PROBABILITY
YEARS 9 AND 10

THE FOLLOWING 4 QUESTIONS REFER TO THE INFORMATION BELOW:

C	H	O	C	O	L	A	T	E

The word "chocolate" was written on cards, and the cards were then shuffled. A student, who was blindfolded, then selected one card at random.

1 **The probability that the card was a C was:**

A 0.2 B $\frac{1}{7}$ C $\frac{2}{9}$ D 2

2 **The probability that the card was a vowel was:**

A $\frac{4}{9}$ B $\frac{3}{7}$ C $\frac{1}{2}$ D 4

3 **The probability that the card was not a D was:**

A 9 B 7 C 1 D 0

4 **The probability that the card was a letter from the word JELLY BEAN was:**

A 3 B $\frac{4}{9}$ C $\frac{1}{3}$ D $\frac{5}{9}$

5 **A fair die, with numbers 1 to 6 on it, was tossed. The probability that the uppermost side was a multiple of 3 was:**

A $\frac{1}{3}$ B $\frac{1}{6}$ C 1 D 2

6 **Two students went to a lolly factory where they saw the production line for making jelly "worms". In the production line, 5% were rejected because they were too flattened by the rollers or had other faults. If 100 snakes were taken at random from the production line, then *the most accurate prediction* we can make is:**

A Exactly 5 will have been rejects.
B There could not have been more than 5 rejects.
C There could have been any number of rejects amongst the 100.
D If there were repeated batches of 100 worms removed, on average 5 out of each batch would have been rejects.

7 **A scientist collected 100 European wasps in a trap. She informed a student that in this sample, if he removes one of the wasps at random, the probability of it being a female is one. The most reasonable conclusion which the student can draw is:**

A All of the wasps in the jar are males.
B 99 of the wasps are male and the first wasp is female.
C None of the wasps in the jar are males.
D He can only catch a female, because the male wasps in the jar fly too quickly to be caught.

8 **A spinner with number 1 to 7 was spun twice in a row. The first time it landed on an even number. The probability of it landing on an even number for the second spin was:**

A $\frac{1}{4}$ B $\frac{3}{7}$ C $\frac{4}{7}$ D $\frac{1}{2}$

9 **Assuming that the probability of having a boy is $\frac{1}{2}$ in any given childbirth, the probability of having 2 boys in a row is:**

A 1 B $\frac{1}{2}$ C $\frac{1}{4}$ D $\frac{1}{8}$

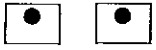
10 **In a set of 30 students:**

- **20 studied Art**
- **15 studied Drama**
- **4 studied neither Art nor Drama**

If a student was selected at random, the probability that the student studied both Art and Drama was:

A $\frac{13}{15}$ B $\frac{17}{30}$

C $\frac{3}{10}$ D unable to be determined, because insufficient information is provided.

11 **If two fair dice with 6 sides numbered 1 to 6 are tossed, the probability of getting "snakes eyes"**  **is:**

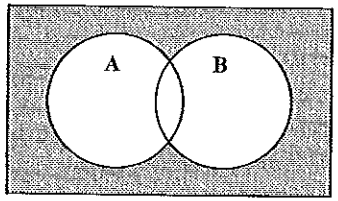
A 1 B $\frac{1}{6}$ C $\frac{1}{3}$ D $\frac{1}{36}$

12 **A box of marbles was set up so that the probability of getting a red marble is $\frac{3}{5}$.**

This means that:

A There were exactly 5 marbles in the box, 3 of which were red.
B Each time 5 marbles are removed from the box in a row, 3 of them will be red.
C For every 3 red marbles in the box, there are 5 which are not red.
D For every 5 marbles placed in the box, 3 were red.

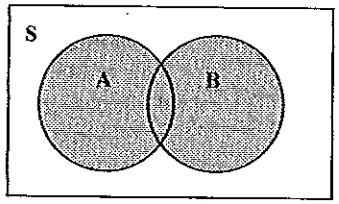
13 In the following Venn Diagram, the region shaded is:



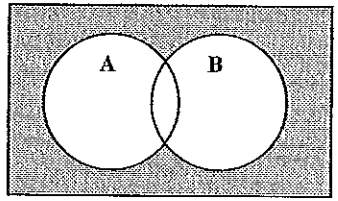
A $\overline{(A \cup B)}$ B $A \cap B$ C B D $\overline{B}$

14 In the following Venn Diagram, the shaded region which represents $A \cap B$ is:

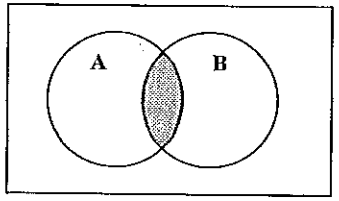
A



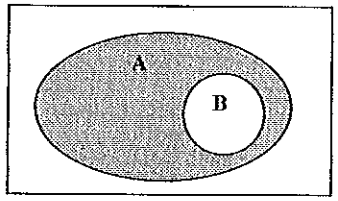
B



C



D



15 If $A = \{1, 2, 3, \ldots . 16\}$
and $B = \{x : x > 11\}$ where $B \subset A$, then Pr (B) equals:

A $\frac{5}{16}$ B $\frac{3}{8}$ C $\frac{11}{16}$ D 5

THE FOLLOWING 3 QUESTIONS REFER TO TWO OCTAGONAL DICE BEING TOSSED SIMULTANEOUSLY. EACH HAS NUMBER 1-8 ON IT.

16 The probability that their results add up to 14 is:

A $\frac{4}{64}$ B $\frac{14}{64}$ C $\frac{3}{8}$ D $\frac{3}{64}$

17 The probability that the two numbers are different is:

A $\frac{7}{64}$ B $\frac{3}{4}$

C $\frac{7}{8}$ D unable to be determined.

18 The probability that each of the numbers is a multiple of 5 is:

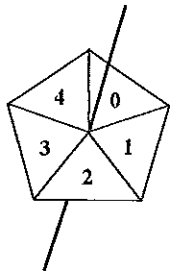
A $\frac{1}{64}$ B $\frac{5}{64}$ C $\frac{1}{32}$ D $\frac{1}{5}$

19 If a fair die with 10 sides with numbers 1 to 10 on it is tossed 3 times in a row, the probability of getting three fives in a row is:

A $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ B $\frac{1}{10} \times \frac{1}{10} \times \frac{1}{10}$

C $\frac{1}{10} + \frac{1}{10} + \frac{1}{10}$ D 555

THE FOLLOWING 5 QUESTIONS REFER TO THE INFORMATION BELOW.



A 5-sided spinner with numbers 0 to 4 is spun twice, and the results are recorded in a table like that shown below.

Outcome of 1st spin	Outcome of 2nd spin	Total of 2 spins
2	3	5

20 The probability that the outcome of the 2nd spin is zero is:

A 0 B $\frac{1}{4}$

C $\frac{1}{5}$ D dependent on the result of the first spin

21 The probability of getting two zeros in a row is:

A 0 B $\frac{1}{10}$ C $\frac{2}{5}$ D $\frac{1}{25}$

22 The probability of getting two odd numbers in a row is:

A $\frac{1}{2}$ B $\frac{1}{5}$ C $\frac{4}{5}$ D $\frac{4}{25}$

23 The probability of getting a total of 5 over the two spins is:

A $\frac{1}{25}$ B $\frac{2}{25}$ C $\frac{4}{25}$ D $\frac{4}{5}$

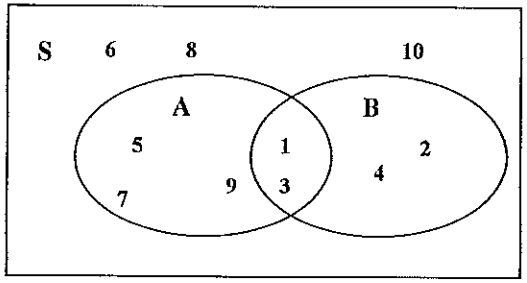
24 **The probability of getting a 1 on the 1st spin and any number except 1 on the 2nd spin is:**

A 0 B $\frac{1}{25}$ C $\frac{4}{25}$ D 1

25 **Teenagers in a certain City were surveyed and it was found that about 2 teenagers in 3 liked Elton John. If you went to a school of 600 teenagers in that City, and asked them if they liked Elton John, you might expect:**

A about 400 of the students to say they like him.
B exactly 400 of the students to say they like him.
C at least 400 of the students to say they like him.
D at least half of them to definitely like him.

THE FOLLOWING 3 QUESTIONS REFER TO THE VENN DIAGRAM BELOW.
There are 10 numbers, arranged as shown. The numbers are written on cards, and shuffled and one card is selected.



26 **Pr $(\widetilde{B})$ is equal to:**

A $\frac{2}{5}$ B $\frac{3}{5}$ C $\frac{3}{10}$ D $\frac{1}{5}$

27 **Pr $(A \cup \widetilde{B})$ is equal to:**

A $\frac{4}{5}$ B $\frac{3}{5}$ C $\frac{2}{5}$ D $\frac{1}{5}$

28 **Pr $(A \cap B)$ is equal to:**

A $\frac{4}{5}$ B $\frac{3}{5}$ C $\frac{2}{5}$ D $\frac{1}{5}$

29 **In a class of 20 girls in a certain school, the probability of having long hair is $\frac{7}{10}$, of having pierced ears is $\frac{1}{4}$ and of walking to school is $\frac{1}{5}$. If one girl is selected at random, by someone who is blindfolded, what is the probability that she walks to school, has short hair and has pierced ears.**

A $\frac{1}{5}+\frac{3}{10}+\frac{1}{4}$ B $\frac{1}{5}+\frac{7}{10}+\frac{1}{4}$

C $\frac{3}{10}\times\frac{1}{4}\times\frac{1}{5}\times 3$ D $\frac{3}{10}\times\frac{1}{4}\times\frac{1}{5}$

30 **The probability of a certainty is:**

A 0 B $\frac{1}{2}$ C 1 D infinity

31 **If a mother has 3 babies in a row, and we assume that she is equally likely to have a girl or a boy in any given birth, the probability she has at least one girl is:**

A $\frac{1}{2}$ B $\frac{1}{8}$ C $\frac{3}{8}$ D $\frac{7}{8}$

32 **A bag of sweets contains 4 chocolates and 8 toffees. If a student takes 2 sweets out at random without replacing either, the probability that these 2 sweets were both chocolates is:**

A $\frac{4}{12}$ B $\frac{4}{12}+\frac{3}{11}$

C $\frac{4}{12}\times\frac{3}{11}$ D $\frac{4}{12}\times\frac{3}{11}\times 2$

33 **If a coin is tossed 7 times, the probability of getting tails 7 times in a row is:**

A $\frac{1}{7}$ B $\left(\frac{1}{2}\right)^7$ C $\frac{1}{2}\times 7$ D 7

THE NEXT 2 QUESTIONS REFER TO THE FOLLOWING INFORMATION.
In a certain gambling game, the pack of cards used consists of 20 cards with numbers 1 to 20. The cards are shuffled and 4 players are each given 5 cards face down. Before looking at the cards, each player must predict what kind of numbers are present. If a player predicts correctly, the other 3 must give him or her $5 each. If, on the other hand, the prediction is incorrect, he or she must give the others $5 each.

34 **In one round, Sue bets that all 5 cards in her hand are a number bigger than 10. The probability that she wins her $15 is:**

A $\frac{1}{2}$ B $\left(\frac{1}{2}\right)^5$

C $\frac{10}{20}\times\frac{9}{19}\times\frac{8}{18}\times\frac{7}{17}\times\frac{6}{16}$ D 5

35 **Tim, on the other hand, bets that his hand does not include "the 20". The probability that he loses his bet is:**

A $\frac{1}{4}$ B $\frac{3}{4}$ C $\frac{1}{20}$ D $\frac{19}{20}$

THE NEXT 2 QUESTIONS REFER TO THE FOLLOWING INFORMATION.
Three children are selected by their Grade 1 teacher to hold up cards containing the first three counting numbers.

1	2	3

36 **If the children line up in a random order, the probability that they line up in the correct order from 1 to 3 is:**

A $\frac{1}{6}$ B $\frac{1}{4}$ C $\frac{1}{3}$ D $\frac{1}{2}$

37 **If the children line up randomly, the probability that the 2 odd numbers are next to each other is:**

A $\frac{2}{3}$ B $\frac{1}{2}$ C $\frac{1}{3}$ D $\frac{1}{6}$

THE NEXT 3 QUESTIONS REFER TO THE FOLLOWING INFORMATION.
Some marbles, numbered 0 to 44 inclusive, were placed in a barrel for a draw.

38 **If one marble was taken out and found to be an odd number, the probability that the next was even, if the first was replaced was:**

A $\frac{22}{45}$ B $\frac{23}{44}$ C $\frac{3}{4}$ D $\frac{1}{2}$

39 **If 5 marbles were removed without replacing them, and each was an odd number, the probability that the next marble to be removed was the zero was:**

A 0 B $\frac{1}{45}$ C $\frac{1}{40}$ D $\frac{1}{39}$

40 **If 4 marbles were removed one by one and not replaced, the probability that they were 0 then 1 then 2 then 3 was:**

A $\frac{1}{45}$ B $\frac{4}{45}$

C $\left(\frac{1}{45}\right)^4$ D $\frac{1}{45}\times\frac{1}{44}\times\frac{1}{43}\times\frac{1}{42}$

ANSWERS TO PROBABILITY

1	C	2	A	3	C	4	C	5	A	6	D
7	C	8	B	9	C	10	C	11	D	12	D
13	A	14	C	15	A	16	D	17	C	18	A
19	B	20	C	21	D	22	D	23	C	24	C
25	A	26	B	27	A	28	D	29	D	30	C
31	D	32	C	33	B	34	C	35	A	36	A
37	A	38	A	39	C	40	D				