

## Geometry 13.2

Use permutations with probability

Use combinations with probability

outcome

sample space

factorial (!)

permutation

combination

probability

Tues. FMC

Quiz Fri.  
13.1-13.2

### KeyConcept Factorial

**Words**      The **factorial** of a positive integer  $n$ , written  $n!$ , is the product of the positive integers less than or equal to  $n$ .

**Symbols**       $n! = n \cdot (n - 1) \cdot (n - 2) \cdot \dots \cdot 2 \cdot 1$ , where  $0! = 1$

5. ~~X~~ or C  $500 C_2$   $\frac{500.499}{2}$   
 $= 124,750$   $\frac{1}{124,750}$

6. P or ~~X~~  $12 P_2$   $12 \cdot 11$

7. P or ~~X~~  $132$   $\frac{1}{132}$   $50 P_2$   $50.49$   
 $2450$   $\frac{1}{2450}$

8. a. ~~P~~ C  ${}_7C_3$   $\frac{7 \cdot 6 \cdot 5}{3 \cdot 2 \cdot 1}$  35  $\frac{1}{35}$

b. P ~~C~~  ${}_7P_3$   $7 \cdot 6 \cdot 5$  210  $\frac{1}{210}$

9.  ${}_9P_5$  ~~C~~  ${}_9P_5$  9 8 7 6 5  
15,120  $\frac{1}{15,120}$

10. P ~~C~~  ${}_{10}P_2$   $10 \cdot 9$  90  $\frac{1}{90}$

11. P &

$$\frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2 \cdot 2}$$

$$453,600$$

$$\frac{10!}{2! \cdot 2! \cdot 2!}$$

$$\frac{1}{453,600}$$

12.

$$\frac{3^1 \cdot 7^1 \cdot 3^1 \cdot 9^1 \cdot 5^1 \cdot 7^1 \cdot 2^1 \cdot 3^1}{8}$$

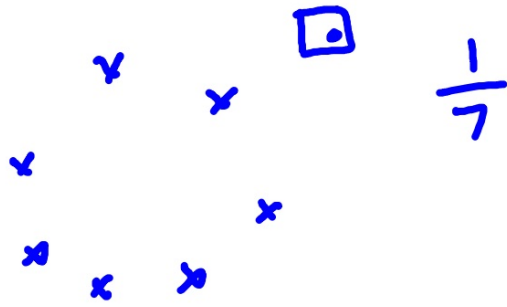
P &

"39372"

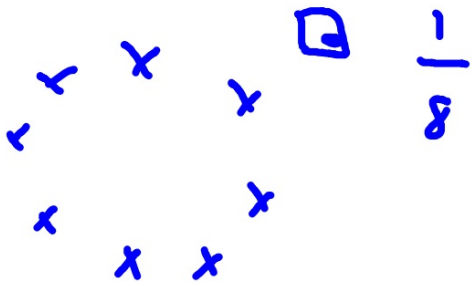
8 P<sub>5</sub>

$$\frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4}{2!}$$

13.



14.



15.

$$\begin{array}{r}
 \cancel{P} \subset 24 \subset 4 \quad \frac{\cancel{24} \cdot 23 \cdot 22 \cdot 21}{\cancel{4 \cdot 3 \cdot 2 \cdot 1}} \\
 10626 \quad \frac{1}{10626}
 \end{array}$$



18. ~~A~~ C  ${}_{10}C_2$   $\frac{10 \cdot 9}{2 \cdot 1} = 45$

19. A B ~~A~~ C  ${}_{7}C_5$

(a) P D C  $\frac{1}{7} \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$

(b)  ${}_{7}P_5 = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 5040$







Is it a different arrangement?  
 $1/5 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$  Why?

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Circular vs. Linear?

Also can you flip it over? (bracelet)

Necklace with/without clasp, etc.