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A die is rolled 100 times. A 1 was rolled 14 times, a 2 was rolled 15 times, a 3 was rolled 20 times, a 4 was rolled 20 times, a 5 was rolled 16 times, and a 6 was rolled 15 times.

1.) What is the experimental probability of rolling a 6?

$\frac{15}{100}$

At the Rockville Middle School carnival, 12 of the first 120 people who played the ring toss game won the first prize, 24 won the second prize, and 36 won the third prize. What is the experimental probability of *not* winning the first, second, or third prize?

2.) [A] 60% [B] 45% [C] 50% [D] 40%

$120 - (12+24+36) = 48$ $\frac{48}{120} = \frac{4}{10}$

A coin is tossed and a die is rolled. What is the probability that the coin shows tails and the die shows a two?

3.) [A] $\frac{1}{12}$ [B] $\frac{1}{4}$ [C] $\frac{1}{2}$ [D] $\frac{1}{24}$

$P(T \wedge 2) = P(T) \cdot P(2) = \frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$

A coin is tossed and a 6-sided die is rolled. What is the probability that the coin shows tails and the die shows a 3 or a 4?

4.) $P(T) \cdot P(3) + P(T) \cdot P(4) = \frac{1}{2} \cdot \frac{1}{6} + \frac{1}{2} \cdot \frac{1}{6} = \frac{2}{12}$

A small manufacturing company has rated 70% of its employees as satisfactory and 30% as unsatisfactory. Personnel records show that 80% of the satisfactory workers had previous work experience in the job they are now doing, while 15% of the unsatisfactory workers had no work experience in the job they are now doing. If a person who has had no previous work experience is hired, what is the probability that this person will be a satisfactory employee?

5.)

		WORK EXP	NO WORK EXP
70%	SATISFACTORY	0.56	0.14
30%	NOT SATISFACTORY	0.255	0.045

$0.7 \cdot 0.8 = 0.56$
$0.7 \cdot 0.2 = 0.14$
$0.3 \cdot 0.15 = 0.045$
$0.3 \cdot 0.85 = 0.255$

$P(\text{SAT} \mid \text{NO EXP}) = \frac{0.14}{0.045+0.14} = 75.7\%$

A drawer contains 8 red socks, 5 white socks, and 9 blue socks. Without looking, you draw out a sock and then draw out a second sock without returning the first sock. What is the probability that the first sock and the second sock are both blue?

6.) [A] $\frac{12}{77}$ [B] $\frac{25}{484}$ [C] $\frac{81}{484}$ [D] $\frac{10}{231}$

$\frac{9}{22} \cdot \frac{8}{21} = \frac{72}{462} = \frac{12}{77}$

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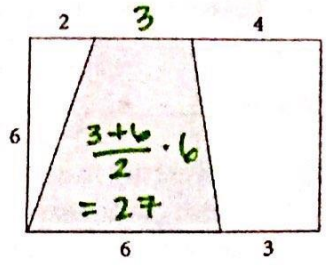
7.) A point is placed randomly in the rectangle below. What is the probability that the point is in the shaded region?

27/54

a. $\frac{3}{7}$ b. $\frac{4}{7}$ c. $\frac{1}{2}$ d. $\frac{5}{9}$



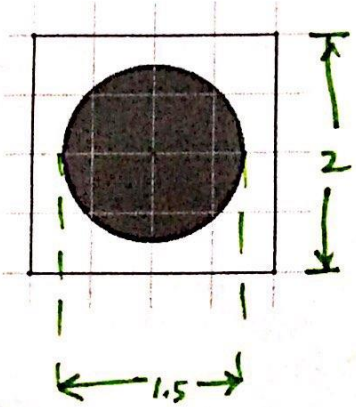
TOTAL
6·9
=54

8.) Greg is a Major League Baseball Pitcher. Accuracy is his strong suit. The target shown below is a square with a side length of 2 feet. Standing at the pitcher's mound, Greg never misses the square with a throw. Lenny is an umpire. Lenny's strike zone is a circle in the middle of the square with a diameter of 1.5 ft. Lenny will call the pitch a **strike** if Greg throws the ball into the circle. *What is the probability that Lenny does not throw a strike with his next pitch?*

1.0 − 0.442 ≈ 55.8

a. About 17.6% b. About 55.8% c. About 51.2% d. About 59.7%

e. None of the above.

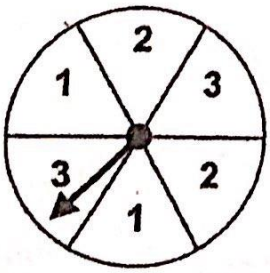


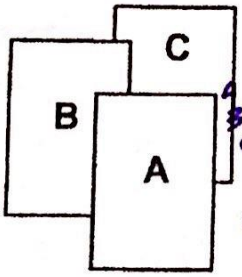
AREA = $\pi r^2 = \pi \cdot (0.75)^2 \approx 1.77$

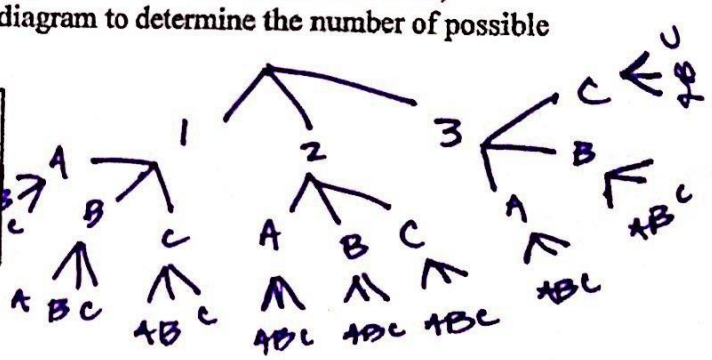
AREA = $B \cdot H = 4$

P(STRIKE ZONE) = $\frac{1.77}{4} \approx 44.2\%$

9.) Draw a tree diagram to show the sample space for each event. Then determine the number of possible outcomes for the event. You spin the spinner once and choose two cards, replacing each card after it is drawn. Use a tree diagram to determine the number of possible outcomes for the event.







27 POSSIBLE OUTCOMES

10.) A survey of 50 seventh-grade pet owners generated the following information:

i. 34 students had dogs, 18 had only dogs
ii. 24 students had fish, 2 had only fish
iii. 10 students had fish and cats
iv. 3 students had dogs and fish

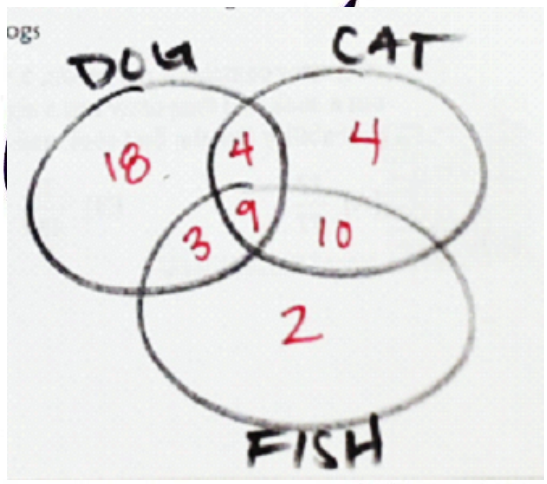
a. What is $P(dog \cap cat \cap fish)$ a. $\frac{3}{50}$

b. What is $P(dog \cup cat)$ b. $\frac{46}{50}$

c. What is P(fish|cat)? $\frac{19}{24}$

d. What is P(not fish)? c.

d. $\frac{26}{50}$



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11.) Jane has a 4-digit combination lock on her suitcase and has forgotten the combination. If she knows that the first digit is a 5 and the second digit is prime, how many numbers must Jane try before the lock is sure to open?

5 | 1,3,5,7 | ? | ?

$1 \cdot 4 \cdot 10 \cdot 10 = 400$

12.) Curtis is at a basketball game with a friend. The refreshment stand at the basketball game sells hot dogs, tacos, fries, hamburgers, and cheeseburgers to eat and cola, root beer, iced tea, coffee, milk, lemonade, and juice to drink. If he wants to order 3 items to eat and 2 items to drink without ordering more than 1 of any particular item, how many ways can Curtis order these items?

$\frac{5}{\text{FOOD 1}} \cdot \frac{4}{\text{FOOD 2}} \cdot \frac{3}{\text{FOOD 3}} \cdot \frac{7}{\text{DRINK 1}} \cdot \frac{6}{\text{DRINK 2}} = 2520$ combos

* MUST DIVIDE BY # OF DUPLICATES ie FCH = HCF

$5C_3 \cdot 7C_2$

$\frac{2520}{3 \cdot 2 \cdot 1 \cdot 2 \cdot 1} = 210$

Finn is taking a 3 question multiple-choice quiz. He estimates that he has a 40% chance of getting each question correct. Finn needs to score a 2 or better on the quiz to pass the class. *What is the probability of Finn passing the class?*

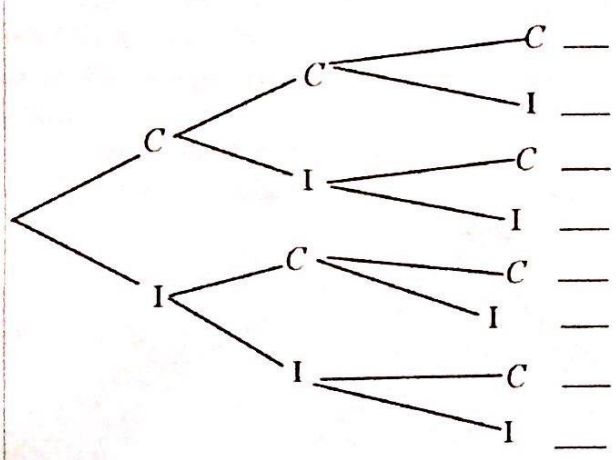
* SSS * MSS SMM
* SSM MMS MMM
* SMS MSM

Note: You may find it helpful to copy and complete the tree diagram below.

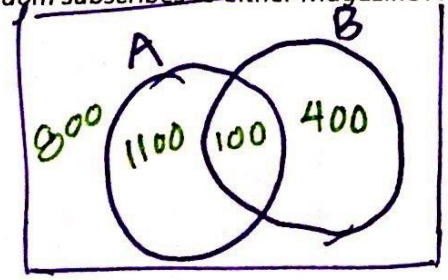
$P(2 \text{ OR } 3) = P(SSS) \cup P(SSM) \cup P(SMS) \cup P(MSS)$

$0.4 \cdot 0.4 \cdot 0.4 + 0.4 \cdot 0.4 \cdot 0.6 + 0.4 \cdot 0.6 \cdot 0.4 + 0.6 \cdot 0.4 \cdot 0.4 = 0.352$

$\approx 35\%$



13.) *Our city has 2400 subscribers for HipHop magazines Of these, 1200 subscribe to Magazine A, 500 subscribe to Magazine B, and 100 subscribe to both. What is the probability that a subscriber selected at random subscribes to ~~either Magazine A~~ or B? Use a Venn Diagram to find the answer.*



$P(A \cup B) = \frac{1600}{2400} = \frac{2}{3} \approx 67\%$

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14.) Consider the table shown below that shows the number of different types of automobiles produced by major manufacturers.

	GM	Ford	Honda	Toyota	
Cars	14	11	12	7	44
SUVs	8	9	5	6	28
Vans	2	3	5	3	13
	24	23	22	16	

TOTAL $24 + 23 + 22 + 16 = 85$

If picked at random, what is the probability that a randomly selected vehicle is a...

a. Ford? $\frac{23}{85}$

b. SUV? $\frac{28}{85}$

c. Van or a Toyota? $\frac{26}{85}$

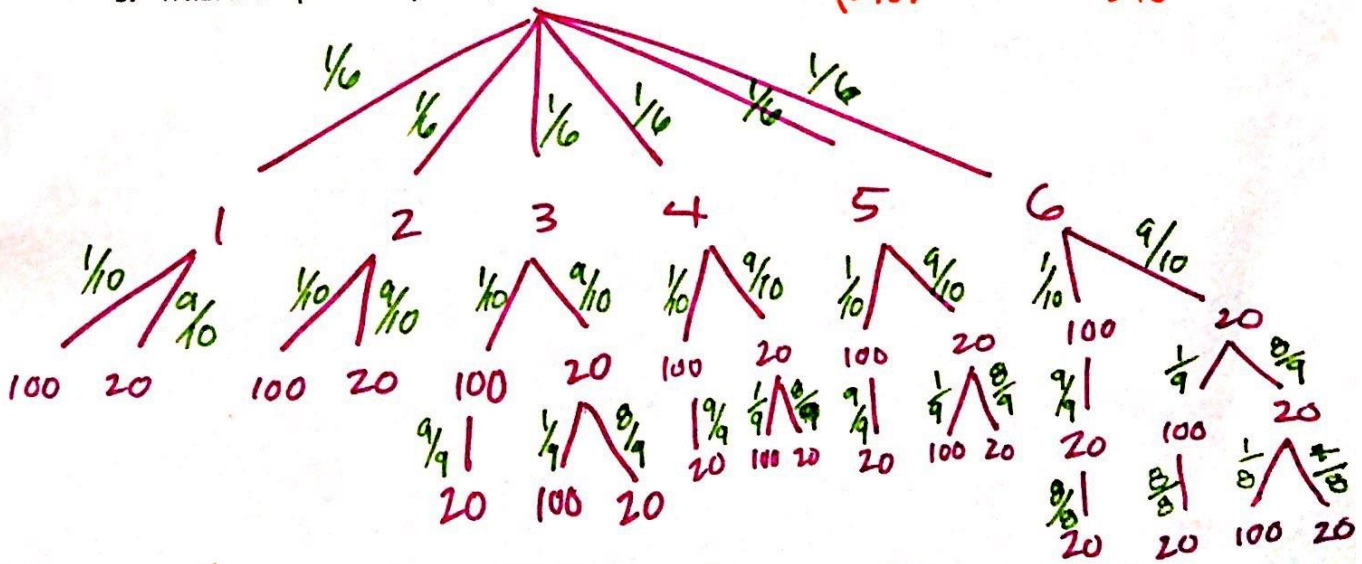
d. Car given that the vehicle is built by GM? $\frac{14}{24}$

e. Ford given that the vehicle is a SUV? $\frac{9}{28}$

15.) For a carnival game, a bag contains one \$100 bills and nine \$20 bills. You roll a single 6-sided die one time. If you roll a one or two you get to pull one bill out of the bag. If you roll a three, four, or five, you get to pull two bills out of the bag. If you roll a six you get to pull three bills out of the bag.

a. Draw a tree diagram for this situation.

b. What is the probability that you win exactly \$120? → $\left(\frac{9}{540}\right) \cdot 6 = \frac{54}{540} = \frac{1}{10}$



$P(\$120) = P(3 \cap 100 \cap 20) \cup P(3 \cap 20 \cap 100) \cup P(4 \cap 100 \cap 20) \cup P(4 \cap 20 \cap 100) \cup$

$\frac{1}{6} \cdot \frac{1}{10} \cdot \frac{9}{9} + \frac{1}{6} \cdot \frac{9}{10} \cdot \frac{1}{9} + \frac{1}{6} \cdot \frac{1}{10} \cdot \frac{9}{9} + \frac{1}{6} \cdot \frac{9}{10} \cdot \frac{1}{9} +$

$P(5 \cap 100 \cap 20) \cup P(5 \cap 20 \cap 100)$

$\frac{1}{6} \cdot \frac{1}{10} \cdot \frac{9}{9} + \frac{1}{6} \cdot \frac{9}{10} \cdot \frac{1}{9}$