CHAPTER 1

SOLVED PROBLEMS FACTORISATIONS, SQUARE DIFFS

1.4 Factoring using the perfect squares, square diffs, etc

1. Factorize
   (a) $3x^3 - x^2y + 6x^2y - 2xy^2 + 3xy^2 - y^3$
   (b) $a^2 - b^2 - 10b - 25$
   (c) $x^4 + 4$
   (d) $x^4 + 64$
   (e) $64 - a^8b^8$
   (f) $a^4 - 100$
   (g) $\frac{1}{9}x^2 - 25$
   (h) $a^9 - 27$
   (i) $(x-2)^2 - (y+3)^2$
   (j) $4x^2 + 8xy + 4y^2$
   (k) $4x^2 + 12xy + 9y^2$
   (l) $(x-2)^2 - 10(x-1) + 25$
   (m) $t^3 - t^2 + t - 1$
   (n) $t^3 - t^2 - t + 1$
   (o) rationalize the denominator:
      i. $\frac{4}{\sqrt{2}+\sqrt{5}}$
      ii. $\frac{4}{\sqrt{2}-\sqrt{5}}$
   (p) rationalize the denominator:
      i. $\frac{x^2y}{\sqrt{x}-\sqrt{y}}$
      ii. $\frac{x^2y}{x-\sqrt{y}}$
      iii. $\frac{x^2y}{\sqrt{x}-y}$
   (q) rationalize the denominator: $\frac{1}{a-\sqrt[3]{b}}$

2. The real numbers x and y satisfy the equation $x^2 + y^2 = 10x - 6y - 34$. What is $x + y$?

3*. The number $2^{48} - 1$ is exactly divisible by two numbers between 60 and 70. Find the numbers.

4*. Is the number

$$x = 2222^{5555} + 5555^{2222} = (2222^5)^{1111} + (5555^2)^{1111}$$

divisible by 7 ?