1. Josh has a bag containing pieces of candy. The bag contains 10 red circular pieces, 10 red square pieces, 10 blue triangular pieces, and 10 blue star-shaped pieces. He draws a red piece of candy from the bag.

   What is the complement of this event? $P(R^c) = P(B)$

   (A) He draws a blue piece
   B) He draws a square piece
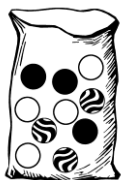   C) He draws a circular piece
   D) He draws a star-shaped piece

2. Given the spinner, what is the:

   P(Red) = $3/8$

   P(Red)^C = $5/8$

   P(White) = $\frac{1}{8}$

   P(Green) = $0/8$

   P(Green)^C = $8/8$

   P(Blue) = $4/8$
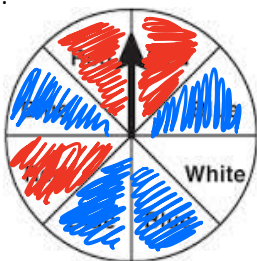
3. Given a bag of marbles, what is the:

   P(Black) = $3/10$

   P(White) = $4/10$

   P(Swirl) = $3/10$

   P(Swirl)^C = $7/10$

4. Sam is picking fruit from a basket that contains many different kinds of fruit. Which set is independent?

   A) Event 1: He picks a kiwi and eats it
      Event 2: He picks an apple and eats it

   B) Event 1: He picks an apple and eats it
      Event 2: He picks an apple and eats it

   C) Event 1: He picks a kiwi and eats it
      Event 2: He picks a kiwi and puts it back

   D) Event 1: He picks a kiwi and puts it back
      Event 2: He picks an apple and puts it back

5. Given the roll of 2 dice and their values are summed, what is the:

   Complete the table of the sample space of the sum of two die.

	•	••	•••	••••	•••••	••••••
•	2	3	4	5	6	7
••	3	4	5	6	7	8
•••	4	5	6	7	8	9
••••	5	6	7	8	9	10
•••••	6	7	8	9	10	11
••••••	7	8	9	10	11	12

   P(sum of 12) = $4/36$

   P(sum of 12)^C = $35/36$

   P(sum of 7) = $6/36$

   P(sum of 4) = $3/36$

   P(sum of 4)^C = $33/36$

   P(even sum)^C = $18/36$

   $P(odd) =$

6. Joemomma is choosing cards from a deck of cards or rolls a die. Which set is independent?

   A) Event 1: He picks a card and keeps it
      Event 2: He picks a second card

   B) Event 1: He picks a card and keeps it
      Event 2: He rolls a die

   C) Event 1: He picks a marble and keeps it
      Event 2: He picks a second marble

   D) Event 1: He picks a card and rips it up
      Event 2: He picks a second card

7. A total of 200 people attend a party, as shown in the table.

	Adults	Children	Total
Male	60	20	80
Female	90	120(.25)=30	120
Total	150	50	200

A person is selected at random to win a prize. The probability of selecting a child, given that the person is female, is 0.25. The probability of selecting a male, given that the person is a child, is 0.4. 50(.40)=20

Complete the two-way table to show the number of adults, children, males, and females who attended the party.

8. Rosa collects data on what students at her school like to eat at the movie theater. She asks a random sample of 120 students two questions:

- Do you like to eat popcorn at the movie theater?
- Do you like to eat candy at the movie theater?

Her data are partially shown in the table. Of the students she asks, 60% of those who like to eat popcorn also like to eat candy. Complete the table to show the number of students in each category.

	Like Popcorn	Don't Like Popcorn	Total
Like Candy	.60 (70) 42	16	58
Don't Like Candy	28	34	62
Total	70	50	120

9. A total of 50 students play either soccer or lacrosse.

- 20 girls play lacrosse
- 20 boys play either soccer or lacrosse
- 20 students play soccer

What is the probability that a student plays soccer or is a girl?

$$P(G \cup S) = P(G) + P(S) - P(G \cap S)$$
$$= \frac{30}{50} + \frac{20}{50} - \frac{10}{50}$$
$$= \frac{40}{50}$$

	Lacrosse	Soccer	total
Boy	10	10	20
Girl	20	10	30
total	30	20	50

10. Use the incomplete table to answer the questions below.

a. Complete the table.

	Adults	Children	Total
Male	10	20	30
Female	15	45	60
Total	25	65	90

b. If a person is chosen at random, what is the probability the person is an adult and a male?

$$P(A \cap M) = \frac{10}{90}$$

c. If a person is chosen at random, what is the probability the person is a child? $P(C) = \frac{65}{90}$

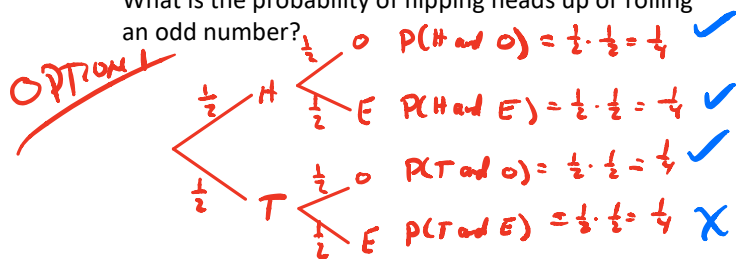d. If a female is chosen at random, what is the probability the female is a child? $P(C|F) = \frac{45}{60}$

e. If a child is chosen at random, what is the probability the child is an adult and a female?

$$P(A \cap F | C) = \frac{0}{60}$$

0

11. The probability of flipping a fair coin and heads landing face up is 0.5. The probability of rolling a fair number cube, with sides numbered 1 through 6, and an odd number landing face up is 0.5.

What is the probability of flipping heads up or rolling an odd number?

OPTION 1

$P(H \text{ and } O) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ ✓

$P(H \text{ and } E) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ ✓

$P(T \text{ and } O) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ ✓

$P(T \text{ and } E) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$ ✗

$P(H \text{ or } O) = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$

OPTION 2

$P(H \text{ or } ODD) = P(H) + P(ODD) - P(H \cap ODD)$

$= \frac{1}{2} + \frac{1}{2} - \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)$

$= \frac{2}{2} - \frac{1}{4}$

$= \frac{4}{4} - \frac{1}{4}$

$= \frac{3}{4}$

12. An online retailer conducts a random survey of its customers. The survey shows that 80% of the customers receive their purchases within four days, 95% of those customers are satisfied with the quality of their purchases.

What percent of all customers receive their purchases within four days and are not satisfied with the quality of their purchases?

A) 4%
B) 5%
C) 19%
D) 24%

.95 S

.80 4d

.05 Sᶜ $P(4d \text{ and } S^c) = (.80)(.05) = .04$

.20 4dᶜ
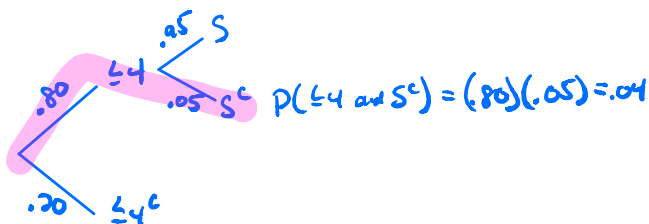
13. Events A and B are independent.
P(A and B) = 0.25
What are possible probabilities for events A and B?

P(A) = 0.25

P(B) = 1

Any combination of $P(A) \cdot P(B) = 0.25$ and $0 \le P(A)$ and $P(B) \le 1$

14. During a 90-day semester, a student records whether he arrives at school on time and whether he goes to bed by 10:00 pm the night before. The results are shown in the table

	Number of Occurrences		
	Arrives at School on Time	Arrives at School Late	total
Goes to Bed by 10:00 pm	72	8	80
Goes to Bed After 10:00 pm	9	1	10
total	81	9	90

Does the student arriving at school on time depend on whether the student goes to bed by 10:00 pm? Justify your reasoning.

$P(\text{on time}) = \frac{81}{90} = \frac{9}{10}$

$P(\text{on time} \mid \text{by 10:00}) = \frac{72}{80} = \frac{9}{10}$

$P(\text{on time}) = P(\text{on time} \mid \text{by 10:00})$

These are independent events.

15. The two-way table shows the number of births, in thousands, in the United States for the years 2010 and 2011.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2010	324	303	340	327	325	338	346	359	350	342	337	326	4017
2011	322	299	330	315	328	335	348	362	346	331	328	322	3966

A baby born in 2011 is randomly selected. What is the probability that the baby was born in February?

$\dfrac{299}{3966}$

16. Fransisco asks the students in his school what pets they have. He studies the events show.
    - Event S: The students has a cat.
    - Event T: The students has a dog.

    Fransisco finds that the two events are independent. Select all the equations that must be true for events S and T.

    - ○ $P(S|T) = P(S)$
    - ○ $P(S|T) = P(T)$ _Dumb_
    - ○ $P(T|S) = P(S)$ _Dumb_
    - ○ $P(T|S) = P(T)$
    - ○ $P(S \cup T) = P(S) \cdot P(T)$
    - ○ $P(S \cap T) = P(S) \cdot P(T)$

17. Juan studies the events shown below.
    - Event A: A student has hairy moles
    - Event B: A student is born by the toxic waste plant

    Juan find the $P(A|B) = P(A)$

    What assumptions can be made about Event A and Event B? Choose all that apply.

    A. A and B are independent
    B. A and B are dependent
    C. A and B are mutually exclusive
    D. A and B must happen together
   E. A and B can't happen together

18. Timmy studies the events shown below.
    - Event A: A student has no teeth
    - Event B: A student is born in Midvale

    Timmy finds the $P(A \cap B) = P(A) \cdot P(B)$

    What assumptions can be made about Event A and Event B? Choose all that apply.

    A. A and B are independent
    B. A and B are dependent
    C. A and B are mutually exclusive
    D. A and B must happen together
    E. A and B can't happen together

19. Max studies the events shown below.
    - Event A: A student has no teeth
    - Event B: A student is born in Midvale

    Timmy find the $P(B|A) \neq P(B)$

   What assumptions can be made about Event A and Event B? Choose all that apply.

    A. A and B are independent
    B. A and B are dependent
    C. A and B are mutually exclusive
    D. A and B must happen together
    E. A and B can't happen together

20. This Venn diagram represents students who play instruments in the orchestra.
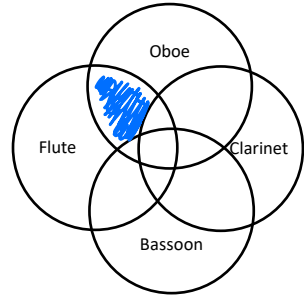
    Identify each region of the Venn diagram that represents students who play only the flute and the oboe

Use this for the next 2 problems: The usher at a wedding asked each of the 80 guests whether they were a friend of the bride or of the groom. Here are the results:
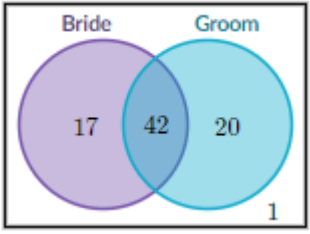
21. **In this sample, are the events "bride" and "groom" mutually exclusive?**

    No. 42 guests are friends with both bride & groom.

22. **Find the probability that a randomly selected person from this sample was a friend of the bride OR of the groom.**

    $P(B \text{ or } G) = \frac{79}{80}$