Name: _____

Operations with Polynomials

Exercise 1: Evaluate each expression for the indicated values

1) $2x^2 + 4y - 5x$;   x=9 and y=-3
2) $a^2 - 2a^3 + 4a + 10$;   a=-4
3) $2a^2b + 2ab^2 - 3ab$;   a=2 and b=3
4) $c^2d^3 + 2c^2d + 4d - 2c + 9$;   c=2 and d=1
5) $a^2x^3 - 2a^2x + 4ax + 3a - 2x$;   x=1 and a=2
6) $11x^3 + 2x^2 - 10$;   x=7

Exercise 2: Consider the expression $3x^2 + 5 - 7x$.

1) Is the expression a polynomial and if so is it a monomial, binomial, or trinomial?

2) What is the degree of the polynomial?

3) Arrange the terms of the polynomial so that the powers of *x* are in descending order.

Exercise 3: Doctors study the heart of a potential heart attack patient by injecting a dye in a vein near the heart. In a healthy heart, the amount of dye in the bloodstream after *t* seconds is given by the expression $-0.006t^4 + 1.79t + 0.53t^2 + 0.14t^3$.

a. Arrange the terms of the polynomial so that the powers of *t* are in descending order.
b. Find the degree of the polynomial.

Exercise 4: The deer population of the Kaibab Plateau in Arizona from 1905 to 1930 can be estimated by the polynomial $-0.13x^5 + 3.13x^4 + 4000$, where *x* is the number of years after 1900. Find the degree of the polynomial.

Exercise 5: Find the sum using the horizontal method

1) $(34x - 15) + (11x + 21)$
2) $(-7x - 1) + (-3x - 6)$
3) $(x^3 + 3x^2 + 2x - 3) + (-x^3 + 2x^2 + 3x + 5)$
4) $(x^6 + x^4 + 2x^2 - 3) + (-3x^6 + 5x^4 + 8x^2 + 11)$
5) $(x^9 + 3x^7 - 3x) + (4x^9 + x^7 - 9x)$
6) $\left(\frac{1}{5}x^4 + \frac{4}{7}x^2 - \frac{1}{3}x\right) + \left(\frac{2}{5}x^4 - \frac{3}{7}x^2 - \frac{2}{3}x\right)$
7) $\left(\frac{1}{2}x^4 + \frac{3}{2}x^2 - \frac{5}{7}x\right) + \left(\frac{3}{2}x^4 + \frac{6}{9}x^2 + \frac{1}{7}x\right)$

Exercise 6: Find the difference using the horizontal method

1) $\left(-x^2+9x-8\right)-\left(2x^2-x-4\right)$
2) $\left(-x^3+5x-3\right)-\left(4x^3-21x-11\right)$
3) $\left(-x^3+2x^2+4x-11\right)-\left(4x^3+5x^2-2x-9\right)$
4) $\left(x^5+x^4+3x-1\right)-\left(-2x^5-7x^4+4x-2\right)$
5) $\left(0.07x^2+4.3x-4.5\right)-\left(5.3x^3+2.8x^2+3.9x+1.7\right)$
6) $\left(2.3x^2+5.1x-4.2\right)-\left(4.1x^3+6.3x^2+7.1x+1.5\right)$

Exercise 7: Perform the indicated operations by using the vertical alignment method.

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

Exercise 8: Find the missing term:

1) $\left(4x+\underline{\quad\quad}\right)+\left(2x+3\right)=6x+5$
2) $\left(x^2+6x+7\right)+\left(3x^2+\underline{\quad\quad}+1\right)=4x^2+13x+8$
3) $\left(x^2+4x+8\right)-\left(3x^2+\underline{\quad\quad}+6\right)=-2x^2-x+2$
4) $\left(4x+\underline{\quad\quad}\right)+\left(2x+3\right)-\left(x+1\right)=5x+3$

Exercise 9: Find the difference when $-2x^3+6x^2+x-1$ is subtracted from $-10x^3+9x^2-4x+5$.

Grade 9