

2) You have 8 different types of candy.

OR

a) How many ways are there to give Tom, Dick, and Harry each a piece of candy assuming each gets a different type?

$$8 \cdot 7 \cdot 6 = \boxed{336 \text{ different ways}}$$

b) How many ways are there to give Tom, Dick, and Harry each a piece of candy but not necessarily different types?

$$8 \cdot 8 \cdot 8 = 8^3 = \boxed{512 \text{ different ways}}$$

3) Suppose A and B are n-sets, $|A| = |B| = n$

OR

a) How many functions are there from A to B which are not 1-to-1?

U = Each element of A can map to any B

$$|U| = n^n$$

Let R be the set of all 1-to-1 functions from A to B

$$|R| = n(n-1)(n-2)\dots 1 = n!$$

$$|\bar{R}| = |U| - |R| = \boxed{n^n - n!}$$

b) How many $\boxed{n!}$ functions from A to B are onto.