1.3 Graphing Polynomial Functions

PC12 1.3 Graphing Polynomial Functions Name: _____

Graph each polynomial function using an online graphing tool (ex: Desmos) and complete the following table.

a) $f(x) = 9x^2 - 8x - 2$
b) $f(x) = -x^4 - 3x^3 + 3x^2 + 8x + 5$
c) $f(x) = 2x^6 - 13x^4 + 15x^2 + x - 17$
d) $f(x) = -2x^4 - 4x^3 + 3x^2 + 6x + 9$
e) $f(x) = x^3 - 5x^2 + 3x + 4$
f) $f(x) = 2x^5 + 7x^4 - 3x^3 - 18x^2 - 20$
g) $f(x) = -x^7 + 8x^5 - 16x^3 + 8x$
h) $f(x) = -2x^3 + 8x^2 - 5x + 3$

	Degree	y - intercept	# of Turning Points	Sign of Leading Coefficient	Even or Odd Degree?	End Behaviour as $x \to \infty$	End Behaviour as $x \to -\infty$
a	2	-2	1	+	even	$y \to \infty$	$y \to \infty$
b	4	5	3	-	even	$y \to -\infty$	$y \to -\infty$
c	6	-17	5	+	even	$y \to \infty$	$y \to \infty$
d	4	9	3	-	even	$y \to -\infty$	$y \to -\infty$
e	3	4	2	+	odd	$y \to \infty$	$y \to -\infty$
f	5	-20	4	+	odd	$y \to \infty$	$y \to -\infty$
g	7	0	6	-	odd	$y \to -\infty$	$y \to \infty$
h	3	3	2	-	odd	$y \to -\infty$	$y \to \infty$

What are the maximum and minimum number of turning points in the graph of a polynomial function with degree 8? 9? n?

degree 8: minimum # of turning points is 1 maximum # of turning points is 7

degree 9: minimum # of turning points is 0 maximum # of turning points is 8

degree n: minimum # of turning points is 0 if n is odd, 1 if n is even maximum # of turning points is $n-1$

What is the end behaviour of a function with a degree that is

a) even and has a positive leading coefficient?

$y \to \infty$ for both end behaviours

b) even and has a negative leading coefficient?

$y \to -\infty$ for both end behaviours

c) odd and has a positive leading coefficient?

$y \to -\infty$ when $x \to -\infty$
$y \to \infty$ when $x \to \infty$
(rises to the right)

d) odd and has a negative leading coefficient?

$y \to \infty$ when $x \to -\infty$
$y \to -\infty$ when $x \to \infty$
(falls to the right)