MEMO 2015-9ɆD-00003(2)

NO CALCULATOR MAY BE USED!

(1) Determine the sum of the following expressions and write the answer in ascending order of $x$:

$$-2x + x^7 - 3 + 5x^2 + 12x^4 \quad \text{en} \quad 4x^5 - 4x + 6x^7 - 18x^4 + 2$$

$$\therefore \quad (-2x + x^7 - 3 + 5x^2 + 12x^4) + (4x^5 - 4x + 6x^7 - 18x^4 + 2)$$

$$= -2x + x^7 - 3 + 5x^2 + 12x^4 + 4x^5 - 4x + 6x^7 - 18x^4 + 2$$

$$= 1x^7 + 6x^7 + 4x^5 + 12x^4 - 18x^4 + 5x^2 - 2x - 4x - 3 + 2$$

$$= 7x^7 + 4x^5 - 6x^4 + 5x^2 - 6x - 1$$

$$= -1 - 6x + 5x^2 - 6x^4 + 4x^5 + 7x^7$$

(2) Subtract $(4mn^3 + 3mn - 5m^2n + 3)$ from $(7mn - m^2n + 4mn^3)$ and use your answer to answer the following questions:

$$\therefore \quad (7mn - m^2n + 4mn^3) - (4mn^3 + 3mn - 5m^2n + 3)$$

$$= 7mn - m^2n + 4mn^3 - 4mn^3 - 3mn + 5m^2n - 3$$

$$= 7mn - 3mn - 1m^2n + 5m^2n + 4mn^3 - 4mn^3 - 3$$

$$= 4mn + 4m^2n - 3$$

(a) How many terms does the expression consist of. **3**

(b) Determine the degree of the expression in $m$. **2**

(c) Write down the constant term. **$-3$**

(d) Determine the value of the expression of $m = \frac{-3}{2}$ and $n = 4$.

$$4mn + 4m^2n - 3$$

$$= 4\left(\frac{-3}{2}\right)(4) + 4\left(\frac{-3}{2}\right)^2(4) - 3$$

$$= 4 \times 4\left(\frac{-3}{2}\right) + 4 \times 4\left(\frac{9}{4}\right) - 3$$

$$= \frac{\cancel{16}^{\,8}}{1} \times \left(\frac{-3}{\cancel{2}}\right) + \frac{\cancel{16}^{\,4}}{1} \times \left(\frac{9}{\cancel{4}}\right) - 3$$

$$= 8 \times -3 + 4 \times 9 - 3$$

$$= -24 + 36 - 3$$

$$= 9$$

(3) Simplify:

(a) $-2x^1y^3(2x^2y^2 - 3x^1y^1)$

$= -4x^3y^5 + 6x^2y^4$

(b) $(y-3)(y+3)$

$= y^2 + 3y - 3y - 9$

$= y^2 - 9$

(c) $4p^1(p^1 - 3) + (2 + p^1)3$

$= 4p^2 - 12p^1 + 3(2 + p^1)$

$= 4p^2 - 12p^1 + 6 + 3p^1$

$= 4p^2 - 9p + 6$

(d) $\frac{4}{5}k^4(20k^4 - 1)$

$= \frac{4}{\cancel{5}} \times \frac{\cancel{20}^{\,4}}{1} k^{4+4} - \frac{4}{5}k^4$

$= 4 \times 4\, k^8 - \frac{4}{5}k^4$

$= 16k^8 - \frac{4}{5}k^4$

(e) $(a^1 - 3b^1)(2a^1 + 3b^1)$

$= 2a^2 + 3ab - 6ab - 9b^2$

$= 2a^2 - 3ab - 9b^2$

(f) $[(m-4)(m+4)]^2$

$= [m^2 - 16]^2$

$= (m^2 - 16)(m^2 - 16)$

$= m^4 - 16m^2 - 16m^2 + 256$

$= m^4 - 32m^2 + 256$

(g) $(t^1 - 2)(3t^1 + 1 - t^2)$

$= 3t^2 + 1t - t^3 - 6t - 2 + 2t^2$

$= -t^3 + 5t^2 - 5t - 2$

(h) $(x - 5)^2 - (x + 1)^2$

$= (x - 5)(x - 5) - (x + 1)(x + 1)$

$= (x^2 - 5x - 5x + 25) - (x^2 + 1x + 1x + 1)$

$= x^2 - 5x - 5x + 25 - x^2 - 1x - 1x - 1$

$= -12x + 24$

(4) Prove that: $[(x - 2)^2 - (x + 2)^2]^2 = 64x^2$

**LHS** $= [(x - 2)^2 - (x + 2)^2]^2$

$= [(x - 2)(x - 2) - (x + 2)(x + 2)]^2$

$= [x^2 - 2x - 2x + 4 - (x^2 + 2x + 2x + 4)]^2$

$= [\cancel{x^2} - 4x \cancel{+ 4} - \cancel{x^2} - 2x - 2x \cancel{- 4}]^2$

$= [-8x]^2$

$= (-8x)(-8x)$

$= 64x^2$

$=$ **RHS**