For 1 and 2 find the number of outcomes in each situation.

1. In the production of a movie, eight actors are considered for the male roles of Danny, Ken, and Marty. In how many ways can the director cast the male roles?

Since the roles are different you could use a permutation

or

you could use mult. count. princ.

$$\frac{8}{\text{Danny}} \cdot \frac{7}{\text{Ken}} \cdot \frac{6}{\text{Marty}} = 336$$

$$_8P_3 = 336$$

2. On your shelf there are the following movies: 5 mystery, 8 action/adventure, and 6 comedy.

a) How many ways can you pick one of each to watch over the weekend?

use mult. count. princ.

$$\frac{5}{\text{MYST.}} \cdot \frac{8}{\text{ACT/ADV}} \cdot \frac{6}{\text{COM}} = \boxed{240}$$

b) How many ways can you pick two of each to watch over the weekend? In other words, how many ways can you pick 2 of 5 mystery's __AND__ 2 of 8 action/adventure, __AND__ 2 of 6 comedy's to watch.

use mult. count. princ. together with Combinations → order you pick movies doesn't matter.

$$\frac{_5C_2}{2\text{ myst}} \cdot \frac{_8C_2}{2\text{ act/adv}} \cdot \frac{_6C_2}{2\text{ com}} = 10 \cdot 28 \cdot 15$$

$$= \boxed{4200 \text{ ways to have 2 of each}}$$

MULTIPLY because of words AND.

c) You only have time to watch two movies tonight and will watch two of the same kind of movie. How many ways could you pick 2 of the same kind of movie? In other words, how many ways can you pick 2 of 5 mystery's OR 2 of 8 action/adventure, OR 2 of 6 comedy's to watch.

The only difference compared to part b) is that the word OR tells me to ADD

$$\frac{_5C_2}{2\text{ myst}} + \frac{_8C_2}{2\text{ act/adv}} + \frac{_6C_2}{2\text{ com}} = \frac{10 + 28 + 15}{}$$

$$= \boxed{53 \text{ ways}}$$

3. In a bag are the numbers from 1 to 15. You will randomly pick one of the numbers from the bag. Find each probability as a fraction without reducing.

a) P(Odd and Prime) = $\dfrac{5}{15}$

Fav. outcomes must be both

3, 5, 7, 11, 13

⤷ ⇒ ⑤

c) P(Factor of 12) = $\dfrac{6}{15}$

Factors of 12:

1, 2, 3, 4, 6, 12

Fav outcomes = 6

b) P(Even or multiple of 3) = $\dfrac{10}{15}$

① EVEN: 2, 4, 6, 8, 10, 12, 14

⑤ MULT of 3: 3, 6, 9, 12, 15

② COUNTED TWICE: 6 & 12

Fav outcomes = 7 + 5 − 2

$= \boxed{10}$

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a) P(Odd and Prime) =   b) P(Even or multiple of 3)

c) P(Factor of 12) =