1. (9pts) Find the product and simplify
   
   (a) (3pts) \(-2x^2(x^5 + 3x^4 - 5) = -2x^2 \cdot x^5 - 2x^2 \cdot 3x^4 - 2x^2 \cdot (-5) = -2x^7 - 6x^6 + 10x^2\)
   
   (b) (3pts) \((2x - 3)(4x + 1) = 2x \cdot 4x + 2x \cdot 1 - 3 \cdot 4x - 3 \cdot 1 = 8x^2 + 2x - 12x - 3 = 8x^2 - 10x - 3\)
   
   (c) (3pts) \((3x + 5)(3x - 5) = (3x)^2 - 5^2 = 9x^2 - 25\)

2. (9pts) Factor
   
   (a) (3pts) \(25x^2 - 20x + 4 = (5x)^2 - 2 \cdot 5x + 2^2 = (5x - 2)^2\)
   
   (b) (3pts) \(x^3 + 2x^2 + x = x(x^2 + 2x + 1) = x(x^2 + 2 \cdot 1 \cdot x + 1^2) = x(x + 1)^2\)
   
   (c) (3pts) \((x + 2)^2 - 9 = (x + 2)^2 - 3^2 = (x + 2 - 3)(x + 2 + 3) = (x - 1)(x + 5)\)

3. (5pts) Factor out the greatest common factor from

   \[18x^2y^5 - 6x^3y^3 + 15x^5y^2\]

   \[18 = 2 \cdot 3^2, \ 6 = 2 \cdot 3, \ 15 = 3 \cdot 5\]

   The highest power of \(x\) common to all terms is 2, the highest power of \(y\) common to all terms is 2.

   Thus the greatest common factor is \(3x^2y^2\).

   Hence \(18x^2y^5 - 6x^3y^3 + 15x^5y^2 = 3x^2y^2(6y^3 - 2xy + 5x^3)\)

4. (2pts) Find constant \(k\) such that the following is a perfect square trinomial
(a) (1pt) $x^2 + kx + 9$
Since $9 = 3^2$, for the above expression to be a perfect square trinomial, the middle term must be $2 \cdot 3 \cdot x$. Hence $k = 2 \cdot 3 = 6$.

(b) (1pt) $x^2 - 8x + k$
Since the middle term equals $-8x = -2 \cdot 4 \cdot x$, for the above expression to be a perfect square trinomial, the last term must be $4^2$. Hence, $k = 16$. 