Calculus I Worksheet 3 - Polynomial Functions Paul L. Bailey October 2, 2008

A *polynomial function* is a function of the form

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0,$$

where $a_i \in \mathbb{R}$ and $a_n \neq 0$. The degree of f(x) is $\deg(f) = n$. The real numbers a_i are the coefficients of f(x). The leading coefficient of f(x) is a_n . The constant coefficient of f(x) is a_0 .

The zeros of f(x) are the real and complex solutions to the equation f(x) = 0. The *y*-intercept of f(x) is the point $(0, a_0)$.

The x-intercepts of f(x) are the points (r, 0), where r is a real zero of f(x).

The shape of f(x), which determines the behavior of the function near $\pm \infty$, is

(a) +|+ if n is even and $a_n > 0;$

(b) -|- if n is even and $a_n < 0$;

(c) -|+ if n is odd and $a_n > 0$;

(d) +|- if n is odd and $a_n < 0$.

Find the degree, leading coefficient, constant coefficient, zeros, intercepts, and shape of f(x) = y. Use the intercepts and the shape to sketch the graph of f(x).

-	Polynomial: $y = \sqrt{5} - 2$
-	Degree:
-	Leading Coefficient:
-	Constant Coefficient:
-	Zeros:
-	$y ext{-intercept:}$
-	x-intercepts:
-	Shape:
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-	Polynomial: $y = 8 - 2x^2$
	Polynomial: $y = 8 - 2x^2$ Degree:
	Polynomial: $y = 8 - 2x^2$ Degree: Leading Coefficient:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:y-intercept:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:y-intercept:x-intercepts:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:y-intercept:x-intercepts:Shape:
	Polynomial: $y = 8 - 2x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:y-intercept:x-intercepts:Shape:

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Polynomial: $y = 7 + 8x - 3x^2$ Degree:Leading Coefficient:Constant Coefficient:Zeros:y-intercept:x-intercepts:Shape:

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Polynomial:	$y = x^3 - 9x$
Degree:	
Leading Coefficient	:
Constant Coefficien	ıt:
Zeros:	
y-intercept:	
x-intercepts:	
Shape:	

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Polynomial:	$y = x^3 - 2x^2 - 4x + 8$
Degree:	
Leading Coefficient	:
Constant Coefficier	ıt:
Zeros:	
y-intercept:	
x-intercepts:	
Shape:	

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Polynomial: $y = x^4 - 10x^2 + 9$ Degree: Leading Coefficient: Constant Coefficient: Zeros: y-intercept: x-intercepts: Shape:

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Polynomial:	$y = x^4 - 5x^3 - 3x^2 + 17x - 10$
Degree:	
Leading Coefficient	:
Constant Coefficier	nt:
Zeros:	
y-intercept:	
x-intercepts:	
Shape:	

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Polynomial:	$y = 6x^3 - 11x^2 - 24x + 9$
Degree:	
Leading Coefficient	:
Constant Coefficien	nt:
Zeros:	
y-intercept:	
x-intercepts:	
Shape:	