

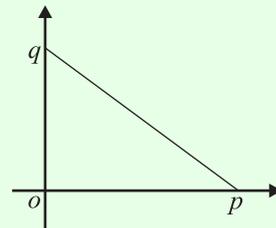
DISCRETE MATHS (Q 6 & 7, PAPER 2)

2009

- 6 (a) A student taking a literature course has to read three novels from a list of ten novels.
- (i) How many different selections of three novels are possible?
 - (ii) Two of the ten novels are by the same author. How many selections are possible if the student wishes to choose three novels by different authors?
- (b) (i) In how many different ways can eight people be seated in a row?
- (ii) Three girls and five boys sit in a row, arranged at random. Find the probability that the three girls are seated together.
 - (iii) Three girls and n boys sit in a row, arranged at random. If the probability that the three girls are seated together is $\frac{1}{35}$, find the value of n .

- (c) x and y are randomly selected integers with $1 \leq x \leq 10$ and $1 \leq y \leq 10$.
 p is the point with coordinates $(x, 0)$ and q is the point with coordinates $(0, y)$.
Find the probability that

- (i) the slope of pq is equal to -1
- (ii) the slope of pq is greater than -1
- (iii) the length of $[pq]$ is less than or equal to 5.



- 7 (a) The prices of four food items in a shopping basket are €3, €5, €1 and €6. Find the weighted mean price of these items using the weights 2, 3, 4 and 1 respectively.
- (b) (i) Solve the difference equation $u_{n+2} - 6u_{n+1} + 5u_n = 0$, where $n \geq 1$, given that $u_1 = 0$ and $u_2 = 20$.
- (ii) Find an expression in n for the sum of the terms $u_1 + u_2 + u_3 + \dots + u_n$.
- (c) The two numbers a and b have mean \bar{x} and standard deviation σ_1 .
The three numbers c, d and e have mean \bar{x} and standard deviation σ_2 .
Find the standard deviation of the five numbers a, b, c, d and e in terms of σ_1 and σ_2 .

ANSWERS

6 (a) (i) 120

(ii) 112

(b) (i) $8! = 40,320$

(ii) $\frac{3}{28}$

(iii) 12

(c) (i) $\frac{1}{10}$

(ii) $\frac{9}{20}$

(iii) $\frac{3}{20}$

7 (a) €3.10

(b) (i) $u_n = 5^n - 5$

(ii) $\frac{5}{4}(5^n - 1) - 5n$

(c) $\sigma = \sqrt{\frac{2\sigma_1^2 + 3\sigma_2^2}{5}}$