

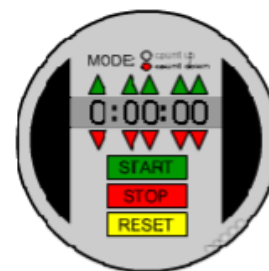
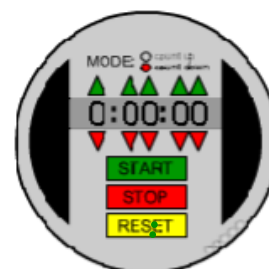
Home: 84Date: 1/15

page 647-8 #9-25 odd 26-38 all

<http://www.mathvizza.com>Bell WorkDirections: Please simplify the following.

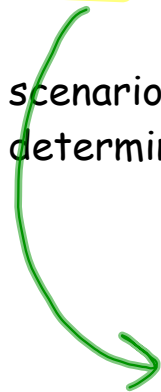
1.  $(x^2y)^3 \left(\frac{2}{x}\right)^{-2}$

2.  $\left[\frac{12xy^3}{3xy}\right]^{-2}$



## Objectives

1. The students will comprehend combinations.
2. The students will compute the number of combinations of  $n$  objects chosen  $r$  at a time.
3. The students will compute probabilities involving combinations.
4. The students will determine if a scenario warrants the use of combinations or permutations when determining the number of arrangements.


$$P(x) = \frac{\text{poss. \# of winners}}{\text{All Poss. Outcomes}}$$

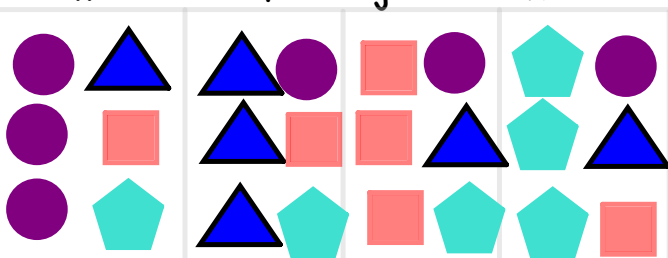
Combination

Combination - # of ways of picking a few objects out of many where the order does not matter.

Formula -

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


  
 Permutation of 4 objects taken 2 at a time.

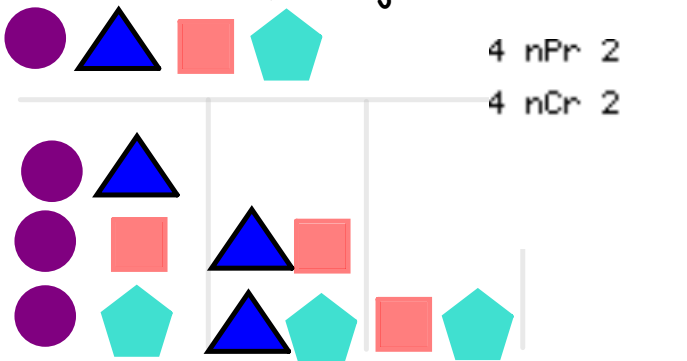


$${}^4P_2 = \frac{n!}{(n-r)!}$$

4 nPr 2

12

Combination of 4 objects taken 2 at a time.



$${}^4C_2 = \frac{n!}{r!(n-r)!}$$

$$\frac{4!}{2!(4-2)!} = \frac{4!}{2!2!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 1 \cdot 2 \cdot 1} = 6$$

(6)

Examples from the Homework

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Find the value of each expression.

#8  ${}_{7}C_4$

#10  ${}_{10}C_7$

$$\frac{10!}{7!(10-7)!} = \frac{10!}{7!3!}$$

$$\frac{\overset{5}{\cancel{10}} \cdot \overset{3}{\cancel{9}} \cdot \cancel{8} \cdot \cancel{7} \cdot \dots \cdot 1}{\cancel{7} \cdot \cancel{6} \cdot \dots \cdot 1 \times \cancel{3} \cdot \cancel{2} \cdot 1} = 120$$

Find the number of ways in which a committee can be selected.

#20 3 people from a group of 5

$${}_{5}C_3 = 10$$

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Multiple Event Combinations

A pizza parlor offers a selection of 3 different cheeses and 9 different toppings. In how many ways can a pizza be made with the following ingredients?

#26ish 2 cheeses and 6 toppings

$$\begin{array}{c} E_1 \\ 3C_2 \end{array} \cdot \begin{array}{c} E_2 \\ 9C_6 \end{array} = 252$$

Probabilities with Combinations

A bag contains 5 white marbles and 3 green marbles. Find the probability of selecting each combination.

#31       $E_1$        $E_2$   
 2 green and 1 white

# of Successful Outcomes  
 Total # of Possible Outcomes

$$\frac{{}^3C_2 \cdot {}^5C_1}{{}^8C_3} = \frac{3 \cdot 5}{56} = \frac{15}{56} = .268$$

Permutation or Combination

Electing 3 people out of 20 people to the offices president, vice-president and treasurer.

$${}_{20}P_3$$

Permutation or Combination

Electing 3 people out of 20 people to a committee

$${}_{20}C_3$$

Permutation or Combination

Picking 4 toppings for a banana split out of 11 toppings.

$${}_{11}C_4$$

Permutation or Combination

The top 3 runners in the final heat of ten at the Olympics in the 100 meter dash.

$${}_{10}P_3$$

Permutation or Combination

Being dealt 5 cards out of a deck of 52 cards.

Permutation or Combination

$${}_{52}C_5$$

Compare & Contrast

C.

A.

B.



Permutations

Combinations

