities.

PRACTICE

Find the probability.

Using a deck of cards, find the probability of choosing a card from column A (Do not replace in deck.) and then a card from column B.

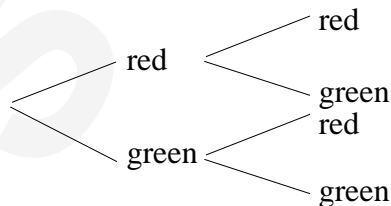
A	B	Probability
1. queen	queen	_____
2. black five	black five	_____
3. 3 of hearts	3 of hearts	_____
4. black card	black card	_____
5. red or black card	red or black card	_____
6. jack of spades	queen of spades	_____
7. black ace	red ace	_____
8. a spade	a spade	_____
9. a heart	a diamond	_____
10. 4 of clubs	3 of clubs	_____

Using a bag containing 3 yellow marbles, 2 green marbles, and 6 orange marbles, find the probability of choosing a marble from column A (Do not replace in bag.) and then from column B.

Column A	Column B	Probability
11. a yellow marble	a yellow marble	_____
12. a green marble	a green marble	_____
13. an orange marble	an orange marble	_____
14. a yellow marble	a green marble	_____
15. a yellow marble	an orange marble	_____
16. a green marble	an orange marble	_____

➤ Review

- What is the probability that a roll of a die will show 1?
 - $\frac{4}{6} = \frac{2}{3}$
 - $\frac{1}{6}$
 - $\frac{0}{6}$
 - $\frac{1}{2}$
- This tree diagram shows the possibilities for choosing a red or green disk when choosing a disk twice, returning the first disk after choosing the first time.



What are the chances that one chose is red and one chose is green?

- $\frac{3}{4}$
 - $\frac{1}{2}$
 - $\frac{1}{4}$
 - $\frac{1}{3}$
- How many outcomes are possible if you toss 4 coins?
 - 8
 - 4
 - 16
 - 32

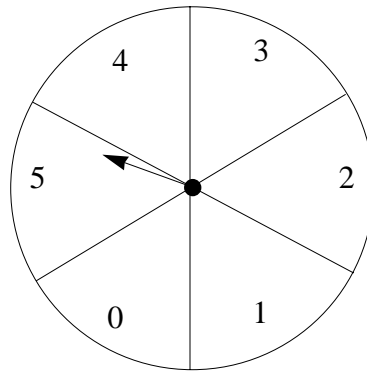
(Use for 4 – 6.)

R **R** **Y** **Y** **Y** **G**

4. What is the probability of drawing a **R**?
- $\frac{3}{4}$
 - $\frac{2}{6} = \frac{1}{3}$
 - $\frac{5}{6}$
 - $\frac{3}{6} = \frac{1}{2}$
5. What is the probability of drawing two **Y**'s in 2 draws (Do not replace first letter.)?
- $\frac{3}{4}$
 - $\frac{6}{36} = \frac{1}{6}$
 - $\frac{9}{36} = \frac{1}{4}$
 - $\frac{6}{30} = \frac{1}{5}$
6. What is the probability of drawing a **G**?
- $\frac{2}{6} = \frac{1}{3}$
 - $\frac{1}{6}$
 - $\frac{5}{6}$
 - $\frac{4}{6} = \frac{2}{3}$
7. Jennifer, Rita, and Judy are sitting on a sofa. In how many different orders could they be sitting?
- 6
 - 3
 - 9
 - 5

8. If you have a brown shirt, a red shirt, a green shirt, and a yellow shirt, what is the probability of you choosing a yellow shirt?
- 1
 - $\frac{2}{4} = \frac{1}{2}$
 - $\frac{1}{3}$
 - $\frac{1}{4}$
9. Use the shirts from number 8 to find the probability of choosing a red shirt or a green shirt?
- $\frac{3}{4} = 75\%$
 - $\frac{2}{4} = \frac{1}{2} = 50\%$
 - $\frac{1}{4} = 25\%$
 - $\frac{1}{8} = 12.5\%$

(Use for 10 – 12.)



10. What is the probability of spinning a 3?
- $\frac{0}{6}$
 - $\frac{1}{6}$
 - $\frac{3}{6} = \frac{1}{2}$
 - $\frac{4}{6} = \frac{2}{3}$

11. What is the probability of spinning a 4 or a 5?
- $\frac{2}{6} = \frac{1}{3}$
 - $\frac{0}{6}$
 - $\frac{1}{6}$
 - $\frac{3}{6} = \frac{1}{2}$
12. What is the probability of spinning a number less than 3?
- $\frac{3}{6} = \frac{1}{2} = 50\%$
 - $\frac{4}{6} = \frac{2}{3} = 66\frac{2}{3}\%$
 - $\frac{2}{6} = \frac{1}{3} = 33\frac{1}{3}\%$
 - $\frac{0}{6} = 0\%$
13. If a bag contains 4 blue balls, 5 black balls, and 1 purple ball, what is the probability of choosing a blue ball in each of two draws (Do not replace first ball.)?
- $\frac{2}{10} = \frac{1}{5} = 20\%$
 - $\frac{8}{45} = 17.8\%$
 - $\frac{12}{90} = \frac{2}{15} = 13\frac{1}{3}\%$
 - $\frac{3}{250} = 1.2\%$
14. There are 4 kinds of ice cream (chocolate, vanilla, strawberry, lemon) and 4 kinds of toppings (syrup, sprinkles, nuts, coconut). How many possible choices could you have with one ice cream and one topping?
- 16
 - 8
 - 32
 - 20
15. How many different odd sums can be made when rolling 2 dice?
- 12
 - 11
 - 9
 - 10
16. There are 3 blue marbles in a bag of 12 marbles. What is the probability of choosing a blue marble?
- $\frac{1}{3}$
 - $\frac{6}{12} = \frac{1}{2}$
 - $\frac{3}{12} = \frac{1}{4}$
 - $\frac{1}{12}$
17. There are 10 green beads, 6 yellow beads, and 4 white beads in a jar. What is the probability of picking a green bead?
- $\frac{0}{20}$
 - $\frac{6}{20} = \frac{3}{10}$
 - $\frac{10}{20} = \frac{1}{2}$
 - $\frac{4}{20} = \frac{1}{5}$

18. A child has a chance of being a boy or girl. If a woman has 2 boys, what is her chance of having a girl the next time?
- There is a 50-50 chance.
 - There is no way to predict this.
 - She will have a boy.
 - She will have a girl.
19. A box contains 15 pillows, 3 of which are striped. What is the probability of picking a striped pillow from the box?
- $\frac{15}{3} = 5$
 - $\frac{0}{15}$
 - $\frac{3}{15} = \frac{1}{5}$
 - $\frac{3}{18} = \frac{1}{6}$
20. What is the probability of tossing a coin 1 time and having it show a tail?
- $\frac{0}{2}$
 - $\frac{1}{2}$
 - 2
 - 1
21. Missy wins her swim meets 25% of the time. What is the probability that she will win her next meet?
- $\frac{1}{2}$
 - $\frac{3}{4}$
 - $\frac{1}{4}$
 - $\frac{1}{3}$
22. If 2 coins are tossed, what is the probability of tossing 2 tails?
- $\frac{1}{4}$
 - $\frac{2}{4} = \frac{1}{2}$
 - $\frac{3}{4}$
 - $\frac{0}{4}$
23. A jar contains 16 straws. All 16 straws are striped. What is the probability of drawing a straw that is not striped?
- $\frac{16}{16}$
 - $\frac{13}{16}$
 - $\frac{0}{16}$
 - $\frac{1}{16}$
24. If you toss 2 red and white sided disks, what result should occur most often?
- two reds
 - two whites
 - one red, one white
 - All combinations will occur at the same rate.

25. Disks numbered 1–17 are in a pail. What is the probability of choosing an odd number?

- a. $\frac{10}{17}$
- b. $\frac{3}{17}$
- c. $\frac{1}{17}$
- d. $\frac{9}{17}$

26. How many different outfits can be made with black or red pants, a white or blue shirt, and brown or black shoes?

- a. 6
- b. 8
- c. 3
- d. 16