REVISION EXERCISES

1. Solve in IR the following equation $(x+\sqrt{x})^4 - (x+\sqrt{x})^2 = 159,600$
2. Using a determinate, find the area of a triangle whose vertices are (-3,1) ; (2,-4) ; (5,1) are the given points collinear ?
3. If the position of an object after "t" hours is given by $f(t) = \frac{t}{t+1}$
   a) Is this object moving to the Left or to the Right at "t" = 10 hours? Justify Your Answer.

4. a) Write (if possible) the Vector $\bar{A}(1,6)$ as a linear combination of vectors $\bar{U}(1,3)$ and $V(-1,-2)$

   b) Given $V_1 = 2\bar{e}_1 + \bar{e}_2$

   $V_2 = 3\bar{e}_1 + \bar{e}_2$

   Write $\bar{e}_1$ and $\bar{e}_2$ as linear combination of vectors V_1 and V_2

5. Consider the sample space S on which the:
   a. Probability P is defined

   Consider also two events A & B,such that $P(A \cup B) = \frac{5}{6}$,$P(A \cap B) = \frac{1}{4}$ $P(A) = \frac{2}{3}$

   Find : $P(B)$,$P(\bar{A})$, $P(\bar{B})$, $P(\overline{A \cap B})$,

   b. A fair coin is tossed 3 times, find the probability of obtaining 2 Heads.
   c. A factory has 3 machines A,B & C , producing the large Number of certain items of the total daily production of items, 50% are produced on A , 30% on B and 20% on C.
   Records show that 2% of items of Produced on A are Defective 3% from B and 4% from C are also defective. The Accurance of Defective items is independent of all other items. One item is chosen Randomly from a daily Total Output
      i) Show that the probability of bing defective is 0.027
      ii) Given that it is detective, find the probability that it was produced by Machine
         a) A
         b) B
         c) C

6. a. If the line L which passes through the Point P(1,2,3) and parallel to vector
V=-2j + i + 3k. find its position
b. given that V=2i + j + 2k and V=-3i - 2j + 6k are vectors equation of two straight line in space determine the angle between two vectors

7. The population P1 and P2 of two cities are given by the following equations

$P1 = 10{,}000\, e^{kt}$

$P2 = 20{,}000 e^{0.01t}$

Where is constant and t is time in years with t = 0 corresponding to year 2000.

Find the constant k so that the two populations are equal in 2040 and approximate your answer to 3 decimals.

8. Find the slope and y-intercept of the regression line y = ax + b that fits the following data.

x	5	5	7	7	9	11	13	15	14	13	16	17
y	4	8	10	7	10	10	12	13	15	16	17	17

9. Find the value of $z = \left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{2010}$ **and leave your answer in the form z=a + bi**

10. A)Solve in the set of positive integers
$^{n-1}C_{n-5} = 3\ ^{n-3}C_{n-7}$

b)Consider the quadratic equation $z^2 - 6z$ + c where c is real; for what value of c does this polynomial have real roots?

c) Solve in IR $4e^{3x}-3e^{2x}-e^{x} = 0$

11. i) Let z1 =-1+i and z2 = $-\sqrt{2}-\sqrt{6}i$
a. **Find** the trigonometric forms of z_1 and z_2

b. Write the product of $z_1.z_2$ in Cartesian and trigonometric form.

ii) a. Express complex number $3e^{\pi i}$ in standard form

b. Find all (real or complex) numbers x such that $x^3=-8$

c. Solve $\sin x + \cos x > \sqrt{2}$ (Hint: use complex number theory)

12. For all natural n, the numerical function Fn is defined by

$Fn(x) = \frac{x^n}{1+x^2}$, x belongs to the set IR

Given that $L_n = \int_0^1 Fn(x)dx$

a. Calculate L_1

b. Calculate $L_1 + L_3$ and deduce L_3

c. Show that for all natural numbers P,

$L_{2p} + L_{2p+2} = \frac{1}{2p+1}$

d. Calculate L_2, L_4 and L_6