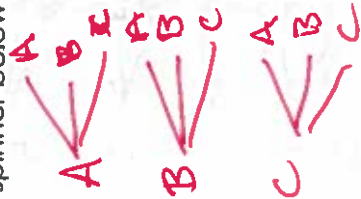
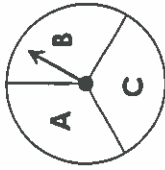


TREE DIAGRAMS

Tree Diagram

In many cases, there is more than one action or choice, which results in several outcomes. Tree diagrams are a useful tool to organize and show all the possible outcomes.

1. The spinner below is spun twice.



9 ways
 AA CA
 AB CB
 AC CC
 BA
 BB
 BC

Sample Space

Probability Questions

a) $P(B \text{ twice})$

$$\frac{1}{9}$$

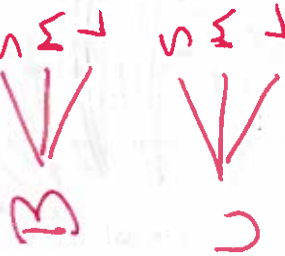
b) $P(\text{at least one A})$

$$\frac{5}{9}$$

c) $P(\text{no C})$

$$\frac{4}{9}$$

2. The popcorn stand offers buttered or unbuttered popcorn in three sizes: small, medium, and large.



6 ways
 BS
 BM
 BL
 US
 UM
 UL

a) $P(\text{buttered})$

$$\frac{3}{6} = \frac{1}{2}$$

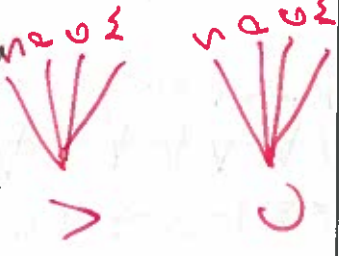
b) $P(\text{large})$

$$\frac{2}{6} = \frac{1}{3}$$

c) $P(\text{small with no butter})$

$$\frac{1}{6}$$

3. You have a choice of vanilla or chocolate ice cream, topped with sprinkles, peanuts, granola, or M&M's.



8 ways
 VS
 VP
 VG
 VM
 CS
 CP
 CG
 CM

a) $P(\text{chocolate})$

$$\frac{4}{8} = \frac{1}{2}$$

b) $P(\text{M&M's})$

$$\frac{2}{8} = \frac{1}{4}$$

c) $P(\text{vanilla with sprinkles})$

$$\frac{1}{8}$$

4. A day of the week is chosen at random, then a coin is tossed.

Su M T W Th F S
 H T H T H T H T H T H T H T

64 ways
 SuH SuT MTh MTF THH THT TTH THT WTh WT

a) $P(\text{tails}) = \frac{7}{14} = \frac{1}{2}$
 b) $P(\text{a day that starts with T}) = \frac{4}{14} = \frac{2}{7}$
 c) $P(\text{Friday, then heads}) = \frac{1}{14}$

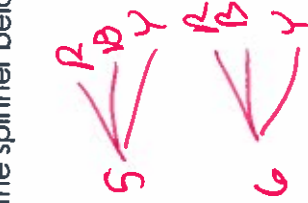
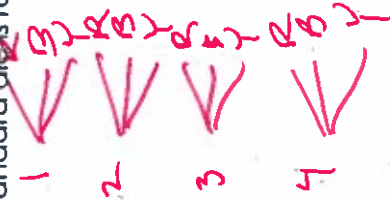
5. The spinner below is spun, then a letter from the word MATH is chosen at random.



20 ways
 TM TA TT TH PM PA PT PH PM PA PT PH PM PA PT PH

a) $P(\text{letter M}) = \frac{5}{20} = \frac{1}{4}$
 b) $P(\text{a shape with four congruent sides}) = \frac{8}{20} = \frac{2}{5}$
 c) $P(\text{a trapezoid, then not A}) = \frac{3}{20}$

6. A standard die is rolled, then the spinner below is spun.



18 ways
 1R 1B 1Y 2R 2B 2Y 3R 3B 3Y 4R 4B 4Y 5R 5B 5Y 6R 6B 6Y

a) $P(\text{prime number}) = \frac{9}{18} = \frac{1}{2}$
 b) $P(\text{red}) = \frac{6}{18} = \frac{1}{3}$
 c) $P(\text{at least 3, then yellow}) = \frac{4}{18} = \frac{2}{9}$