

Home: 82

page 640-641 #9-23 odd 25-30, 31-47 odd

Date: 1/13<http://www.mathvizza.com>Bell WorkDirections: For the following experiments, please:

1. determine how many events make up the experiment
2. determine the number of outcomes that are possible for each event
3. determine the number of possible outcomes there are for the experiment.

A. Flipping a coin, picking a letter out of the consonants and spinning spinner labeled 1-9.

1. 3

$$E_1 \rightarrow 2$$


$$E_2 \rightarrow 26 - 5 = 21$$

$$E_3 \rightarrow 9$$

$$\therefore 2 \cdot 21 \cdot 9$$

B. Picking 4 cards from 4 different standard poker decks

## Objectives

1. The students will comprehend **permutations**.
2. The students will use **permutations** to count the possible outcomes of **arranging  $n$  objects in a line**.
3. The students will use **permutations** to count that number of **arrangements for  $n$  objects** when some of the objects repeat.
4. The students will compute the **permutation of  $n$  objects taken  $r$  at a time**. 
5. The students will compute a **permutation of  $n$  objects arranged in a circle**.

Permutations

Permutation - # of distinct arrangements of  
a number of objects where order matters

Permutations for n objects  
in a line

$$n!$$

Permutations for n objects  
taken r at a time

$${}^n P_r = \frac{n!}{(n-r)!}$$

Permutations for n objects  
with repeated objects

$$\frac{n!}{d_1! d_2! \dots d_k!}$$

*d is any repeating item*

where d is the numbers of times  
an object repeats

Permutation of n objects  
arranged in a circle

$$(n-1)!$$

racelar

$$\frac{7!}{\binom{2!}{r} \binom{2!}{a} \binom{2!}{c}} = 630$$

Permutations for n objects

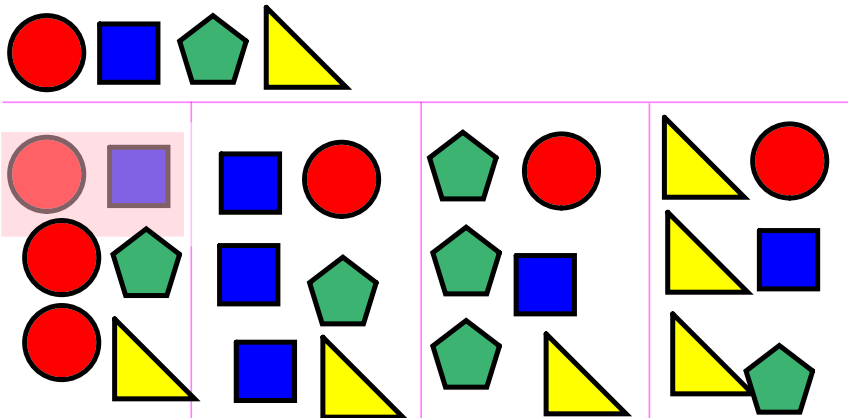
How many ways can you arrange 8 students in a line?

8!

Permutations for n objects

taken r at a time

How many ways can you arrange the following 4 shapes selecting 2 at a time?



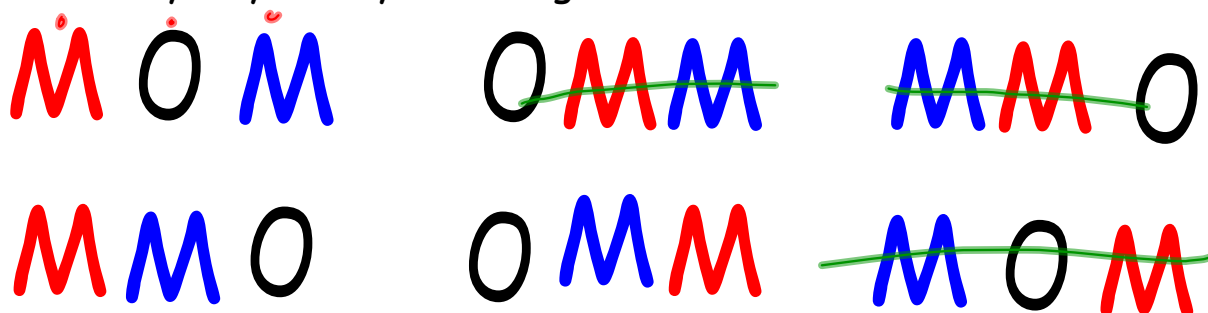
$${}^4P_2$$

$$\frac{4!}{(4-2)!} = \frac{4!}{2!}$$

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

Permutations for n objects  
with repeated objects

How many ways can you arrange the letters in the word MOM?



$$\frac{3!}{2!} = \frac{6}{2} = 3$$

Permutation of n object  
arranged in a circle

How many ways can 6 people sit in a circle?

$$(6-1)! = 5! = 120$$

Examples from the Homework

page 641

In how many ways can a teacher arrange 6 students in the front row of a classroom with the following number of students?

#36. 24

#38. 30

$$\frac{24!}{(24-6)!} = \frac{24!}{18!} = 24 \cdot 23 \cdot 22 \cdot 21 \cdot 20 \cdot 19$$

Find the number of permutations of the letters in each word.

#40 pencil

#41 trout

$$6! = 720$$

$$\frac{5!}{2!} = \frac{5 \cdot 4 \cdot 3}{2} = 60$$

On your Calculator

In your homework, you may do any problem between  
17-24 on your calculator.

$${}_{10}P_8$$

$${}_{10}P_6$$

$${}_{10}P_2$$

USE  
Parentheses

```
96909120
24*23*22*21*20*1
9
96909120
(10 nPr 6)/(10 n
Pr 2)
1680
```