Name: _____   Date: _____

Topic: _____   **PROBABILITY**   _____

Question 1   [3 + 1 + 1 + 1 = 6 marks]

A survey of 50 students was taken concerning the breakfast cereal that they ate. 35 said that they ate Weeties, 25 said that they ate Rice Bubbles, while 10 said they ate neither cereal.

(a)   Draw a Venn Diagram to display this information.

Hence, or otherwise, find the probability that the next student surveyed:

(b)   eats Rice Bubbles and Weeties.

_____

_____

(c)   doesn't eat Weeties.

_____

_____

(d)   eats Rice Bubbles, given they don't eat Weeties.

_____

_____

Question 2   [1 + 1 + 2 + 2 = 6 marks]

Two dice are rolled. Two events A and B are defined as:
    A = exactly one six is rolled
    B = a score of less than nine is obtained
Use a suitable sample space to find the following:

  (a) P(A)

  (b) P(B)

  (c) P(A∩B)

  (d) P(A/B)

Question 3 [1 + 1 + 1 + 1 + 1 = 5 marks]

A recent survey of 60 Year 12 girls was conducted at Penhale College. They were asked which of their subjects and which sport they preferred. Their responses are given below.

	Humanities	Science	Options
Athletics	11	8	10
Swimming	7	9	15

Find the probability that the next girl chosen at random from these students:
 (a) prefers Humanities.

 (b) prefers Options and Swimming.

 (c) prefers Humanities or Athletics.

 (d) prefers Science, given that she prefers Athletics.

(e)   prefers Science, if she doesn't prefer Options or Swimming.

Question 4   [1 + 2 + 1 = 4 marks]

A shooter shooting at a target receives the following tabulating his scores.

Score	0	1	2	3	4	5
Number of times	6	8	12	20	16	8

If he shoots again, find the probability that he scores:
(a)   more than 3.

(b)   more than his mean score.

(c)   more than 3, given that he scores more than his mean.

Question 5   [2 + 3 + 4 = 9 marks]

Runners finishing Men's Olympic Marathons in recent times have found that their times are normally distributed with a mean of 3 hours and a standard deviation of 25 minutes.

Find the probability that the next runner running in the Olympic Marathon:
(a)   finishes in less than 2.5 hours.

(b)   finishes in over 3.5 hours.

There are 50 runners invited to participate in the Olympic Marathon.

(c)   Find how many runners are expected to finish between 2.5 hours and 3.5 hours.
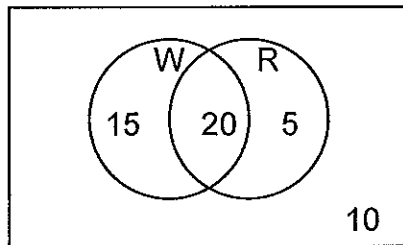
(6 + 6 + 5 + 4 + 9 = 30 marks)

Name: Date:

Topic: **PROBABILITY**

Question 1

(a)

[3]

(b) P(RW) $= \dfrac{20}{50}$ [1]

(c) P(W) $= \dfrac{15}{50}$ [1]

(d) P(R/W) $= \dfrac{5}{15}$ [1]

Question 2

	1st Die					
	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

2nd Die

(a) P(A) $= \dfrac{10}{36}$ [1]

(b) P(B) $= \dfrac{26}{36}$ [1]

(c) P(A $\cap$ B) $= \dfrac{4}{36}$ [2]

(d) P(A/B) $= \dfrac{4}{26}$ $[\dfrac{1}{1}]$

Question 3

(a) P(H) $= \dfrac{29}{60}$ [1]

(b) P(O $\cap$ S) $= \dfrac{15}{60}$ [1]

(c) $P(H \cup \bar{A})$ $= \dfrac{36}{60}$ [1]

(d) $P(S/\bar{A})$ $= \dfrac{8}{29}$ [1]

(e) $P(S/\overline{O \cup S})$ $= \dfrac{8}{19}$ [1]

Question 4

(a) $P(x > 3)$ $= \dfrac{24}{70}$ [1]

(b) $\bar{x}$ $= 2.8$ [1]

   $P(x > \bar{x})$ $= \dfrac{44}{70}$ [1]

(c) $P(x > 3 / x > \bar{x}) = \dfrac{24}{40}$ [1]

Question 5

$\mu = 180$ and $\sigma = 25$

(a) $P(x < 150)$ $= P(z < \dfrac{150 - 180}{25})$ $= P(z < -1.2)$ [1]

   $= 0.1151$ [1]

(b) $P(x > 210)$ $= P(z > \dfrac{210 - 180}{25})$ $= P(z > 1.2)$ [1]

   $= 1 - P(z < 1.2)$ [1]

   $= 1 - 0.8849$

   $= 0.1151$ [1]

(c) $P(150 < x < 210)$ $= P(-1.2 < z < 1.2)$ [1]

   $= P(z < 1.2) - P(z < -1.2)$ [1]

   $= 0.8849 \quad - 0.1151$

   $= 0.7698$ [1]

No. runners $= 50 \times 0.7698$ [1]

   $= 38$

(6 + 6 + 5 + 4 + 9 = 30 marks)