1. An ordinary die is thrown. Find the probability that the number obtained is
   a) a multiple of 3 1/3 b) less than 5 2/3 c) a factor of 6 2/3
2. Two ordinary dice are thrown. Find the probability that
   a) the sum on the two dice is 3, 1/18
   b) the sum on the two dice exceeds 9, 1/6
   c) the two dice show the same number, 1/6
   d) the numbers on the two dice differ by more than 2. 1/3

3. In a group of 30 students all study at least one of the subjects Physics and Biology. 20 attend the Physics class and 21 attend the Biology class. Find the probability that a student chosen at random studies both Physics and Biology. 11/30

4. Given that $P(\overline{A}) = 2/3$, $P(B) = 1/2$ and $P(A \cap B) = 1/12$. Find $P(A \cup B)$. 3/4

5. X and Y are two events such that $P(X) = 2/5$, $P(X \mid Y) = 1/2$ and $P(Y \mid X) = 2/3$.
   Find a) $P(X \cap Y)$ 4/15 b) $P(Y)$ 8/15 c) $P(X \cup Y)$ 2/3
6. Events A and B are such that $P(A) = 2/5$ and $P(B) = 1/4$. If A and B independent events, find a) $P(A \cap B)$ 1/10 b) $P(A \cap \overline{B})$ 3/10 c) $P(\overline{A} \cap \overline{B})$ 9/20
7. If events A and B are independent and $P(A) = 0.3$, $P(B) = 0.5$, find $P(A \cap B)$ and $P(A \cup B)$. Are events A and B mutually exclusive? 0.15
   0.65
8. A businessman has two secretaries. The probability that the one he hired most recently will be absent on any given day is 0.08, the probability that the other secretary will be absent on any given day is 0.07, and the probability that they will both be absent on any given day is 0.02. What is the probability that they
   a) either or both secretaries will be absent on any given day? 0.13
   b) at least one secretary comes to work on any given day? 0.98
   c) only one secretary comes to work on any given day? 0.11

9. A student artist who has entered an oil painting and a watercolour in a show feels that the probabilities are, respectively, 0.19, 0.13 and 0.11 that she will sell the oil painting, the watercolour, or both. What is the probability that she will sell
   a) either of these works but not both? 0.1
   b) neither of these works? 0.79
   c) the oil painting but not the watercolour? 0.08

10. In a restaurant, 40% of the customers choose steak for their main course. If a customer chooses steak, the probability that he will choose ice cream to follow is 0.6. If he does not have steak, the probability that he will choose ice cream is 0.3. Find the probability that a customer picked at random will choose
    a) steak and ice cream 0.24 b) ice cream 0.42

11. The probability that a bus from A to B will leave on time is 0.7 and the probability that it will leave on time and also arrive on time is 0.56. What is the probability that if such

a bus leave on time it will also arrive on time? 0.8

12. At a factory, the employees were surveyed and classified according to their level of education and whether they smoked. The data are shown in the table below.

	Education Level	
Smoking habit	Not college graduates	College graduate
Smoke	55	25
Do not smoke	127	73

If an employee is selected at random, find the probability that
a) the employee is college graduate, 0.35
b) The employee is a smoker and college graduate, 0.08929
c) The employee smokes, given that he or she did not graduate from college, 0.3022
d) The employee is not a smoker, given that he or she graduated from college. 0.7449
e) The employee is a smoker or a college graduate.
Are the events “smoke” and "college graduate" mutually exclusive? independent? Explain. No No

13. In how many ways can 6 books be arranged on a shelf?

14. How many three digits number can be made from the set {1, 2, 3, 4, 5, 6, 7}, each number containing three different digits? 210

15 How many four digits odd numbers can be made from the set {2, 5, 7, 9}, no integer being used more than once? 18

16. How many three digits odd numbers greater than 300 can be formed with the digits 2, 3 and 5 if
a) there is no repetition 2 b) repetition is allowed 12

17. A student has 4 different Mathematics books, 5 different History books and 7 different English books. In how many ways can he arrange his books on his shelf if books of the same subject are to be kept together? 87091200

18. At an examination there are 7 papers to be written, 3 of which are Mathematics. How many possible timetables can be made if the first and last papers must be Mathematics papers? 720

19. A team of six children is to be selected from a class of twenty children, to compete in a quiz game.
a) In how many ways can the team be chosen if:
i) any six can be chosen, 38760
ii) the six chosen must include the eldest in the class? 11628
b) What is the probability that a team chosen includes the eldest in the class? 0.3

20. A committee of 5 is to be formed from a group of 10 people consisting of 4 single men, 4 single women and a married couple. The committee is to consist of a chairman, who must be a single man, 2 other men and 2 women. Find the total number of ways in

which the committee can be formed. How many of these ways include at least one person the married couple? What is the probability that the committee includes at least one person the married couple?
240, 168, 0.7

21. Find the number of different arrangements of the six letters in the word 'ELEVEN' in which
    a) all three letters 'E' are consecutive, 24
    b) The first letter is 'E' and the last letter is 'N'. 12

22. Find the number of permutations of the letters of the word 'FOOTBALL'. 10080

23. In how many ways can a committee, consisting of a chairman, secretary, treasurer and 4 ordinary members, be chosen from 8 persons? (Committees with different chairman, secretaries or treasurers count as different committees) 1680

24. An examination paper has 2 parts, Part A and Part B. There are 8 questions in Part A and 10 questions in Part B. A candidate is required to do 5 questions from Part A (which must include either Question 1 or Question 2 but not both) and any 7 from Part B. In how many ways can he complete the paper? 3600