Math 105 TOPICS IN MATHEMATICS

REGULAR HOMEWORK – IX

April 6 (Mon), 2015

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Line #: 52920.

⋆ **Due date:** **Wednesday, April 8th, 2015** .

⋆ **Your paper will be collected in class. No late homework will be accepted. Please see "Rules, Policies and Protocols " p.14 about homework policy.**

[I] (3pts) Permute the order of terms, if necessary, to make each of the given polynomials in the ascending order.

(1) $5x + x^3 - 2x^2$. (2) $\frac{1}{3} - 4x^5 + 2x^4 - \frac{1}{2}x$.

(3) $x^{10} + x^9 + x^8 + x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x + 1$.

[II] (3pts) Permute the order of terms, if necessary, to make each of the given polynomials in the descending order.

(1) $2x^2 - \sqrt{2}\,x^4 - \sqrt{2}$. (2) $7x^5 + 4x^6 + 10x^7 - 13x^8$.

(3) $x^2 - x^4 + x^6 - x^8$.

[III] (4pts) Do

(1) $\Big(2x^3 + 3\,x^2 + 4\,x\Big) + \Big(x^4 + 5\Big)$.

(2) $\Big(x^4 + 8\,x^3 + 4x\Big) - \Big(x^4 + 7x^3 - 3\,x^2 + 6\Big)$.

(3) $f\left(x\right) + g\left(x\right)$, where

$$f\left(x\right) = x^8 + 7x^5 + 21x^2,$$

$$g\left(x\right) = x^6 - 3x^4 - 10x^2.$$

(4) $f\left(x\right) - g\left(x\right)$, where

$$f\left(x\right) = \frac{1}{3}x^4 + \frac{1}{2}x^2 + 1,$$

$$g\left(x\right) = \frac{2}{3}x^4 + \frac{3}{2}x^2 + \frac{5}{6}.$$

[IV] (3pts) Expand

(1) $-10\left(81x^6 - 162x^3 + 729\right)$.

(2) $2\left(\frac{1}{2}x^3 + \frac{9}{2}x^2 + \frac{17}{2}x\right)$.

(3) $\dfrac{6x^5 - 36x^4 + 48x^3 - 48x^2 + 36x - 6}{6}$.

[V] (3pts) Expand

(1) $x\left(14x^3 + 21x^2 + 35x\right)$.

(2) $\frac{3}{4}x\left(6x^5 + 10x^4 + 12x^3 + 8x^2 + 4x\right)$.

(3) $x^{10}\left(x^6 + x^4 + x^2 + 1\right)$.

[VI] (2pts) Expand

(1) $\left(x + 2\right)\left(x + 9\right)$.

(2) $\left(x + 7\right)\left(x - 4\right)$.

[VII] (4pts) Expand

(1) $\Big(x^2+3\Big)\Big(2x^2+4x+1\Big)$. (2) $\Big(x^3+x^2+3x\Big)\Big(x^2+4x-1\Big)$.

[VIII] (8pts) Expand

(1) $\Big(x-1\Big)\Big(\quad x^{18}+x^{17}+x^{16}+x^{15}+x^{14}+x^{13}+x^{12}+x^{11}+x^{10}$
$+x^9+x^8+x^7+x^6+x^5+x^4+x^3+x^2+x+1\Big)$.

(2) $\Big(1-x\Big)\Big(1+x+x^2+x^3+x^4+x^5+x^6+x^7+x^8+x^9+x^{10}$
$+x^{11}+x^{12}+x^{13}+x^{14}\Big)$.

(3) $\Big(1+x\Big)\Big(1-x+x^2-x^3+x^4-x^5+x^6-x^7+x^8-x^9+x^{10}$
$-x^{11}+x^{12}-x^{13}+x^{14}-x^{15}+x^{16}\Big)$.

(4) $\Big(1+x\Big)\Big(1-x+x^2-x^3+x^4-x^5+x^6-x^7+x^8-x^9\Big)$.