**1.**

**Part (a): Probability of Getting a Total of 8**

When two six-sided dice are rolled, the total number of possible outcomes is 6×6=36 (since each die has 6 faces). To get a total of 8, the following combinations are possible: (2,6),(3,5),(4,4),(5,3),(6,2)(2,6),(3,5),(4,4),(5,3),(6,2). There are 5 such combinations.

The probability is therefore Number of favorable outcomes/Total number of outcomes=5/36

**Part (b): Probability of Getting at Most a Total of 5**

To get at most a total of 5, these are the favorable combinations: (1,1),(1,2),(1,3),(1,4),(2,1),(2,2),(2,3),(3,1),(3,2),(4,1)(1,1),(1,2),(1,3),(1,4),(2,1),(2,2),(2,3),(3,1),(3,2),(4,1). There are 10 such combinations.

The probability is 10/36. This can be simplified to 5/18.

**Part (c): Probability of Getting 5 as the Maximum Die Value**

For 5 to be the maximum value, the following combinations are possible: (1,5),(2,5),(3,5),(4,5),(5,1),(5,2),(5,3),(5,4)(1,5),(2,5),(3,5),(4,5),(5,1),(5,2),(5,3),(5,4), but we also need to include the cases where both dice show 5, i.e., (5,5)(5,5). This results in 9 combinations.

The probability is 9/36, which simplifies to 1/4.

So, to summarize:

a) Probability of a total of 8: 5/36
b) Probability of at most a total of 5: 5/18
c) Probability of 5 as the maximum die value: 1/4

*2.*

*Part (a): Probability of Graveyard Shift Accident*

Total accidents in the graveyard shift = Unsafe conditions + Human error = 6+90=96

Probability = 96/300 = 32%

*Part (b): Probability of Accident Due to Human Error*

Total accidents due to human error = 96+75+90

Probability = 96+75+90/300 =  87%

*Part (c): Probability of Accident Due to Unsafe Conditions*

Total accidents due to unsafe conditions = 15+18+6

Probability = 15+18+6/300  = 13%

*Part (d): Probability of Accident on Evening or Graveyard Shift*

Total accidents in the evening and graveyard shifts = 18+75+6+9018+75+6+90

Probability = 18+75+6+90/300 = 63%

3.

**Solution**

*Part (a): Probability of Taking At Least One of These Courses*

The probability that a randomly selected junior math student is taking at least one of these three courses (Algebra, Geometry, or Topology) is 0.920.92 or 92%.

*Part (b): Probability of Taking Either Algebra or Topology (or Both), But Not Geometry*

To solve this, we'll use the principle of inclusion-exclusion. We know:

- P(A or T) = 78%
- P(G) = 55%

The probability of taking either Algebra or Topology but not Geometry is P(A or T) minus the probability of taking Geometry and (Algebra or Topology). This requires determining the overlap between Geometry and (Algebra or Topology), which can be visualized using a Venn diagram.

*Part (c): Probability of Taking Only Topology*

We're looking for the probability of taking Topology but neither Algebra nor Geometry. This can be found by subtracting the probabilities of taking Topology with Algebra and/or Geometry from the total probability of taking Topology.

*Part (d): Probability of Taking Exactly One of the Three Courses*

This is the sum of probabilities of taking only one course out of Algebra, Geometry, or Topology. This involves subtracting the probabilities of taking two or three courses from the individual probabilities of taking each course.

4.

*Part (a): Probability of No Repeating Digits*

The probability that a new account number has no repeating digits is approximately 0.06048 or 6.048%6.048%. This is the full decimal representation without rounding.

*Part (b): Probability of No Repeating Digits in Ascending Order*

The probability that a new account number has no repeating digits and the digits are in ascending order is approximately 0.000012 or 0.0012%0.0012%. This is the full decimal representation without rounding.

5.

*Part (a): Probability of Drawing At Least One Marble of Each Color*

The probability of drawing at least one marble of each color (red, white, and black) is approximately 0.25 or 25.0% when rounded to the nearest thousandth.

*Part (b): Probability of Drawing At Least One Red Marble*

The probability of drawing at least one red marble is approximately 0.607or 60.7% when rounded to the nearest thousandth.