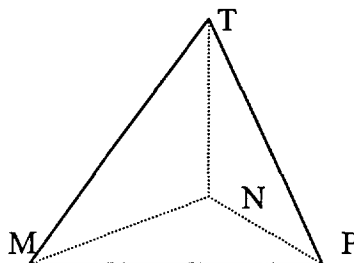


Section B Short Questions

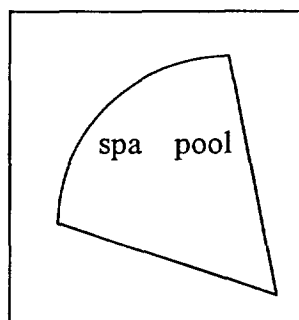
(35 marks)

Answer ALL questions in this section. Each question carries 5 marks.

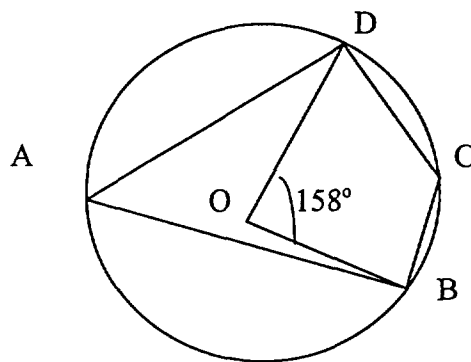
- B1. Solve the equation $2 \cos^2 x - 5 \cos x + 2 = 0$ for $0^\circ < x < 360^\circ$.
- B2. Solve the inequality $2x^2 - 7x > 4$.
- B3. The cost of coffee X is \$30 per 100g and the cost of coffee Y is \$20 per 100g. Now 20g of X is mixed with 80g of Y. How much would 100g of the new mixture cost?
- B4. TN is a tower 100 m tall. Given $TM = 150$ m, $TP = 120$ m and $\angle TPM = 60^\circ$.
- (a) Find the angle of elevation of T from M.
- (b) Calculate $\angle TMP$.
- [Answers correct to 1 decimal place.]



- B5. A spa pool in the form of a sector of radius 8m and sector angle 80° is constructed inside a rectangular garden which measures 12m x 15m.
- (a) Find the area of the spa pool.
- (b) Find the area of the pavement surrounding the pool.
- [Answers correct to 1 decimal place.]



- B6. There are 10 yellow flowers, 25 red flowers, 15 pink flowers and 10 orange flowers in a flower bed.
- A flower is picked at random. Find the probability that the flower is pink.
 - Two flowers are picked at random without replacement. Find the probability that both flowers are red.
- B7. A, B, C and D are points on the circumference of a circle centre at O and $\angle BOD$ equals 158° . Find $\angle BAD$ and $\angle BCD$.

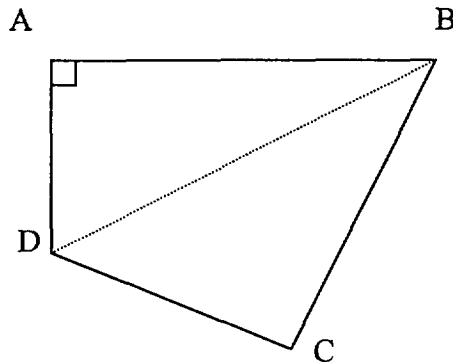


Section C Long Questions (45 marks)

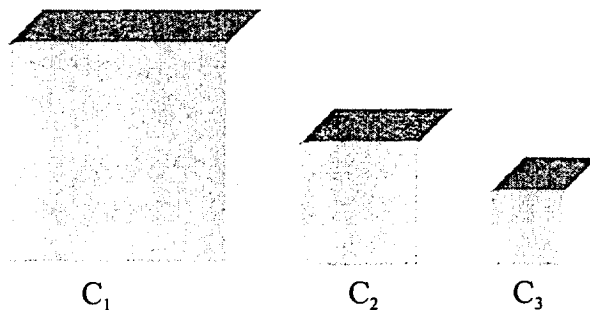
Answer ANY THREE questions in this section. Each question carries 15 marks.

- C1. In the equation $2x^2 - (k+1)x + (k-1) = 0$, α and β are roots.
- Write down the value of $\alpha + \beta$. (1 marks)
 - Write down the value of $\alpha \beta$. (1 marks)
 - Write down the value of $\alpha^2 + \beta^2$. (3 marks)
 - Find the value of k if the equation has identical roots. (4 marks)
 - Show that the roots of the equation are always real for all real values of k. (3 marks)
 - Solve the equation when $k = -2$. (3 marks)

- C2. In the figure below, $\angle BAD$ is a right angle, $\angle BCD = 98^\circ$, $\angle BDC = 48^\circ$ and $\angle ABD = 28^\circ$.



- (a) Calculate the length of BD . [Answer correct to 2 decimal places.] (2 marks)
- (b) Calculate the length of BC . [Answer correct to 2 decimal places.] (3 marks)
- (c) Find the perimeter of $ABCD$. [Answer correct to 2 decimal places.] (4 marks)
- (d) Calculate the cost of fencing $ABCD$ if it costs \$10 per m for fencing to the nearest dollar. (2 marks)
- (e) Find the area of the triangular plot BCD to the nearest m^2 . (2 marks)
- (f) If it costs \$1.50 per m^2 for mowing grass, calculate the cost of mowing the triangular plot BCD to the nearest dollar. (2 mark)
- C3. A cube C_1 measures $1m \times 1m \times 1m$. A second cube C_2 which has a linear dimension half that of C_1 is placed next to C_1 . Another cube C_3 which has a linear dimension half that of C_2 is placed next to C_2 . The process is repeated such that infinitely many cubes are placed together in a line and the linear dimension of all the cubes are in G.P.



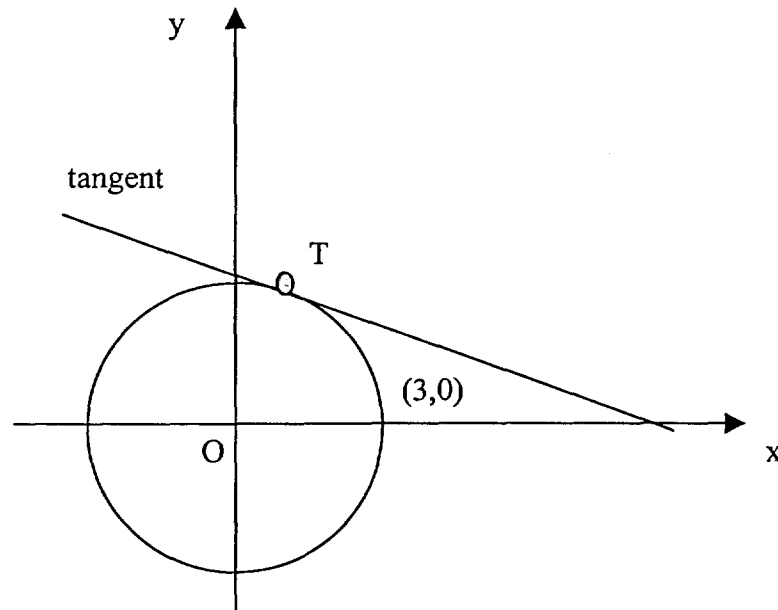
CMV6103

FC Supplementary Examination I

00/01

- C3. (a) Calculate the surface area of C_1 . (2 marks)
- (b) Calculate the surface area of C_2 . (2 marks)
- (c) Calculate the sum of surface area of C_1 , C_2 and C_3 .
[Answer correct to 4 significant figures.] (3 marks)
- (d) What is the surface area of the cube C_7 ?
[Answer correct to 4 significant figures.] (2 marks)
- (e) Calculate the sum of surface area of all the cubes. (6 marks)

- C4. A circle with radius 3 units is centred at the origin as shown below.



- (a) Write down the equation of the circle. (1 mark)
- (b) A tangent $y = mx + 5$ touches the circle at the point T in the first quadrant as shown. Find the value of m. (5 marks)
- (c) Find the area enclosed by the x-axis, the y-axis and the tangent in the first quadrant. (3 marks)
- (d) Find the equation of the normal at T. (3 marks)
- (e) Find the coordinate of the point T. (3 marks)

C5. The length (in cm) of 2 groups of fish in a pond are as follows:

Group A	58	51	95	54	53
Group B	32	33	47	47	40

- (a) Find the mean, mode and median of the lengths of all the fish in the pond.
(4 marks)
- (b) The mean is not a good measurement of central tendency in this problem.
Why?
(2 marks)
- (c) Christine defined a new central value X such that
$$X = \frac{1}{2} (\text{median of group A} + \text{median of group B}).$$

Find X .
(3 marks)
- (d) Calculate the standard deviation of the lengths of all the fish. You are required to show your working in the format of a table as shown below.
[Answer correct to 1 decimal place]
(6 marks)

mark	x	$(x - \bar{x})$	$(x - \bar{x})^2$

*** END OF PAPER ***