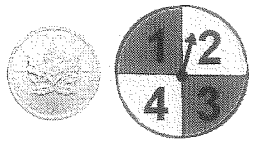
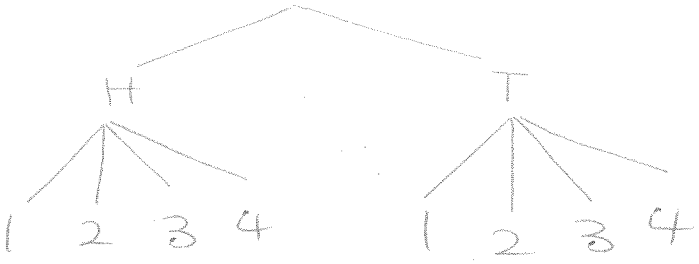
Foundations 12 4.1-4.4 Extra Practice Questions

A1. Patrick flips a coin and spins a spinner divided into four equal regions. Draw a tree diagram to show the possible outcomes.





8 outcomes

B1. The following information is similar to that from a mail-order catalogue. The information describes a shirt.
Style: long sleeve, short sleeve
Colour: white, black, red, beige, green
Neck: round, turtle, V neck

How many different possible shirts can you order?

$\underset{\text{style}}{2} \times \underset{\text{colour}}{5} \times \underset{\text{neck}}{3} = \boxed{30 \text{ shirts}}$

B2. A computer network is configured to accept a 6-letter alphanumeric password. This means that each character can either be a letter or a digit (1-9). The first 3 characters have to be a letter and the last 3 characters have to be a digit.

a) How many different passwords are possible?

$\underset{L}{26} \quad \underset{L}{26} \quad \underset{L}{26} \quad \underset{\#}{9} \quad \underset{\#}{9} \quad \underset{\#}{9} = \boxed{12{,}812{,}904}$

b) Suppose each character can be used only once. How many possibilities are there?

$\underset{L}{26} \quad \underset{L}{25} \quad \underset{L}{24} \quad \underset{\#}{9} \quad \underset{\#}{8} \quad \underset{\#}{7} = \boxed{7{,}862{,}400}$

C1. Simplify the following expressions.

a) $\frac{8!}{6!} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 8 \cdot 7 = \boxed{56}$

b) $\frac{(n+3)!}{n!} = \frac{(n+3)(n+2)(n+1)(n)\cdots}{n(n-1)\cdots} = \boxed{(n+3)(n+2)(n+1)}$

c) $\frac{(n-2)!}{(n+1)!} = \frac{(n-2)(n-3)(n-4)\cdots}{(n+1)(n)(n-1)(n-2)\cdots} = \boxed{\frac{1}{(n+1)(n)(n-1)}}$

C2. Solve for n: $\frac{(n+4)!}{(n+3)!} = 10$

$\frac{(n+4)(n+3)(n+2)\cdots}{(n+3)(n+2)\cdots} = 10$

$n+4 = 10$

$-4 \quad -4$

$\boxed{n = 6}$

D1. How many permutations are there of all the letters in NORTH?

$5!$ or $5P_5 = \boxed{120}$

D2. You have 12 stuffed animals. How many ways are there to arrange them on a shelf?

$12!$ or $12P_{12} = \boxed{479,001,600}$

E1. A truck contains one crate of carrots, broccoli, zucchinis, cauliflower, and cucumbers. One crate is removed at each of the first 3 stops. In how many different ways could the crates have been removed?

$5 \times 4 \times 3 = 5P_3 = \frac{5!}{2!} = \boxed{60}$

E2. Ten runners line up for the 100-m dash. How many possible ways are there for the first, second, and third place result?

$10 \cdot 9 \cdot 8 = 10P_3 = \frac{10!}{7!} = \boxed{720}$

E3. A baseball team has 12 members. In how many ways can the coach choose the batting order of 9 players?

$12\ 11\ 10\ 9\ 8\ 7\ 6\ 5\ 4 = 12P_9 = \frac{12!}{3!} = \boxed{79,833,600}$

F1. How many permutations are there of all the letters in MISSISSIPPI?

11 Letters
4 I's
4 S's
2 P's

$\frac{11!}{(4!4!2!)} = \boxed{34,650}$

F2. There are 7 boxes of cereal on a shelf. Five of the boxes are Raisin Bran, one box is Special K and one box is Lucky Charms. How many ways can the boxes be arranged in a row?

$\frac{7!}{5!} = \boxed{42}$ RRRRRSL

F3. A true-false test has 7 questions. How many answer keys are possible if 3 answers are True and 4 answers are False?

TTTFFFF $\frac{7!}{3!4!} = \boxed{35}$