Algebra 2 | Polynomial Functions Test Review | Unit 2

Name Mrs. Thomason Date

What you need to know & be able to do	Things to remember	Problem	Problem
Classify Polynomials	• Write all answers in **Standard Form** ➢ greatest exp to least • Classify Polynomials based on Degree and # Terms • Leading Coeff - first coeff in standard form • Constant – Term without a variable	1. List all the names for **Degree:** **0 -** constant **1 -** linear **2 -** quadratic **3 -** cubic **4 -** quartic **Number of Terms:** **1 -** monomial **2 -** binomial **3 -** trinomial **4 -** polynomial	2. $f(x) = x + 2 - x^2 - 4x^4$ Standard form: $f(x) = -4x^4 - x^2 + x + 2$ Leading coefficient: -4 Constant: 2 Name of Degree: 4 quartic Name by # terms: 4 polynomial # of zeros: 4 # of turns: 3 End behavior: as $x \to +\infty, f(x) \to -\infty$ as $x \to -\infty, f(x) \to -\infty$
Adding and Subtracting	Adding: ➢ Combine like terms Subtracting: ➢ Distribute the negative (add the opposite) ➢ Combine like terms	3. $(3x^2 + 7 + x) + (14x^3 + 2 + x^2 - x)$ $14x^3 + 4x^2 + 9$	4. $(1 - x^2) - (3x^2 + 2x - 5)$ $-3x^2 - 2x + 5$ $-4x^2 - 2x + 6$
Multiply Polynomials	• Distribute each term in the first quantity to each term in the second • Multiply coefficients, add exponents	5. $(3x^2)(2x^2 + 9x - 6)$ $6x^4 + 27x^3 - 18x^2$	6. $(x - y)(x^2 - xy + y^2)$ $x^3 - x^2y + xy^2$ $-x^2y + xy^2 - y^3$ $x^3 - 2x^2y + 2xy^2 - y^3$
Combining Functions	Given: $f(x) = 2x^2 + 5x - 3$ $g(x) = -4x + 5$	7. Find $f(x) - 2g(x)$ $(2x^2 + 5x - 3) - 2(-4x + 5)$ $2x^2 + 5x - 3 + 8x - 10$ $2x^2 + 13x - 13$	8. Find $g(x) \cdot f(x)$ $(-4x + 5)(2x^2 + 5x - 3)$ $-8x^3 - 20x^2 + 12x + 10x^2 + 25x - 15$ $-8x^3 - 10x^2 + 37x - 15$
		9. Find $f(g(x))$ $2(-4x+5)^2 + 5(-4x+5) - 3$ $2(16x^2 - 40x + 25) - 20x + 25 - 3$ $32x^2 - 80x + 50 - 20x + 22$ $32x^2 - 100x + 72$	10. Find $f(-2) + g(3)$ $2(-2)^2 + 5(-2) - 3 + (-4(3) + 5)$ $8 - 10 - 3 - 7$ -12

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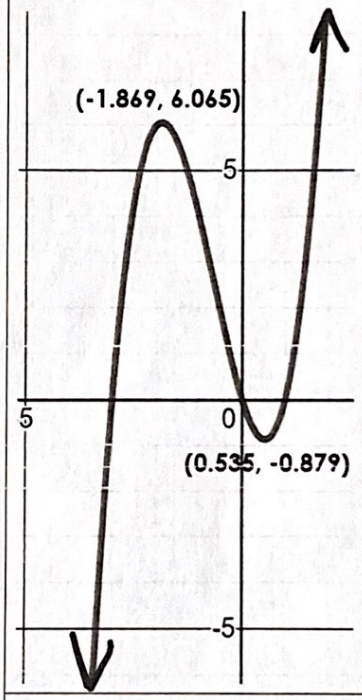
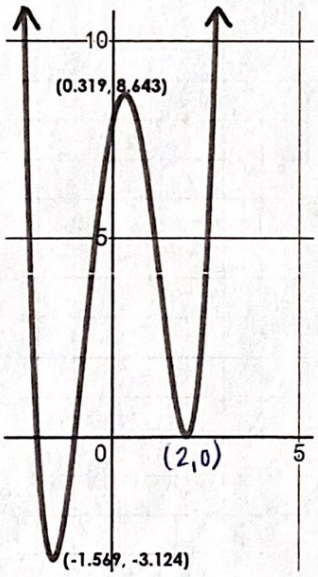
Inverses	Finding Inverses • Replace $f(x)$ with y • Switch x & y • Solve for y	11. $f(x) = 3x - 7$; find $f^{-1}(x)$ $x = 3y - 7$ $\frac{x+7}{3} = \frac{3y}{3}$ $f^{-1}(x) = \frac{x+7}{3}$	12. $g(x) = \frac{1}{4}x + 3$; find $g^{-1}(x)$ $x = \frac{1}{4}y + 3$ $x - 3 = \frac{1}{4}y$ $g^{-1}(x) = 4x - 12$
	Proving Inverses • Use compositions • $f(g(x)) = x$ • $g(f(x)) = x$	13. $f(x) = 2x - 5$; $g(x) = -2x + 5$ $f(g(x)) = 2(-2x+5) - 5$ $= -4x + 10 - 5$ $= -4x + 5$ NO!	14. $f(x) = 2x + 8$; $g(x) = \frac{1}{2}x - 4$ $f(g(x)) = 2(\frac{1}{2}x - 4) + 8$ $= x - 8 + 8$ $= x$ ✓ YES! $g(f(x)) = \frac{1}{2}(2x+8) - 4$ $= x + 4 - 4$ $= x$ ✓
Characteristics of Polynomial Graphs	a) Domain: x values b) Range: y values c) Zeros: x-intercepts d) # of extrema – turning points e) Relative max: y-values at peaks f) Relative min: y-values at valleys g) Absolute Max – highest y-value h) Absolute Min – lowest y-value i) Intervals of increase: x-values where graph is rising toward right j) Intervals of decrease: x values where graph is falling toward right k) End behavior: direction that the ends of the graph are going	15.  	Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ Zeros: $-3, 0, 1$ # of extrema: 2 Relative max: $(-1.869, 6.065)$ Relative min: $(0.535, -0.879)$ Absolute Max: none Absolute Min: none Intervals of inc: $(-\infty, -1.869) \cup (0.535, \infty)$ Intervals of dec: $(-1.869, 0.535)$ End behavior: As $x \to +\infty, f(x) \to \infty$ As $x \to -\infty, f(x) \to -\infty$ Least Possible degree : 3
		16.  	Domain: $(-\infty, \infty)$ Range: $[-3.124, \infty)$ Zeros: $-2, -1, 2$ # of extrema: 3 Relative max: $(0.319, 8.643)$ Absolute Max: none Absolute Min: $(-1.569, -3.124)$ Intervals of inc: $(-1.569, 0.319) \cup (2, \infty)$ Intervals of dec: $(-\infty, -1.569) \cup (0.319, 2)$ End behavior: As $x \to +\infty, f(x) \to \infty$ As $x \to -\infty, f(x) \to \infty$ least poss. degree 4