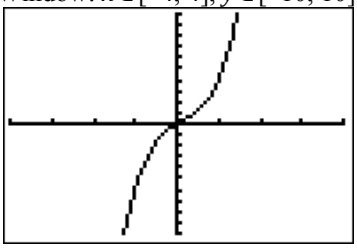
Name: _____ Date: _____

1.2 Characteristics of Polynomial Functions

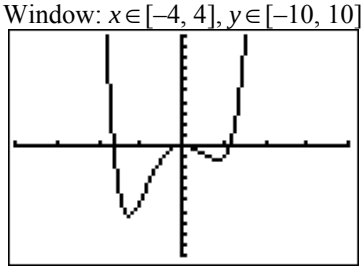
BLM 1–8

1. Each graph represents a polynomial function of degree 3, 4, 5 or 6. Determine the least possible degree of the function corresponding to each graph. Justify your answer.

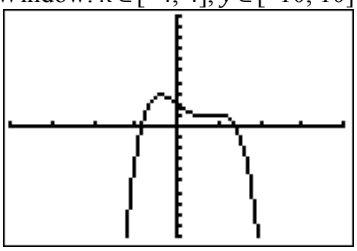
a) Window: $x \in [-4, 4]$, $y \in [-10, 10]$



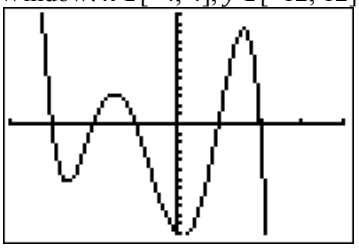
b) Window: $x \in [-4, 4]$, $y \in [-10, 10]$



c) Window: $x \in [-4, 4]$, $y \in [-10, 10]$



d) Window: $x \in [-4, 4]$, $y \in [-12, 12]$



2. Refer to question 1. For each graph do the following.

i) State the sign of the leading coefficient. Justify your answer.

ii) Identify any symmetry.

3. Use the degree and the sign of the leading coefficient to

i) describe the end behaviour of each polynomial function

ii) state which finite differences will be constant

iii) determine the value of the constant finite differences

a) $f(x) = 2x^3 - 4x^2 + x - 3$

b) $f(x) = -3x^2 - 4x + 1$

c) $f(x) = -x^4 + 2x^2 + 2$

d) $f(x) = 2x + 6$

e) $f(x) = x^5 - 3x^3 + 2x + 4$

4. State the degree of the polynomial function that corresponds to each constant finite difference. Determine the value of the leading coefficient for each polynomial function.

a) third differences = 24

b) fifth differences = –240

c) second differences = 12

d) fourth differences = –96

5. Consider the function $g(x) = -2x^4 + 3x^2 + 6x - 1$.

a) Without graphing, determine

i) the end behaviour of the function

ii) which finite differences will be constant

iii) the value of the constant finite differences

b) Sketch a graph of the polynomial function.

6. Each table represents a polynomial function. Use finite differences to determine the following for each

i) the degree

ii) the value of the leading coefficient

a)

x	*y*
−2	−3
−1	2
0	1
1	6
2	29
3	82
4	177

Name: _____ Date: _____

b)

x	y
−1	−13
0	−4
1	−7
2	−22
3	−49
4	−88
5	−139

7. An open topped rectangular box has a volume, V, in cubic centimetres, that can be modelled by the function $V(x) = x(x - 8)(x - 20)$, where x is the length of the base of the box, in centimetres.

a) Without calculating, determine which finite differences are constant for this polynomial function and the value of that constant. Justify your answer.

b) Describe the end behaviour of the function, assuming that there are no restrictions on the domain.

c) Graph $V(x)$. State the restrictions on the domain in this situation.

8. Graph a polynomial function that satisfies each description.

a) a cubic function with a negative leading coefficient and one x-intercept

b) a quintic function with a positive leading coefficient and 3 x-intercepts

c) a quadratic function with a negative leading coefficient and no x-intercepts

d) a quartic function with a positive leading coefficient and 4 x-intercepts