Name: …………………………………………………………. Date: ……………………….. Period: ……….. Seat #: …………

Mathematics III   Unit-2   Graphs of Polynomial Functions – Test # 3   B.Thevar/R.Andrews
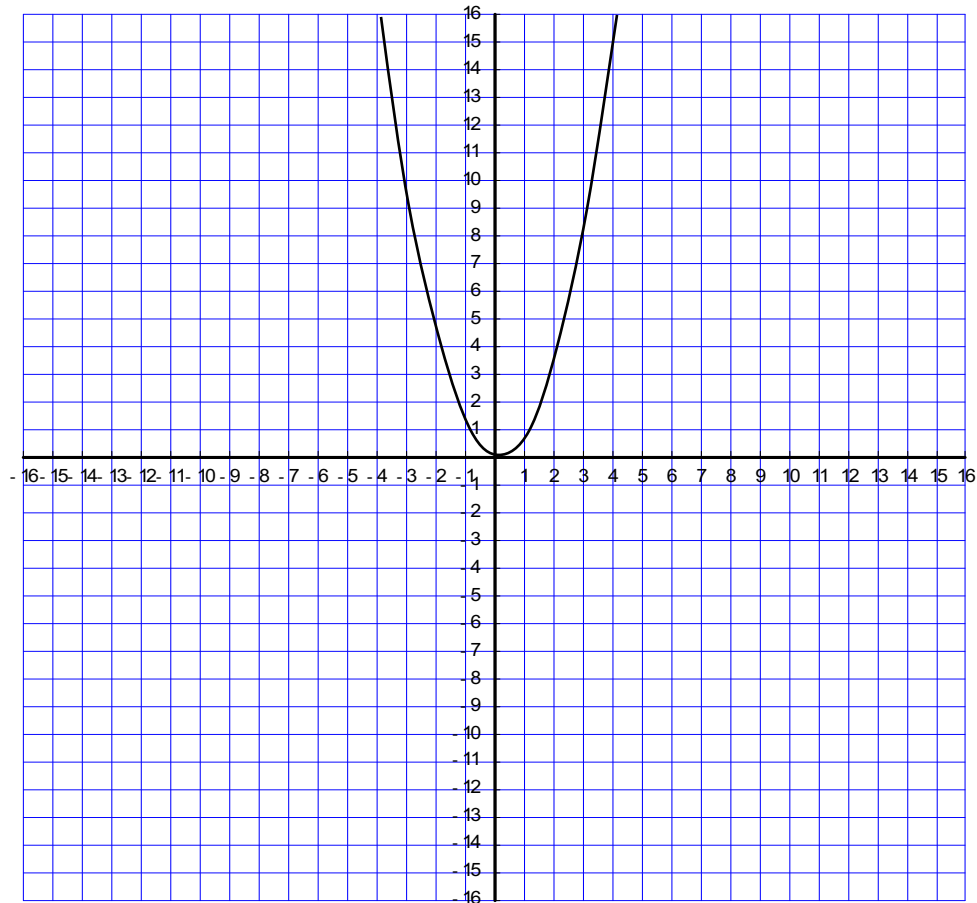
Direction:

- You can write on the test
- You may use a calculator
- Show your work to get full credit
- Use pencil only

MM3A1.a

1.   The graph of the basic quadratic function (parabola) $f(x) = x^2$ is given.
          Then sketch the following graphs using **transformation** of the given basic graph.

(a). $g(x) = (x + 5)^2 + 4$ shift _____units _____ & _____units _____

(b). $h(x) = (x – 4)^2 - 4$ shift _____units _____ & _____units _____
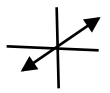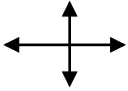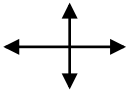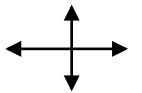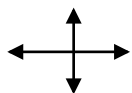
MM3A1.b

2.　Write the following polynomial functions in **Standard Form**. Identify the degree and leading coefficient of each polynomial.

	Polynomial	Standard Form (Highest to lowest exponent)	Degree	Leading Coefficient
Example	$f(x) = 3x^2 + x^3 - 5x + 2$	$f(x) = x^3 + 3x^2 - 5x + 2$	3	1
1.	$g(x) = 5x - 2x^2 + 1$			
2.	$h(x) = x^3 - 3x^2 - 3x^5 - 4$			
3.	$k(x) = 3 + 2x + x^4$			
4.	$J(x) = 1 - x^3$			

MM3A1.c & d

3.　Is the **degree** of the polynomial function even or odd? Is the **leading coefficient** positive or negative?　Does the graph **rise or fall** on the left or right? Sketch the shape of the graph.

Polynomial function $f(x) = ax^n$ Graph	Degree Even/Odd	Lead Coefficient Positive/Negative	End Behavior	
			Left End As x $\rightarrow$ -∞	Right End As x $\rightarrow$ ∞
Example. $y = x$	1 odd	1 positive	y $\rightarrow$ - ∞ Falls	y $\rightarrow$ ∞ Rises
1. $y = 2x^3$				
2. $y = -2x^3$				
3. $y = 3x^4$				
4. $y = -3x^4$				
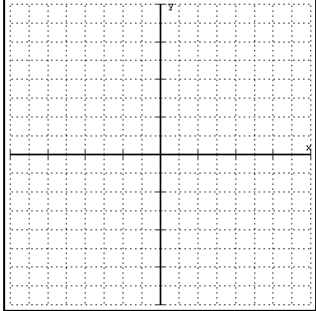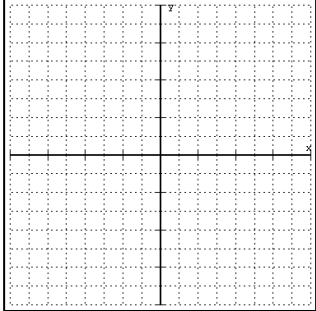
MM3A1.c

4.   Using the table below, classify the following polynomial functions by their **symmetry**.

Function	Even, Odd, or Neither?	Symmetry about the y- axis?	Symmetry about the origin?
Example: $f(x) = x^2 + 2x^1$	Neither	No	No
$g(x) =\quad -2x^2 + x$			
$h(x) = x^3 - x^1$			
$j(x) = -x^3 + 2x^2 + 3x$			
$l(x)\ =\ -(x^4 - 5x^2 + 4)$			

MM3A1.d

5.   Find the **x-intercepts and y-intercept** for the graph of each equation. Using their x & y intercepts, sketch the graph of each polynomial function.

Polynomial Equation	x-intercepts	y-intercept	Graph
1. Y = 2 (x + 3) (x − 2)			
2. y = -2 (x + 4) (x + 2) (x − 1)			

MM3A1.d

6.   Write the **factored form of the polynomial function** (use x-intercepts) for each graph. Don't forget the **vertical scale factor** or **Lead Coefficient** (use y-intercept).

1. _____

2. _____

MM3A1. d

7.   The above graph is a complete graph of a polynomial function. Answer the following questions
        by using the **characteristics of polynomial graphs**.

        a.   Is the **degree** of the polynomial function **even or odd**? Why?

        b.   Is the **leading coefficient** of the polynomial function **positive or negative**? Why?

        c.   Name the **zeros** of the polynomial function (*multiple zeros write that many times*).

        d.   Write the polynomial function in factored form (include the **multiplicity** of zeros) with a
                suitable leading coefficient a = 1 or a = -1.
                        Y =
        e.   Find the **degree** of the polynomial function.
                        Degree =
        f.   Write the **domain and range** of the polynomial function.
                Domain: *Range:*
        g.   Write the **end behavior** of the polynomial function.
                Left End: *Right End:*

        h.   How many extreme (**relative maximum or minimum**) values does the graph have?
                Number of extreme values =

        i.   Does the graph have any **absolute maximum or minimum** value? If yes, what is that value?

5