Your final answer must be a reduced fraction or a percent! Show your work.

Theoretical Probability

1. If you roll a number cube, identify what the **theoretical** probability is of rolling a 1 or a 6?

#1 answer: $\frac{1}{3}$

$P(1 or 6) \longrightarrow \frac{2}{6} = \frac{1}{3}$

2. A jar contains 8 blue marbles, 2 red marbles and 4 green marbles. If you pick one out, identify what the **theoretical** probability is that the marble will be red?

#2 answer: $\frac{1}{7}$

$P(R) \rightarrow \frac{2}{14} = \frac{1}{7} =$

3. This year's "taste-off" competition among restaurants has been narrowed to 25 finalists: 10 Italian, 5 German, 5 Mexican, and 5 Japanese restaurants. Identify what the **theoretical** probability is that an Italian or Japanese restaurant wins the competition, given that all restaurants have an equal chance?

#3 answer: $\frac{3}{5}$

$P(I for JP) = \frac{15}{25} = \frac{3}{5} =$

Experimental Probability

For 4 & 5, consider the data to the right.

H	H	T	T	T
T	T	H	T	H
T	T	T	T	H
H	T	H	T	H

4. A penny is flipped 20 times. The chart above shows the outcomes of the experiment. Identify what the **experimental** probability is of the penny turning up heads?

#4 answer: $\frac{2}{5}$

$P(H) \rightarrow \frac{8}{20} = \frac{2}{5}$

5. Identify what the **experimental** probability is of the penny turning up heads or tails?

$P(H or T) \rightarrow \frac{20}{20} = 1$

#5 answer: 1

For 6 & 7, consider the data to the right.

6	4	2	3	4
3	1	5	3	6
6	3	2	4	3
2	5	1	4	6

6. A die is rolled 20 times. The chart above shows the outcomes of the experiment. Identify what the **experimental** probability is that the die will turn up an odd number?

$P(odd) = \frac{9}{20}$

#6 answer: $\frac{9}{20}$

7. Using the chart above, identify what the **experimental** probability is that the die will turn up 4?

$P(4) \rightarrow \frac{4}{20} = \frac{1}{5}$

#7 answer: $\frac{1}{5}$

Independent Events

8. Suppose Brooke tosses three nickels. Identify the probability that all three will show tails.

$P(N, N, N) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

#8 answer: $\frac{1}{8}$

9. You flip a coin and toss a 6-sided number cube. Identify what the probability is that you will get heads and a 5?

#9 answer: $\frac{1}{12}$

$$P(H \text{ ; } 5) = \frac{1}{2} \cdot \frac{1}{6} =$$

10. A bag contains 3 Snickers, 4 Milky Way, and 5 Heath bars. Bailey reaches in the bag and picks one candy bar, then puts it back in the bag and picks another candy bar. Identify what the probability is that she will get a Snickers and then a Milky Way?

#10 answer: $\frac{1}{12}$

$$P(Sn \text{ ; } MW) = \frac{\cancel{3}}{\cancel{4}12} \cdot \frac{\cancel{4}^1}{12_{\times 3}} =$$

Dependent Events

11. A chemistry teacher received a shipment of 20 glass graduated cylinders. Five of these have cracks. If she randomly selects 2 cylinders from the box to use for a class demonstration, identify what the probability is that neither cylinder is cracked?

#11 answer: $\frac{21}{38}$

$$P(N\text{crked} \text{ ; } N\text{crked}) = \frac{3\cancel{15}}{2\cancel{420}} \cdot \frac{14^7}{19} =$$

12. There are 5 red, 2 yellow, 6 black, and 6 blue marbles in a hat. You pick 2 marbles from the hat. Marbles are <u>not</u> returned after they have been drawn. Identify what the probability is that the first marble is red and the second is black?

#12 answer: $\frac{5}{57}$

$$P(R \text{ ; } Blk) = \frac{5}{19} \cdot \frac{\cancel{6}^1}{3\cancel{18}} =$$

13. A deck of cards has 4 blue, 3 black, and 6 purple cards. You pick 2 cards from the deck. Cards are <u>not</u> returned to the deck after they are picked. Identify what the probability is that you will get two blue cards?

#13 answer: $\frac{1}{13}$

$$P(Blu \text{ ; } Blu) = \frac{\cancel{4}^1}{13} \cdot \frac{\cancel{3}^1}{\cancel{12}_{\times 4}^1} =$$

Compound Events

For each of the following, circle (I) for independent or (D) for dependent. Then find the probability. Your final answer can be a reduced fraction or a percent.

14. You roll a fair 6-sided die and then draw one card from a standard deck of cards. Find the P (odd, red jack)

(I) or D

$$P(odd, \text{ red jack}) = \frac{\cancel{3}^1}{\cancel{26}^1} \cdot \frac{\cancel{2}^1}{52} =$$

#14 answer: $\frac{1}{52}$

15. You have 7 pairs of red socks, 2 pairs of green socks and 3 pairs of white socks. You choose 2 pairs without replacement. Find the P(red pair, white pair)

I or (D)

#15 answer: $\frac{7}{44}$

$$P(R \text{ ; } w) = \frac{7}{\cancel{12}_4} \cdot \frac{\cancel{3}^1}{11} =$$

16. You draw three cards from a standard deck of playing cards and **do NOT replace** them after each draw. Find the P(heart, diamond, diamond)

I or (D)

#16 answer: $\dfrac{13}{850}$

$$P(Hrt, Dia, Dia) = \dfrac{13}{\cancel{52}_{4}} \cdot \dfrac{13}{\cancel{51}_{17}} \cdot \dfrac{12}{50} =$$

17. You draw three cards from a standard deck of playing cards and **replace** them after each draw. Find the P(heart, diamond, diamond)
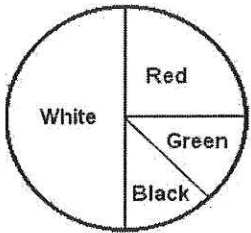
(I) or D

#17 answer: $\dfrac{1}{64}$

$$P(Hrt, Dia, Dia) = \dfrac{13}{52} \cdot \dfrac{13}{52} \cdot \dfrac{13}{52} =$$

18. You roll a fair 6 sided die, flip a coin, and then spin the spinner shown below. Find the P(odd, heads, red)
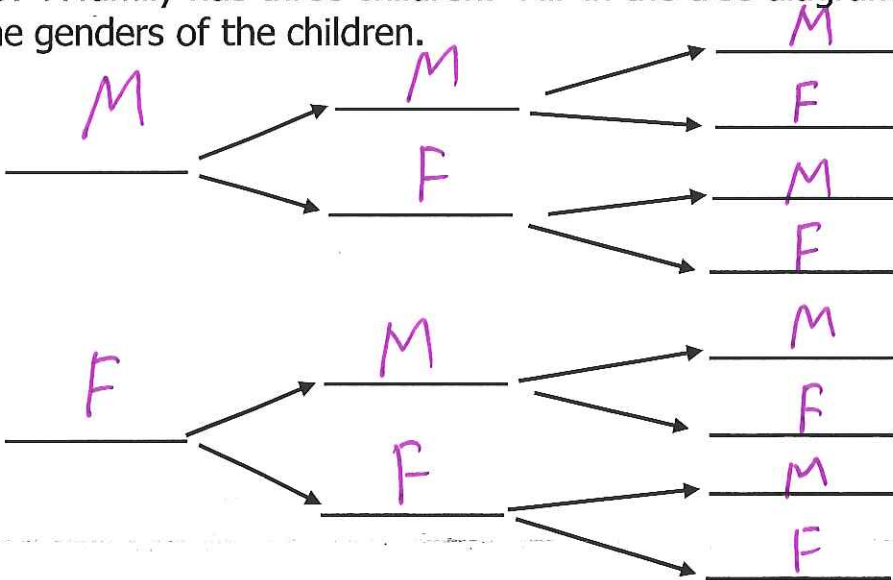
(I) or D

#18 answer: $\dfrac{1}{16}$

Red
White
Green
Black

$$P(odd, H, Rd) = \dfrac{\cancel{3}}{\cancel{6}_{2}} \cdot \dfrac{1}{2} \cdot \dfrac{\cancel{21}}{\cancel{84}_{4}} =$$

Tree Diagrams

19. A family has three children. Fill–in the tree diagram to show the sample space of the genders of the children.

M = Male

F = Female

M
  M
    M
    F
  F
    M
    F

F
  M
    M
    F
  F
    M
    F

20. Use the diagram above to determine the probability of the family having two girls and a boy.

$$P(G, G, B) = \dfrac{3}{8}$$

#20 answer: $\dfrac{3}{8}$

21. Use the diagram above to determine the probability of the family having AT LEAST 1 boy.

$$P(at\ least\ 1\ boy) = \dfrac{7}{8}$$

#21 answer: $\dfrac{7}{8}$

Combinations

22. The owner of Salvadore's Restaurant plans to advertise the variety of lunches served. If there are five varieties of vegetables, four types of main courses, and six kinds of salads, identify how many total combinations of one vegetable, one main course and one salad there are?

#22 answer: _120_
Total
Combinations

Total Combinations: $5 \cdot 4 \cdot 6 = 120$

23. Lunches for the school picnic were made up of 1 item from each category: 3 beverages, 4 salads, 2 types of bread, and 4 fruit.
Identify how many combinations there are?

#23 answer: _96_
Total
Combinations

Total Combinations: $3 \cdot 4 \cdot 2 \cdot 4$

MAKE SURE THAT YOU SHOWED YOUR WORK AND YOUR FRACTIONS ARE REDUCED!