WORKSHEET 2.2 – Evaluating Polynomial Functions

Name: _____ Date: _____ Hour: _____

SECTION 1: Decide whether the function is a polynomial function. If it is, write the function in standard form and state the degree, type, and leading coefficient. If it is not a polynomial function, explain (or circle) why. (2.2.A)

1) $f(x) = 5 - 3x$ YES. f(x) = –3x + 5. Degree: 1. Type: Linear.

   Leading Co: –3.

2) $f(x) = 2x + \frac{1}{5}x^4 + 8$ YES. f(x) = 1/5 x⁴ + 2x + 8. Degree: 4.

   Type: Quartic. Leading Co: 1/5

3) $f(x) = 3x^{-2} + 5x - 7$ NO, it has a negative exponent.

4) $f(x) = 6x^3 + 5x^2 + 4x - 3^x$ NO, it has a variable exponent.

5) $f(x) = 9x - 6x^3 + 3 + 2x^2$ YES. f(x) = –6x³ + 2x² + 9x + 3. Degree: 3.

   Type: Cubic. Leading Co: –6

SECTION 2: Use Direct Substitution to evaluate the polynomial function for the given value of x. (2.2.B)

6) $f(x) = x^4 - 3x^2 + 2x + 7$, for $x = 2$

   f(2) = 15

7) $f(x) = 2x^3 - x^2 + 6x - 5$, for $x = 5$

   f(5) = 250

8) $f(x) = -x^4 + 8x^3 + 13x - 4$, for $x = -2$

   f(2) = –110

9) $f(x) = 7x^3 + 9x^2 + 3x + 1$, for $x = 3$

   f(5) = 280

SECTION 3: Use Synthetic Substitution to evaluate the polynomial function for the given value of x. (2.2.C)

10) $f(x) = 2x^3 - 3x^2 - 14x + 2$, for $x = 4$

$f(4) = 26$

11) $f(x) = 8x^4 - 2x^3 + x^2 - 7x + 9$, for when $x = 3$

$f(3) = 591$

12) $f(x) = 5x^2 - 2x^4 + 9x - 6$, for $x = -2$

$f(-2) = -36$

13) $f(x) = x^6 + 3x + 4$, for $x = 2$

$f(2) = 74$

14) $f(x) = 3x^5 + 8x^4 + x^3 + 6x - 8$, for $x = 4$

$f(4) = 5,200$

15) $f(x) = -4x + 7 + 2x^3$, for $x = -3$

$f(-3) = -35$

SECTION 4: Make a table of values for each function using either Direct Substitution or Synthetic Substitution. (2.2.B, 2.2.C)

16) $f(x) = 2x^3 + 4x^2 - 7x + 9$

x	-2	-1	0	1	2
y	23	18	9	8	27

17) $f(x) = x^4 - 5x^3 - 9x^2 + 10$

x	-2	-1	0	1	2
y	30	7	10	-3	-50