

HW Review: p. 846-7

③ 12 -  $w_1, w_2, w_3, w_4, r_1, r_2, r_3, r_4, b_1, b_2, b_3, b_4$

$$\begin{array}{r} \textcircled{6} \\ \hline 1st \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array}$$

⑪ 10 possible

3:7

⑪

		1 <sup>st</sup> die					
		1	2	3	4	5	6
2 <sup>nd</sup> die	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

2	1/36
3	2/36
4	3/36
5	4/36
6	5/36
7	6/36
8	5/36
9	4/36
10	3/36
11	2/36
12	1/36

①

47:3  
not : white  
white

50

$\frac{1}{2}$  prob. red       $\frac{3}{50}$  prob. white

$$\frac{1}{2} + \frac{3}{50} + x = 1$$

$$\frac{22}{50} \text{ prob. blue} = \frac{11}{25}$$

$$\frac{25}{50} + \frac{3}{50} + x = \frac{50}{50}$$

$$x = \frac{22}{50}$$

## Permutations:

All the different ways you can arrange things. They can help us calculate the number of possible outcomes without long lists.

IF

if

fi

②

FOR

for

fro

ofr

orf

rof

rfo

⑥

PARC

parc

pacr

prac

prca

pcra

pcar

aprc

apcr

arpc

arcp

acpr

acrp

⋮

⋮

⋮

crap

PARC

$$\overline{4} \times \overline{3} \times \overline{2} \times \overline{1} = \textcircled{24}$$

$$4! = 4 \times 3 \times 2 \times 1$$

# of Permutations of  $x$  items =  $x!$

$${}_x P_x = x!$$

ORANGE

$$\overline{6} \times \overline{5} \times \overline{4} \times \overline{3} \times \overline{2} \times \overline{1} =$$

$$\textcircled{720}$$

$${}_4 P_4 = 4! = 24$$

$${}_6 P_6 = 6! = 720$$

Find the number of ways you can arrange (a) all of the letters in the given word and (b) 2 of the letters in the word.

1. TACK

$${}_4P_4 = 4! = 24$$

$${}_4P_2 = \frac{4!}{2!} = \frac{4 \cdot 3 \cdot \cancel{2} \cdot \cancel{1}}{2 \cdot 1} = 12$$

2. MAR

$${}_3P_3 = 3! = 6$$

$${}_3P_2 = \frac{3!}{(3-2)!} = \frac{3!}{1!} = \frac{3 \times \cancel{2} \times \cancel{1}}{1} = 6$$

3. GAMER

$${}_5P_5 = 5! = 120$$

$${}_5P_2 = \frac{5!}{(5-2)!} = \frac{5!}{3!} = \frac{5 \times 4 \times \cancel{3} \times \cancel{2} \times \cancel{1}}{3 \times 2 \times 1} = 20$$

PLUG

$$\overline{4 \times 3 \times 2 \times 1} = {}_4P_4 = 4! = 24$$

$$\overline{4 \times 3} = {}_4P_2 = \frac{4!}{2!} = \frac{4 \times 3 \times \cancel{2} \times \cancel{1}}{\cancel{2} \times \cancel{1}} = 12$$

# of permutations  
of 2 out of 4 things  
- 4 things taken two at  
a time

## Finding probabilities using permutations:

permutations can help find this  $\rightarrow$

$$\text{probability} = \frac{\text{\# of times the desired outcome could happen}}{\text{total \# of outcomes}}$$

permutations can help find this  $\rightarrow$

MUD - probability  
of pick three letters  
that start with "m"?

mud  
mdv  
vdm  
vmd  
dum  
dmv

$$\frac{2}{6} = \frac{1}{3} \quad \frac{1}{6} \quad \frac{1}{3}$$



$$\text{STREAM} \quad {}_6P_6 = 6! = 720$$

Start with s?

$$\frac{120}{720}$$

$$\underline{s} \quad \overline{5} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} = 120$$

Start with s, t (in that order)

$$\underline{s} \quad \underline{t} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} = 24$$

$$\frac{24}{720}$$

$$\begin{array}{l} \underline{r} \quad \underline{e} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} = 24 \\ \underline{e} \quad \underline{r} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} = 24 \end{array} \quad \left. \vphantom{\begin{array}{l} \underline{r} \quad \underline{e} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} \\ \underline{e} \quad \underline{r} \quad \overline{4} \quad \overline{3} \quad \overline{2} \quad \overline{1} \end{array}} \right\} 48$$

$$\frac{48}{720}$$

Homework:

p. 853, 4-32 (even), 33