

Skittles

Count the rainbow?

No two Rainbows are the same.
Neither are two packs of Skittles.
Enjoy an odd mix.

Lemon



Blackcurrant

Strawberry



Lime

Orange



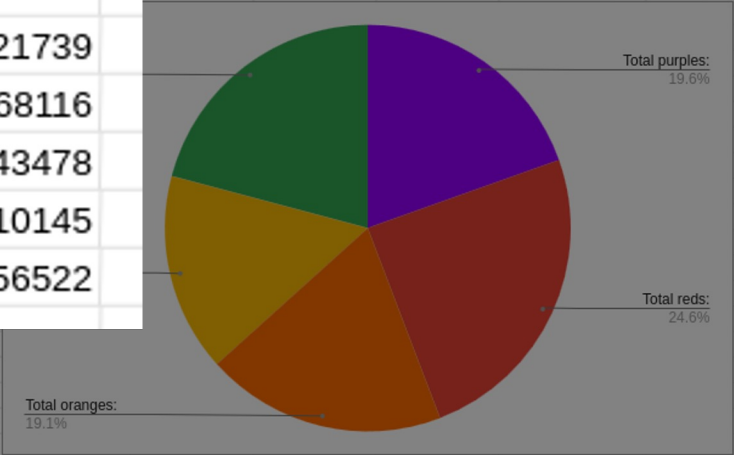




B25 fx

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Purple	Red	Orange	Yellow	Green									
2		3	2	4	5	2	302040502	16	Total purples:	19.56521739	67.5		Number of zeros:	5
3		3	4	5	4	1	304050401	17	Total reds:	24.63768116	85		Most of any colour:	10
4		3	5	1	0	7	305010007	16	Total oranges:	19.13043478	66			
5		5	2	3	3	3	502030303	16	Total yellows:	15.79710145	54.5			
6		3	2	5	5	2	302050502	17	Total greens:	20.86956522	72			
7		6	3	2	1	4	603020104	16						
8		4	2	3										
9		6	3	2										
10		0	8	5										
11		1	3	3										
12		1	10	3										
13		4	3	3										
14		3.5	4	3										
15		3	4	4										
16		2	0	5										
17		2	3	2										
18		4	4	4										
19		5	4	2										
20		3	4	3										
21		3	7	2										
22		3	8	2	1	3	308020103	17						
23							0	0						
24							0	0						
25							0							
26							0							
27							0							
28							0							

Total purples:	19.56521739
Total reds:	24.63768116
Total oranges:	19.13043478
Total yellows:	15.79710145
Total greens:	20.86956522





Stati-Skittle analysis

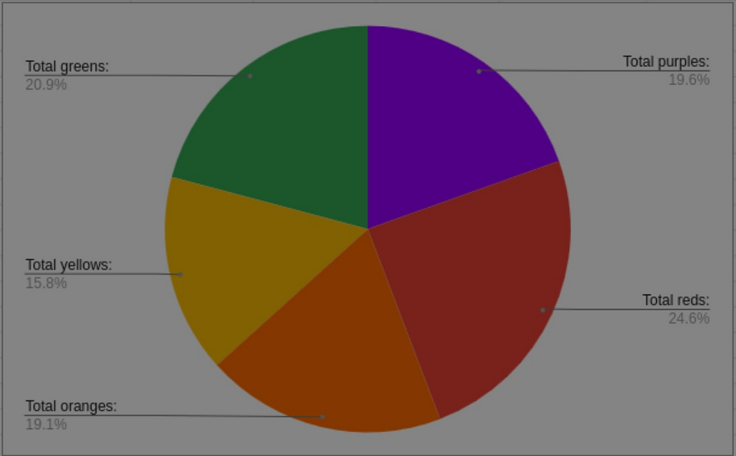


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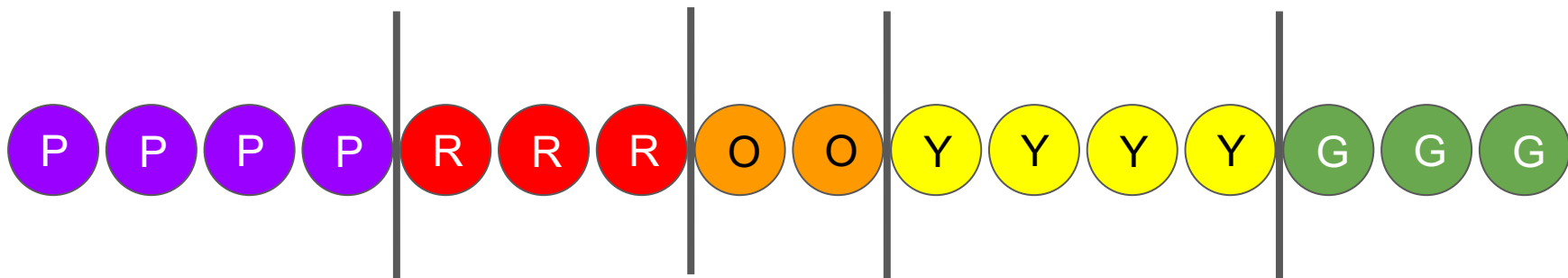
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8		4	2	3	3	3	402030403	16						
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19		5	4	2	4	1	504020401	16						
20		3	4	3	2	5	304030205	17						
21		3	7	2	1	4	307020104	17						
22		3	8	2	1	3	308020103	17						
23							0	0						
24							0	0						
25							0	0						
26							0	0						
27							0	0						
28							0	0						



How many different packets of 16 Skittles are there?

Think of it as 20 Things: 16 Skittles and 4 Dividers



This is easy to count: there are

$$\binom{20}{4} = 4845$$

different packets with 16 skittles, so there are

$$\binom{20}{4} + \binom{21}{4} = 10830$$

total possible packets.

The birthday paradox

$$\mathbb{P}(\text{no matches}) = \frac{10830}{10830} * \frac{10829}{10830} * \frac{10828}{10830} * \dots$$

We only need 123 bags to get this probability under a half!

(and with 180 packets, it's around a quarter)

intentionally blank slide while we
maybe do some live maths

What if we wanted to find ALL the different packets?

$$H \approx 10830 * (\ln 10830 + 0.5) \approx 106\,862$$

That's more than a million Skittles and way more than we have time for 😞