Everybody is generally always thinking if she or he likes me or not. Now let's see how it goes with math's. As Galileo said "Math's is a language of universe"

Let's start with simple Probability by using Baye's Theorem.

Given that you see a girl every day and she smiles at you. Now what are the chances she likes you.

Considering smile and like are two events.

The probability she likes you is

$$P(like|smile) = \frac{P(smile|like)P(like)}{P(smile)}$$

With conditions $P(smile) \neq 0$ where like and smile are two events.

$P(like|smile)$ is what we want to know - the probability she likes given that an event occurs by smiling at you.

$P(smile|like)$ is the probability that she smiles given that if she smiles at someone when she likes.

$P(like)$ Probability that she likes randomly around her surroundings.

** this is tricky to find and needs rigorous calculations.

$P(smile)$ is the probability that she will smile at a random person.

** It is related to $P(like)$

For example, suppose she just smiles at everyone. Intuitively she smiles at you doesn't mean anything one way or another. Indeed,

$$P(smile|like) = 1 \text{ and}$$

$$P(smile) = 1\ ,$$

and we have

$$P(like|smile) = P(like)$$

meaning that knowing that she smiles at you doesn't change anything.

At the other extreme, suppose she smiles at everyone she likes, and only those she likes. Then

$$P(smile) = P(like) \text{ and}$$

$P(smile|like) = 1$. Then we have

$$P(like|smile) = 1$$

and she is certain to like you.

In the intermediate case, what you need to do is find the ratio of odds of smiling at people she likes to smiles in general, multiply by the percentage of people she likes, and there is your answer.

Now, it remains how to calculate it,

Well I am gonna show you all what are your chances,

Let's say each time a girl meet N people she likes at least one of them with probability

$$P(like) = \frac{1}{N}$$

So suppose she picks n people whom she like but can choose 1 or exceptions are always there 😉

So strategy that she will choose,

So, optimally let's say she pass t-1 boys and so if she choose $kth\ person$ why she will not choose $k+1$ th person.

Well this can be only possible,

$$P(k\ th\ guy\ has\ highest\ awesomeness) > P(k+1\ th\ guy)$$

So, we want k to be constant or to increase then if one increases other should decrease.

So let's say if a girl didn't choose anyone $k = 0$, then we can say $k = n - 1$ then probability again goes towards theoretical limit of $1/n$.

Hence, if she chooses k of the person, then,

$$P(like) = k/n$$

Now, there is an extensive calculation for optimum result for true maximum of $n\ guys$ already choosen,

$$= 1/n \sum_{k=t}^{n} (t-1)/(n-1)$$

Which by manipulation and calculation through Euler's formula, (If someone needs calculation contact me directly)**

$$t = \frac{n}{e}$$

$$P(like) = 1/e$$

Now, $P(smile) = t - 1/n$

$$P(smile|like) = P(like)$$

Then the possible

$$P(like|smile) = (\frac{1}{e} * \frac{1}{e})/(\frac{n}{e})$$

$$P\left(\frac{like}{smile}\right) = \frac{1}{2.731} * \frac{1}{n}$$

Now, problem comes how to formulate or find value of n

1. If we say n is rate of people she meets or sees say 10 in a month.

   $$P\left(\frac{like}{smile}\right) = .036$$

   Now, if we remove $n = 1$,
   Chances are

   $$.36\sim\sim 1/3$$
   $$Which\ is\ quite\ high$$

   Now,
2. Let's say $n = No. of \frac{years}{No\ of\ people\ she\ likes}$ if she smiles say on an average

   $$n = \frac{2}{20} = .5$$
   $$P(like|smile) = 0.776$$

   Now, see the girl will like you has highest possibility

   Go for it!!!
   The chances of winning now you can see is so high!! These calculations are for you. I was having just a boring day so formulated it.

   Disclaimer= This is my personal calculation and views. Please Don't take it personally.

   Please also give credit if you change or copy the solution.
   It's open source for you guys/

   With love,
   Harshit