Addition and Subtraction of polynomials

$P(x) = a_n x^n + \cdots + a_1 x + a_0$.

$q(x) = b_m x^m + \cdots + b_1 x + b_0$.

$p(x) + q(x) = (a_0 + b_0) + (a_1 + b_1)x + \cdots (a_i + b_i)x^i + \cdots$

(1) Simplify: $5(4x-8) - 3(8x-8)$.

$= 20x - 40 - (24x - 24)$.

$= 20x - 40 - 24x + 24$.

$= (20-24)x - 40 + 24$.

$= -4x - 16$

(2)

$A = x^2 - 6x + 10$

$B = 3x^3 - 7x^2 + x + 1$

$A + B = 3x^3 - 6x^2 - 5x + 11$

(3) $P(x) = 3x^2 - 5x\left(5x + 8 - (8 - 5x^2 + (8x^2 - x + 1))\right)$

- $8 - 5x^2 + (8x^2 - x + 1) = 8 + 1 - x - 5x^2 + 8x^2$
  $= 9 - x + 3x^2$
- $5x + 8 - (9 - x + 3x^2) = 8 - 9 + 5x + x - 3x^2$
  $= -1 + 6x - 3x^2$
- $P(x) = 3x^2 - 5x(-1 + 6x - 3x^2)$
  $= 3x^2 + 5x - 30x^2 + 15x^3$.
  $= 15x^3 - 27x^2 + 5x$.