Each morning you must decide what to wear.
An outfit consists of a pair of shoes, a pair of
pants, and a shirt.
You have the following to choose from:
3 pairs of shoes
5 pairs of pants
6 shirts

How many different outfits are possible?

Multiplication Counting Principle:

multiplying the number of choices for each step

$$\frac{6}{\text{SHIRTS}} \cdot \frac{3}{\text{SHOES}} \cdot \frac{5}{\text{pants}}$$

$$= \boxed{120 \text{ different outfits}}$$

A restaurant has the following menu choices:

| Appetizers | Wings, Potato Skins, Onion Rings, Cheese Sticks |
| Entrées | Chicken, Lamb, Steak, Burgers, Ham, Ribs |
| Desserts | Ice Cream Cone, Cake, Pie, Cupcake, Brownie, Ice Cream Sundae |

A dinner consists of one Appetizer, one Entrée,
and one Dessert. Find the number of different
dinners that are possible.

$$\frac{4}{\text{\# appetizers}} \cdot \frac{6}{\text{\# entrees}} \cdot \frac{6}{\text{\# desserts}}$$

$$= \boxed{144 \text{ different dinners}}$$

There are 5 people running a race. How many
different ways can 1st through 5th place be
awarded?

$$\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{}$$

$$= \boxed{120}$$

<u>Factorial</u>:   $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

Factorial is usually used if you are
arranging ALL of the available items.

Find each:

1.  $7! =$

    $= 5040$

2.  $\dfrac{8!}{5!} =$

    $= 336$

There are 12 people on a basketball team and only 12 uniform
numbers to pass out.

How many different ways can all 12 uniform numbers be
passed out to the players?

$\underline{12} \cdot \underline{11} \cdot \underline{10} \cdot \underline{9} \cdot \underline{8} \cdot \underline{7} \cdot \underline{6} \cdot \underline{5} \cdot \underline{4} \cdot \underline{3} \cdot \underline{2} \cdot \underline{1}$

OR

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