

Try these (11.1 & 11.2 review):

- 1 a. How many arrangements using all of the letters of the word PARALLELOGRAM are possible?

$$\frac{13!}{3!3!2!} = 86486400$$

3A's 3L's
2R's

- b. How many of these arrangements have all the L's together?

LLPARAEEOGRAM

$$\frac{11!}{3!2!} = 3326400$$

- c. How many of these arrangements have all the A's together?

Same as (b)

- d. How many of these arrangements have all the R's together?

$$\frac{12!}{3!3!} = 13305600$$

- e. How many of these arrangements have all the L's, all the A's, and all the R's together?

LLRRRAAPEOGM

$$8! = 40320$$

2. A school support team of six people is selected from a group of twelve volunteers consisting of three students, five teachers, and four parents. In how many ways can the team be chosen if it must contain

- a. any combination of each type of volunteer?

$${}_{12}C_6 = 924 \text{ possible teams}$$

- b. two of each type of volunteer?

$${}_3C_2 \times {}_5C_2 \times {}_4C_2 = 3 \times 10 \times 6 = 180 \text{ possible teams}$$

- c. at least three teachers?

$${}_5C_3 \times {}_7C_3 + {}_5C_4 \times {}_7C_2 + {}_5C_5 \times {}_7C_1$$

$$= 10 \times 35 + 5 \times 21 + 1 \times 7 = 462 \text{ possible teams}$$

3. In how many ways can a group of 12 people be split into a team of 5, a team of 4, and a team of 3?

$${}_{12}C_5 \times {}_7C_4 \times {}_3C_3$$

$$= 792 \times 35 \times 1$$

$$= \boxed{27720 \text{ ways}}$$