

Worksheet 6

1. Fictional University has a course in magic that has 120 students in it. Of these, there are 35 students from Otherland, there are 43 students that are trolls, and there are 48 students with purple hair, and 33 that wear green pants.

There are 12 that are trolls from Otherland. There are 27 which are trolls with Purple hair. There are 18 which are trolls who wear green pants. There are 13 which are from Otherland and wear green pants. There are 18 which have purple hair and wear green pants. There are 20 that are from Otherland and have purple hair.

There are 8 that are purple haired trolls from Otherland. There are 5 that are trolls from Otherland that wear green pants. There are 7 that are from Otherland, have purple hair and wear green pants. There are 10 that are trolls with purple hair who wear green pants.

There are 3 that are purple haired trolls from Otherland that wear green pants.

How many students have exactly two of the properties of being a troll, being from Otherland, having purple haired or wearing green pants?

2. How many arrangements of 1 2 3 4 5 6 7 8 9 have exactly one of the following (sub)sequences as a subsequence of consecutive entries:
1 2 3 or 4 5 6 or 7 8 9?
3. How many arrangements of 1 2 3 4 5 6 7 8 9 have exactly one of the following (sub)sequences as a subsequence of consecutive entries:
1 2 3 or 3 4 5 or 3 6 9?
4. If 8 standard dice are rolled at once, what is the probability that exactly 4 distinct numbers appear?
5. How many integers less than (or equal to) 200 have exactly two distinct small primes which divide it?
For this question, a small prime is one of the numbers 2, 3, 5, 7, 11, or 13.