

# Practice 6-4 Probability

Find each probability for choosing a letter at random from the word **PROBABILITY**.

1.  $P(B)$  \_\_\_\_\_      2.  $P(P)$  \_\_\_\_\_  
 3.  $P(A \text{ or } I)$  \_\_\_\_\_      4.  $P(\text{not } P)$  \_\_\_\_\_

A child is chosen at random from the Erb and Smith families. Find the odds in favor of each of the following being chosen.

5. a girl \_\_\_\_\_  
 6. an Erb \_\_\_\_\_  
 7. an Erb girl \_\_\_\_\_  
 8. a Smith girl \_\_\_\_\_  
 9. not a Smith boy \_\_\_\_\_  
 10. a Smith \_\_\_\_\_

|       | Erb family | Smith family |
|-------|------------|--------------|
| Girls | 2          | 5            |
| Boys  | 4          | 3            |

A box contains 7 red, 14 yellow, 21 green, 42 blue, and 84 purple marbles. A marble is drawn at random from the box. Find each probability.

11.  $P(\text{red})$  \_\_\_\_\_      12.  $P(\text{yellow})$  \_\_\_\_\_  
 13.  $P(\text{green or blue})$  \_\_\_\_\_      14.  $P(\text{purple, yellow, or red})$  \_\_\_\_\_  
 15.  $P(\text{not green})$  \_\_\_\_\_      16.  $P(\text{not purple, yellow, or red})$  \_\_\_\_\_

Find the odds in favor of each selection when a marble is chosen at random from the box described above.

17. blue \_\_\_\_\_      18. purple \_\_\_\_\_  
 19. not red \_\_\_\_\_      20. not green or blue \_\_\_\_\_  
 21. yellow \_\_\_\_\_      22. not purple or yellow \_\_\_\_\_

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Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

|          |  |
|----------|--|
| Diamonds |  |
| Hearts   |  |
| Spades   |  |
| Clubs    |  |

- Based on her results, what is the experimental probability of selecting a heart?
- What is the theoretical probability of selecting a heart?
- Based on her results, what is the experimental probability of selecting a diamond or a spade?
- What is the theoretical probability of selecting a diamond or a spade?
- Compare these results, and describe your findings.
- Dale conducted a survey of the students in his classes to observe the distribution of eye color. The table shows the results of his survey.

| Eye color | Blue | Brown | Green | Hazel |
|-----------|------|-------|-------|-------|
| Number    | 12   | 58    | 2     | 8     |

- Find the experimental probability distribution for each eye color.

$P(\text{blue}) = \underline{\hspace{2cm}}$       $P(\text{brown}) = \underline{\hspace{2cm}}$       $P(\text{green}) = \underline{\hspace{2cm}}$       $P(\text{hazel}) = \underline{\hspace{2cm}}$

- Based on the survey, what is the experimental probability that a student in Dale's class has blue or green eyes?
- Based on the survey, what is the experimental probability that a student in Dale's class does not have green or hazel eyes?
- If the distribution of eye color in Dale's grade is similar to the distribution in his classes, about how many of the 360 students in his grade would be expected to have brown eyes?

## Probability – Worksheet #4



### A. Coin Flip

- 1) What is the theoretical probability that the coin will land on tails?
- 2) What is the theoretical probability that the coin will land on heads?
- 3) If the coin is flipped 140 times, how many times would you predict that the coin lands on heads?
- 4) Johnny flipped a coin 450 times. His results are below:

| Heads | Tails |
|-------|-------|
| 240   | 210   |

What is the experimental probability that the coin lands on heads?

### B. Roll of the Die (6-sided)

- 5)  $P(4) =$                       7)  $P(\text{not a } 2) =$
- 6)  $P(3 \text{ or } 5) =$                 8)  $P(\text{odd}) =$
- 9) If the die is rolled 300 times, how many times would you predict a roll of a 1 or a 6?
- 10) Johnny rolled the die 1,500 times. His results are below:

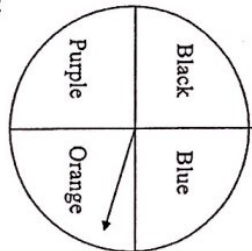
| # on die     | 1   | 2   | 3   | 4   | 5   | 6   |
|--------------|-----|-----|-----|-----|-----|-----|
| Times rolled | 230 | 245 | 300 | 280 | 215 | 230 |

What is the experimental probability that the die will land on a 4?

## Probability – Worksheet #4

### C. Spinners

- 11)  $P(\text{black}) =$
- 12)  $P(\text{not orange}) =$
- 13)  $P(\text{blue or black}) =$
- 14) If the spinner is spun 40 times, how many times would you predict a spin of something that is not purple?
- 15) Johnny spins the spinner 60 times. His results are below:



| Color      | Black | Blue | Orange | Purple |
|------------|-------|------|--------|--------|
| Times Spun | 17    | 15   | 21     | 7      |

- a) What is the experimental probability of a spin of orange?
- b) Which color had an experimental probability that matched its theoretical probability?

### D. Multiple Choice.

- 16) Neil tossed a 6-sided die 90 times. The results of his tosses are recorded in the table below:

| Number | Times tossed |
|--------|--------------|
| 1      | 13           |
| 2      | 15           |
| 3      | 14           |
| 4      | 12           |
| 5      | 18           |
| 6      | 18           |

What number had an experimental probability that matched its theoretical probability?

- A 2
- B 3
- C 4
- D 5



Be Sure to Show ALL Your Work!!!

Special Note: Reduce all fractions to lowest terms.

1. A card is chosen at random from a deck of 52 cards. It is then *replaced* and a second card is chosen. What is the probability of choosing a Jack first and a 3 second?
  
2. What is the probability that from a normal 52 card deck, you randomly draw a 3, and then *without replacing* the 3, you draw the Queen of Hearts?
  
3. A jar contains 6 red balls, 3 green balls, 5 white balls and 7 yellow balls. Two balls are chosen from the jar, with replacement. What is the probability that both balls chosen are green?
  
4. A box contains a penny, a nickel, and a dime. Find the probability of choosing a dime first and then, without replacing the dime, choosing a penny.
  
5. A coin is tossed and a single 6-sided die is rolled. Find the probability of landing on the head side of the coin and rolling 3 on the die.
  
6. The teacher of a class that contains 12 boys and 16 girls needs to pick two volunteers. She randomly selects one student, and then selects another student from the class. Find the probability that
  - a. she chooses a girl first, then a boy
  - b. she chooses two boys

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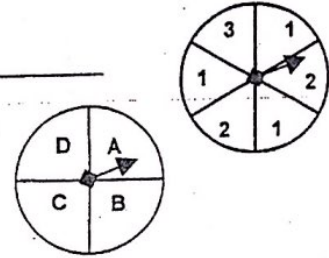
**Probability with Compound Events (Independent and Dependent)  
Practice**

Describe the events by writing **I** for *independent event* or **D** for *dependent event*.

- Ann draws a colored toothpick from a jar. Without replacing it, she draws a second toothpick. \_\_\_\_\_
- John rolls a six on a number cube and then flips a coin that comes up heads. \_\_\_\_\_
- Susie draws a card from a deck of cards and replaces it. She then draws a second card. \_\_\_\_\_
- Seth draws a colored tile from a bag, replaces it; draws a second tile from the bag, replaces it; and then draws a tile a third time from the bag. \_\_\_\_\_
- You draw a red marble from a bag, and then another red marble (without replacing the first marble)? \_\_\_\_\_

Using the two spinners, find each **compound** probability.

- $P(A \text{ and } 2)$  \_\_\_\_\_
- $P(D \text{ and } 1)$  \_\_\_\_\_
- $P(B \text{ and } 3)$  \_\_\_\_\_
- $P(A \text{ and not } 2)$  \_\_\_\_\_



A box contains 3 red marbles, 6 blue marbles, and 1 white marble. The marbles are selected at random, one at a time, and are **not replaced**. Find each **compound** probability.

- $P(\text{blue and red})$  \_\_\_\_\_
- $P(\text{blue and blue})$  \_\_\_\_\_
- $P(\text{red and white and blue})$  \_\_\_\_\_
- $P(\text{red and red and red})$  \_\_\_\_\_
- $P(\text{white and red and white})$  \_\_\_\_\_

Suppose that two tiles are drawn from the collection shown at the right. The first tile is replaced before the second is drawn. Find each **compound** probability.



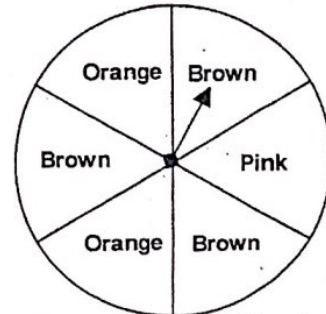
- $P(A \text{ and } A)$  \_\_\_\_\_
- $P(R \text{ and } C)$  \_\_\_\_\_
- $P(A \text{ and not } R)$  \_\_\_\_\_

Suppose that two tiles are drawn from the same collection shown above. The first tile is **not** replaced before the second is drawn. Find each **compound** probability.

- $P(A \text{ and } A)$  \_\_\_\_\_
- $P(R \text{ and } C)$  \_\_\_\_\_
- $P(A \text{ and not } R)$  \_\_\_\_\_

Use the spinner to the right for the next two problems.

- If you spin the spinner twice, what is the probability of spinning orange then brown? \_\_\_\_\_
- If you spin the spinner twice, what is the probability of spinning brown both times? \_\_\_\_\_



- Kevin had 6 nickels and 4 dimes in his pocket. If he took out one coin and then a second coin without replacing the first coin ---
  - what is the probability that both coins were nickels? \_\_\_\_\_
  - what is the probability that both coins were dimes? \_\_\_\_\_
  - what is the probability that the first coin was a nickel and the second a dime? \_\_\_\_\_



Probability Review:

1.) A bag of marbles contains 7 red marbles, 8 green marbles, and 11 yellow marbles. Find each probability below:

P (red):

P (green or yellow):

P (red, then green) without replacement:

2.) There is a 30% chance for rain on Saturday, and a 60% chance for rain on Sunday. What is the probability that it will rain all weekend? (show your work)

3.) Maggie flipped a coin 20 times, and recorded the results in the box below:

|                               |
|-------------------------------|
| H, T, T, H, T, T, H, T, T,    |
| H, T, T, T, H, H, H, T, H, T, |
| T, H                          |

Which is greater the experimental probability or theoretical probability of flipping heads? Explain, and use evidence.

- 4.) There are 35 cars in the parking lot. 12 cars are black, 10 are silver, 5 are blue, 5 are white, and 3 are green. If two cars are selected at random, what is the probability that both cars are black?
- 5.) A toy maker researched the amount of defected footballs. In one store, there were 20 perfect footballs, and 4 defected footballs. If you randomly selected 2 footballs, what is the probability that both of them are perfect?
- 6.) There are 14 pieces of candy in a bag. Four are broken. What is the probability of reaching into the bag and pulling out a non-broken piece?

7.) Maria flips a coin 20 times. The coin only lands on tails 9 times. According to theoretical probability how many more times would Maria have expected the coin to land on tails?

8.) On the spinner below, what is the probability of spinning a prime number, and flipping a heads on the coin? Are these events independent or dependent?

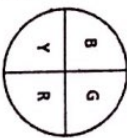


9.) Marvin has a bag of 20 marbles. 8 of the marbles are clear, 4 are blue, 5 are yellow, and 3 are black. What is the probability that Marvin will randomly pull 3 clear marbles out of the bag in a row if he does not replace the marbles after he pulls them?

10.) There is a 0.05 chance that we will have an earthquake this year. What is the probability that we will NOT have an earthquake?

11.) A spinner is divided into 4 equal sections. During a board game, Conner spun the spinner 12 times. The results are shown in the table below.

| Color  | # spins |
|--------|---------|
| Blue   | 5       |
| Green  | 2       |
| Yellow | 1       |
| Red    | 4       |



Theoretically, how many times would Conner have expected to land in each section? \_\_\_\_\_

How does the Theoretic probability of these events compare to the experimental probability? \_\_\_\_\_

12.) There are 40 children watching a magic show. 24 of the children are boys, and 16 of the children are girls. The magician needs to select 4 children to help him with his show. What is the probability that all 4 helpers will be girls? (Show all work)

13.) 80 percent of all California drivers wear seatbelts. If 4 drivers are pulled over, what is the probability that all 4 will be wearing their seatbelts?

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Find the Probability Practice

1. If you roll a number cube, what is the probability of rolling a 4?
2. If you roll a number cube, what is the probability of rolling an even number?
3. If you roll two number cubes, what is the probability of rolling double 6's? (Hint: create a table)
4. If you roll two number cubes, what is the probability of rolling doubles (two 1s, two 2s, etc.)?
5. When flipping a coin twice, what is the probability of flipping heads both times?
6. If you have a number cube and a spinner with three equal sections but two sections are shaded, what is the probability you will roll a 2 and the spinner will land in a shaded section?
7. If one out of 250 pregnancies results in identical twins, what is the probability of not having twins?
8. If one out of 250 pregnancies results in identical twins, what is the probability of having 2 sets of identical twins?
9. 40% of people have O+ blood. If you select 5 people, what is the probability exactly 3 will have O+ blood?
10. 10% of people have green eyes. If you select 5 people, what is the probability exactly 1 person will have green eyes?

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Name \_\_\_\_\_ Date \_\_\_\_\_

# Probability Practice

Show your work for all problems below!

(For 1 – 3) A bag contains 12 purple marbles and 8 blue marbles.

1. What is the probability that you select a purple marble? Express the probability as a decimal.
2. What is the probability that you select a blue marble? Express the probability as a percent.
3. What is the probability of drawing a purple marble, putting it back in the bag, and then drawing another purple marble? Express the probability as a fraction in simplest form.

(For 4 – 10) A bucket contains 10 cubes labeled as follows: A, A, B, C, C, C, C, D, E, E.

4. What is the probability of drawing a cube labeled C? Express the probability as a decimal.
5. What is the probability of drawing a cube labeled with something other than a B? Express the probability as a percent.
6. What is the probability of drawing an A, replacing it and then drawing another A? Express the probability as a fraction in simplest form.
7. What is the probability of drawing an E, NOT replacing it and then drawing a C? Express the probability as a percent.
8. What is the probability of drawing an A or B? Express the probability as a decimal.

There is a 30% chance of rain today and a 40% chance of rain tomorrow.

9. What is the probability it will rain both days? Express your answer as a decimal.  
\_\_\_\_\_
10. Use what you know about determining probability to explain how you found your answer. Use words, symbols and/or numbers in your explanation.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

A jar contains 6 blue gumballs, 7 red gumballs and 7 yellow gumballs.

11. What is the probability of picking a blue gumball, not replacing it, and then picking another blue or a yellow gumball? Express your answer as a percent.  
\_\_\_\_\_
12. Use what you know about determining probability to explain how you found your answer. Use words, symbols and/or numbers in your explanation.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Name \_\_\_\_\_

Date \_\_\_\_\_

# SIMULATIONS & PROBABILITY

Determine which would be the best simulation experiment for each situation. Find your answer in one of the three answer boxes. Using the problem number and color that corresponds to the answer you picked, color following page!

| # | ANSWER 1  | ANSWER 2   | ANSWER 3  |
|---|---|--|---|
| 1 | Flip a coin 12 times. Heads is a save. Tails is a miss. BROWN | Spin a 12 section spinner once. BLACK                                | See how many goals you can score in 12 shots. GRAY                    |
| 2 | Shoot a basketball 20 times. BLACK                            | Flip a coin 20 times. Heads you make it, Tails you don't. BROWN      | Spin a spinner 20 times that has three 3 blue sections and 1 red. RED |
| 3 | Spin a four sectioned spinner 25 times. BROWN                 | Flip a coin 25 times. Heads is correct and Tails is incorrect. BLACK | Practice by guessing on a real test in your class. WHITE              |
| 4 | $\frac{1}{2}$<br>ORANGE                                       | $\frac{1}{3}$<br>PURPLE  | $\frac{1}{4}$<br>YELLOW   |
| 5 | 0.11<br>ORANGE  | 0.55<br>BROWN  | 0.45<br>GREEN   |

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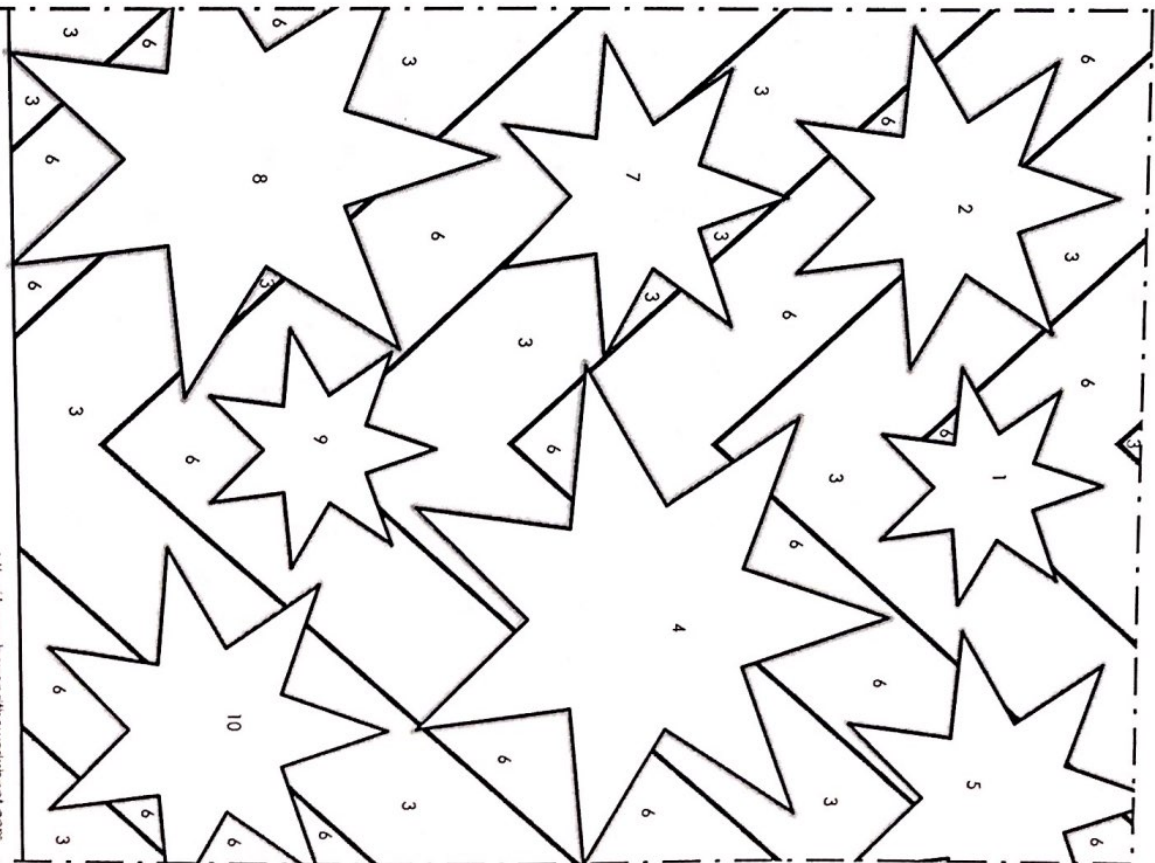
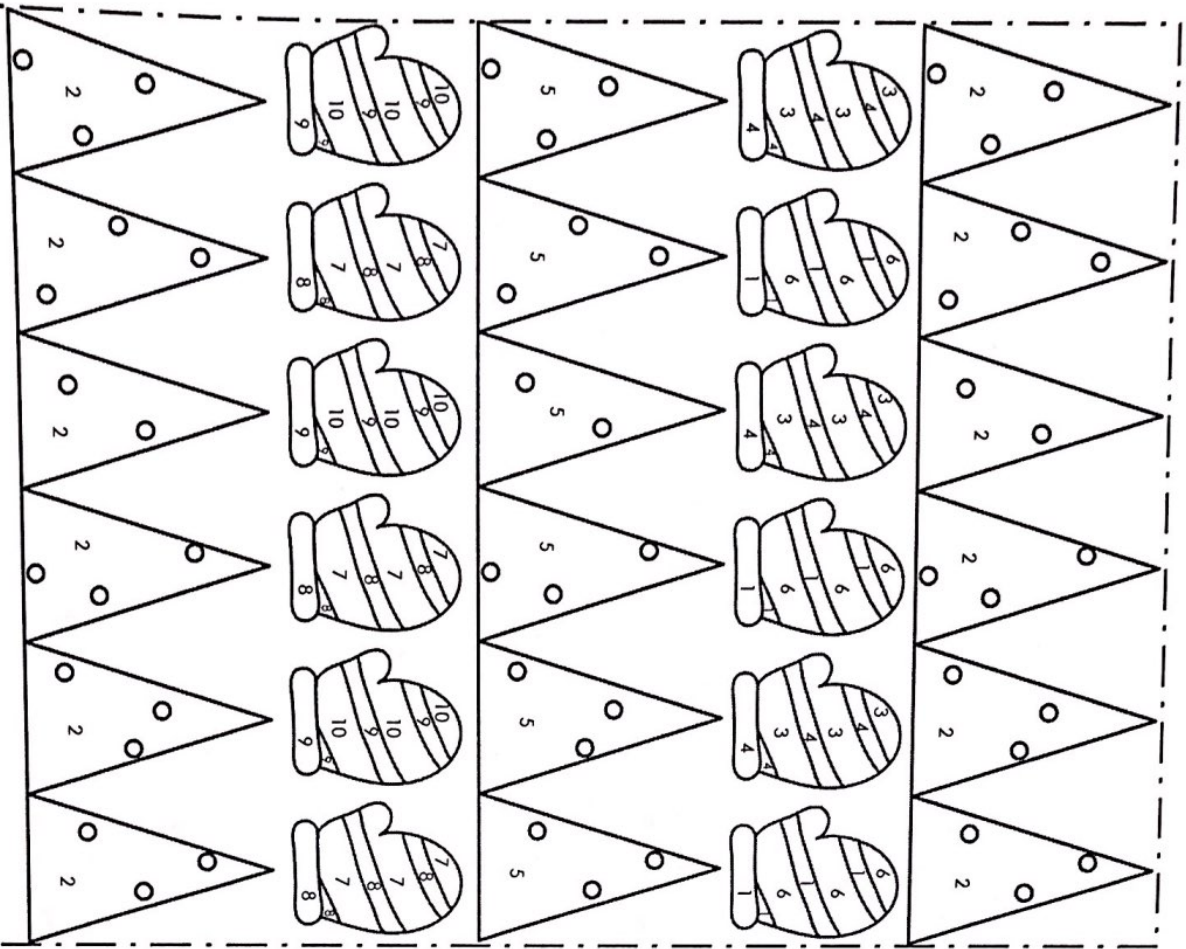
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| #  | ANSWER 1                  | ANSWER 2                   | ANSWER 3                 |
|----|---------------------------|----------------------------|--------------------------|
| 6  | 0.36<br>WHITE             | 0.09<br>BROWN              | 0.64<br>BLACK            |
| 7  | $\frac{22}{40}$<br>YELLOW | $\frac{11}{160}$<br>ORANGE | $\frac{11}{156}$<br>RED  |
| 8  | 36<br>BLUE                | 11<br>RED                  | 18<br>GREEN              |
| 9  | $\frac{1}{2}$<br>PURPLE   | $\frac{1}{4}$<br>ORANGE    | $\frac{1}{16}$<br>YELLOW |
| 10 | $\frac{1}{216}$<br>PINK   | $\frac{1}{36}$<br>PURPLE   | $\frac{1}{27}$<br>GRAY   |

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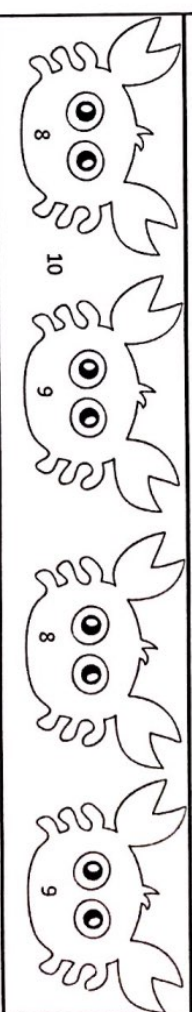
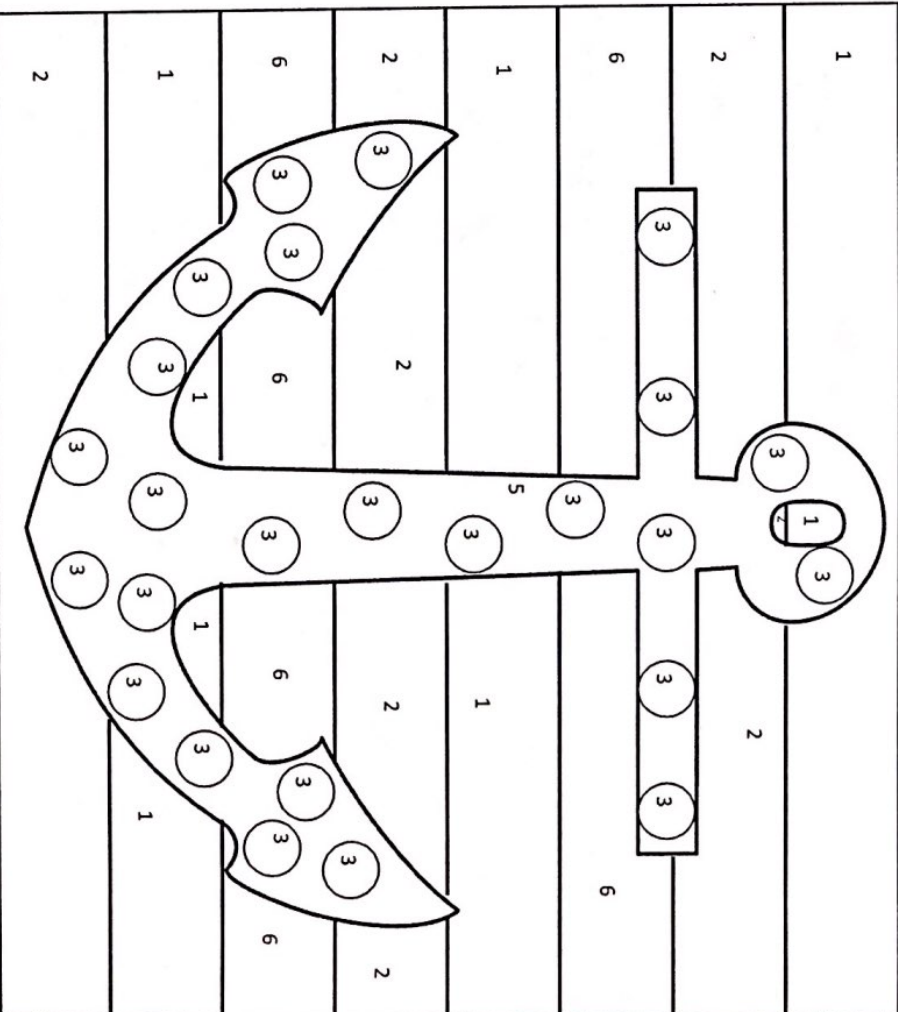
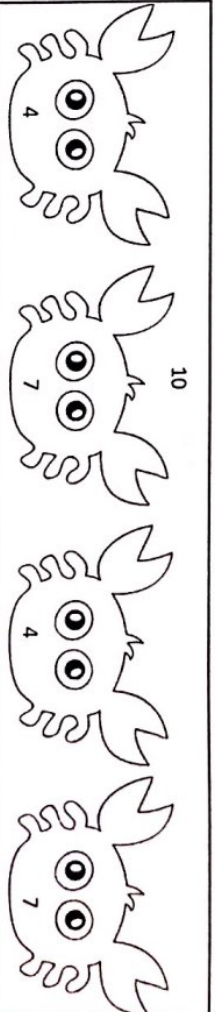
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# Probability Practice

Solve each problem. Find your answer in one of the three answer boxes. Find the problem number on the coloring page and color each section with the number the color that corresponds to your answer.

| #  | Answer 1                | Answer 2                | Answer 3                 |
|----|-------------------------|-------------------------|--------------------------|
| 1  | $\frac{1}{3}$<br>Orange | $\frac{7}{6}$<br>Yellow | $\frac{5}{8}$<br>Red     |
| 2  | $\frac{1}{4}$<br>Green  | $\frac{1}{2}$<br>Blue   | $\frac{3}{50}$<br>Purple |
| 3  | 0.18<br>Pink            | 0.6<br>Black            | 0.30<br>Green            |
| 4  | 25<br>Brown             | 20<br>Gray              | 32<br>Black              |
| 5  | 0.12<br>Orange          | 0.6<br>Blue             | 0.4<br>Red               |
| 6  | 16<br>Red               | 36<br>Yellow            | 3<br>Orange              |
| 7  | 460<br>Pink             | 115<br>Blue             | 1,035<br>Yellow          |
| 8  | 0.25<br>Red             | 0.5<br>Purple           | 0.0625<br>Green          |
| 9  | $\frac{1}{3}$<br>Brown  | $\frac{1}{9}$<br>Purple | $\frac{1}{36}$<br>Black  |
| 10 | 0.6<br>Green            | 0.2<br>Blue             | 0.75<br>White            |



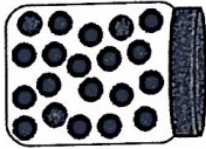


Name \_\_\_\_\_

### PROBABILITY STUDY GUIDE

- There are three choices of jellybeans – grape, cherry and orange. If the probability of getting a grape is  $\frac{3}{20}$  and the probability of getting cherry is  $\frac{2}{5}$ , what is the probability of getting orange?

- The container below contains 7 red, 3 blue, and 10 green marbles. Without looking, if Eric chooses a marble from the container, what will the probability of getting a red marble be? A blue marble? A green marble?



- A bag that contains 5 green marbles, 8 red marbles, and 20 blue marbles. What is the probability of pulling a green marble followed by a red marble, without replacing the first marble?
- A bag that contains 5 green marbles, 8 red marbles, and 20 blue marbles. What is the probability of pulling a green marble followed by a red marble, with replacing the first marble?
- A bag contains 100 marbles, some red and some purple. Suppose a student, without looking, chooses a marble out of the bag, records the color, and then places that marble back in the bag. The student has recorded 13 red marbles and 12 purple marbles. Using these results, predict the number of red marbles in the bag.
- What is the probability of flipping a coin and having it land on heads, and then rolling a die and having it land on an even number?
- A fair coin will be tossed three times. What is the probability that one heads and two tails in any order will results?

Name \_\_\_\_\_

- Students conduct a bag pull experiment. A bag contains 7 marbles: There is one red marble, two blue marbles and four purple marbles. Students will draw one marble without replacement and then draw another. Find the probability of drawing one purple marble followed by another purple marble.

- A box contains 10 purple marbles, 7 green marbles and 3 orange marbles. Two consecutive draws are made from the box without replacement of the first draw.

Find the probability of each event.

- orange first, green second
- both marbles are purple
- the first marble is purple, and the second is ANY color EXCEPT purple

- If you draw two cards from a standard deck of 52 cards without replacement, find:
  - P (Queen first, Jack second)
  - P (Red card first, spade second)

c. P (2 Ace)

Answers

- \_\_\_\_\_ 7 \_\_\_\_\_
- Red \_\_\_\_\_ Blue \_\_\_\_\_ Green \_\_\_\_\_ 8. \_\_\_\_\_
- \_\_\_\_\_ 9. A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_
- \_\_\_\_\_ 10. A \_\_\_\_\_ B \_\_\_\_\_ C \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_