1. Solve for x: $x^3 - [x] = 3$ where $[x]$ denotes the greatest integer less than or equal to x.
   ans: $4^{1/3}$

2. Assume the set M is all ordered pairs of integers. Define a multiplication on M,#, by the following formula

   $$(x,y) \# (z,w) = (xz + 2yw, xw + yz)$$

   What is the identity element for the operation # on M ?   ans: (1,0)

3. The roots of $px^2 + qx + 1$ are ½ and 1/3   What are the roots of $qx^2 - px - 1$?
   ans: -1 and -1/5

   Express $\sum_{k=-2}^{+3} \dfrac{1}{8^k}$ as a binary number   ans: **1001001.001001001**

4. For a point (x,y) on the curve $4x^2 - 16x + 9y^2 + 18y - 10 = 1$

   what is the sum of the distances from it to the points $(2+\sqrt{5}, -1)$ and $(2-\sqrt{5}, -1)$?

   ans: 6

5. In a large on-line discussion group, the average age of all males was 19 while the average of all females was 15. If the average age of all members was 17 ½ years, what was the ratio of females to males? ans: 3:5

   What is the 76th natural number not divisible by 7 or 2? ans: 177

6. Solve for $x > 0$ $2 \log_4(x) = \log_4(4) + \log_4(4x - 12)$ ans: x = 4 , 12

7. Solve for x between 0 and Pi
   $4\sin^4(x) = 4\cos^2(x) - 1$ ans: Pi/4 and 3Pi/4

8. Consider the region in the first quadrant of the (x,y) plane defined by

   $x \le 15,$ $y \le 15$ $3x + 2y \le 57$

   Find the point where the function $P(x,y) = x + 6y$ is the greatest
   ans: x = 15   y = 9   or (15,9)

9. What is the coefficient of $x^4 y^2 z$ in the expansion of $(x + 2y + z)^7$? ans: 420

10. Compute the value of $(1 - \dfrac{3}{20})(1 - \dfrac{3}{19})(1 - \dfrac{3}{18})\dots(1 - \dfrac{3}{8})(1 - \dfrac{3}{7})$ ans: 1/57

11. How many zeroes are at the end of the expansion of 30! ans: 7

12. A unit of currency is called a HAG in the Land of Pyt is a rectangular bill 24 Oras by 32 Oras in size. A person takes a bill and folds it diagonally. What is the area of the resulting pentagon?
    ans: 468 Oras²