

10.1 Factorial, The Fundamental Counting Principle, and Probability

**ON THE BUTTON**

TO DECODE THE BUTTON:

Solve any equation at the right and find the solution around the rim of the button. Each time the solution appears on the button, write the letter of that equation above the solution. Keep working and you will decode the button.



**(E)**  $4! = n$       **(U)**  $\frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1} = n$

**(A)**  $5! = n$       **(M)**  $\frac{6!}{4!} = n$

**(N)**  $7! = n$       **(T)**  $\frac{7!}{6!} = n$

**(I)**  $3!4! = n$       **(F)**  $\frac{8!}{5!} = n$

**(S)**  $2!5! = n$       **(O)**  $\frac{6!}{4!2!} = n$

**(R)**  $6 \cdot 5! = n!$       **(Z)**  $\frac{9!}{6!3!} = n$

**(H)**  $11 \cdot 10! = n!$       **(W)**  $\frac{7!}{2!5!} = n$

**(L)**  $9 \cdot 8 \cdot 7! = n!$       **(D)**  $\frac{5!}{3!2!} = n$



C L  
O I  
D N  
E E

**DIRECTIONS:**

Figure out the answer to any question below. Then find your answer in the coded line at the bottom of the page.

Each time the answer appears in the code, write the letter of that question above it.

*KEEP WORKING AND YOU WILL DECODE THE LINE.*

- (A) How many arrangements of the letters M, A, T, and H are possible if each letter can be used only once in each arrangement?
- (S) Six people are to be seated in a row of six chairs. How many different seating arrangements are possible?
- (D) There are 3 roads connecting Towns A and B, and 4 roads connecting Towns B and C. How many different routes are there from Town A to Town C?
- (O) The GT Dragger offers 5 different engines, 4 different paint jobs, and 2 different radios. How many different "packages" are possible?
- (I) How many different batting orders are possible for the 9 men on a baseball team?
- (V) Orgo has 5 pairs of pants, 6 sport shirts, and 3 belts. How many different outfits can he make using these items?
- (L) How many different 2-letter arrangements can be selected from the set {S,H,A,R,K}?
- (P) How many 3-letter arrangements are possible using the 26 letters of the alphabet if no letter can be used more than once?
- (R) If a school offers 9 different subjects, how many different schedules of 5 classes are possible?
- (C) In how many different ways can a president, vice president, and secretary be elected from a class of 22 students?
- (E) How many different 4-digit numerals are there? (Hint: zero cannot be used as the first digit.)

**TITLE: BIG DRIPS**

362,880 9240 362,880 9240 20 9000 720 24 15,120 9000

9000 24 90 9000 720 12 15,120 40 15,600 15,600 9000 15,120 720

# What Did The Girl Rock Say To The Boy Rock?

Find the answer to any question below in the code key. Notice the letter next to it. Print this letter in the box at the bottom of the page that contains the problem number. Keep working and you will discover the answer to the title question.

① If a coin is tossed, what is the probability of getting a head?

② If a coin is tossed, what is the probability of getting a tail?

③ Suppose a coin is tossed 100 times. About how many times would you expect to get heads?

Suppose you roll a regular 6-faced die. What is the probability of rolling:

④ a 6?

⑤ a 2?

⑥ a 4?

⑦ Suppose you roll a 6-faced die 90 times. About how many times would you expect to get a 5?

Suppose a jar contains 5 red marbles, 4 white marbles, and 3 blue marbles. If a marble is drawn at random from the jar, what is the probability that it is:

⑧ red?

⑨ white?

⑩ blue?

A spinner is pictured at the right. If the arrow is spun, what is the probability that the spinner lands on:

⑪ 2?

⑫ 3?

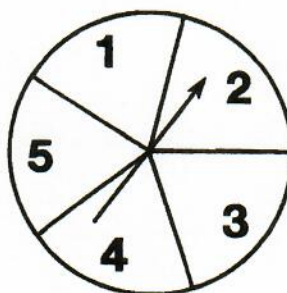
⑬ 5?

⑭ an even number?

⑮ a number less than 3?

⑯ Suppose the arrow is spun 50 times. About how many times would you expect the spinner to land on an odd number?

CODE KEY	
$\frac{5}{12}$	R
$\frac{1}{2}$	T
30	D
$\frac{1}{4}$	I
50	O
$\frac{2}{5}$	B
15	A
$\frac{1}{3}$	U
$\frac{1}{6}$	E
$\frac{1}{5}$	L



14 5 7 13 10 2 1 11 4 15 3 9 12 16 6 8

