

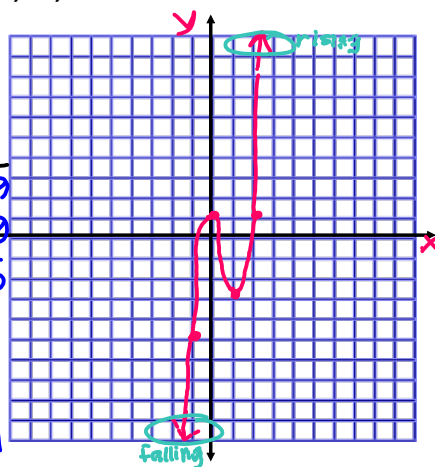
6.2 GRAPHING POLYNOMIALS

There are several ways to graph polynomial functions. We'll start by making a **table of values**. Let's use $x = -3, -2, -1, 0, 1, 2, 3$.

Graph the function below.

$$f(x) = 3x^3 - 5x^2 - 2x + 1$$

x		y
-3	$3(-3)^3 - 5(-3)^2 - 2(-3) + 1$	-119
-2	$3(-2)^3 - 5(-2)^2 - 2(-2) + 1$	-39
-1	$3(-1)^3 - 5(-1)^2 - 2(-1) + 1$	-5
0	$3(0)^3 - 5(0)^2 - 2(0) + 1$	1
1	$3(1)^3 - 5(1)^2 - 2(1) + 1$	-3
2	$3(2)^3 - 5(2)^2 - 2(2) + 1$	1
3	$3(3)^3 - 5(3)^2 - 2(3) + 1$	31



What is the shape of the graph? **N-shape**

How many U-turns are there? **2**

Is the degree even or odd? **odd**

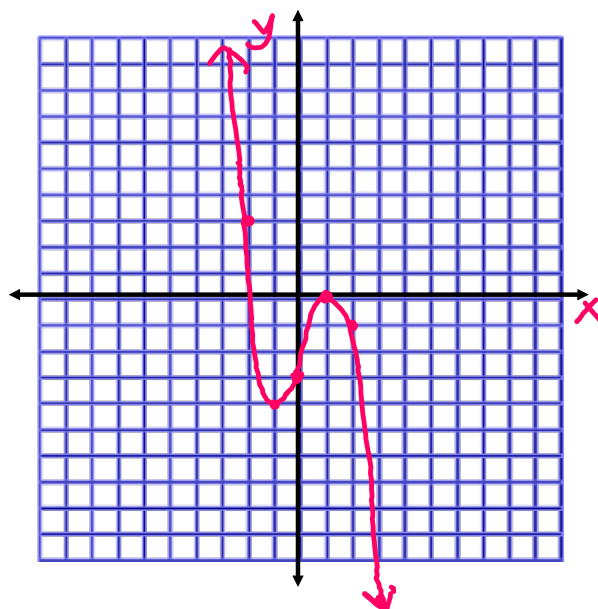
Is the leading coefficient pos. or neg.? **positive**

Describe the end behavior. **falling on the left, rising on the right**

Graph the function below.

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

x	y
-3	24
-2	3
-1	-4
0	-3
1	0
2	-1
3	-12



What is the shape of the graph?

How many U-turns are there?

Is the degree even or odd?

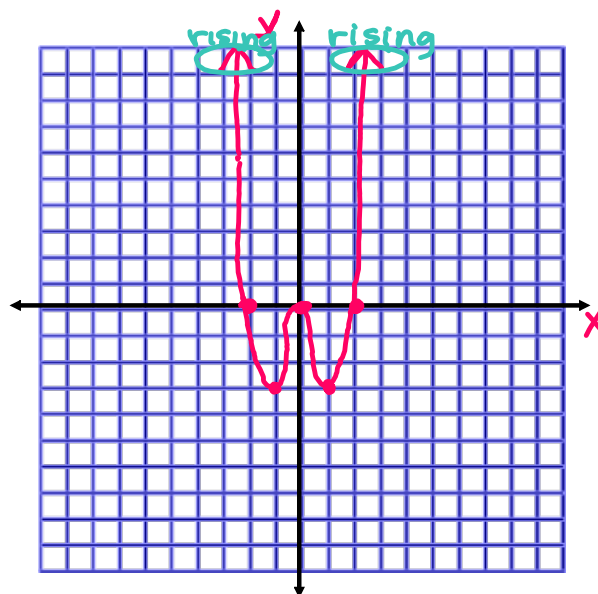
Is the leading coefficient pos. or neg.?

Describe the end behavior.

Graph the function below.

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

x	y
-3	45
-2	0
-1	-3
0	0
1	-3
2	0
3	45



What is the shape of the graph? **W-shape**

How many U-turns are there? **3**

Is the degree even or odd? **even**

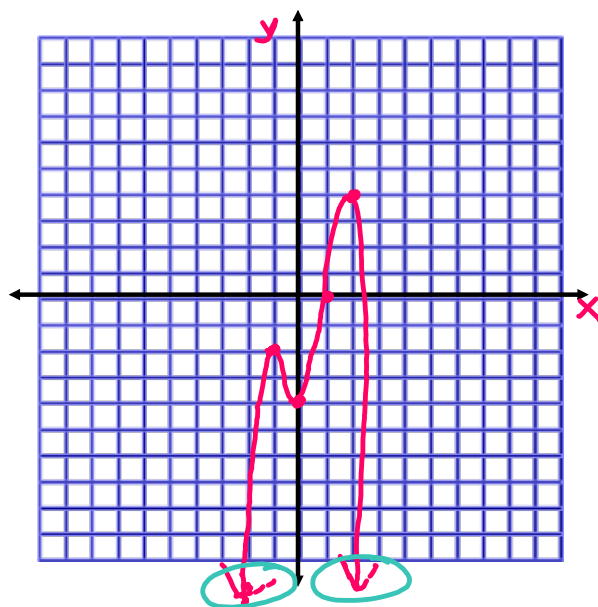
Is the leading coefficient pos. or neg.? **positive**

Describe the end behavior. **rising left & right**

Graph the function below.

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

x	y
-3	-76
-2	-12
-1	-2
0	-4
1	0
2	4
3	-22



What is the shape of the graph? **M-shape**

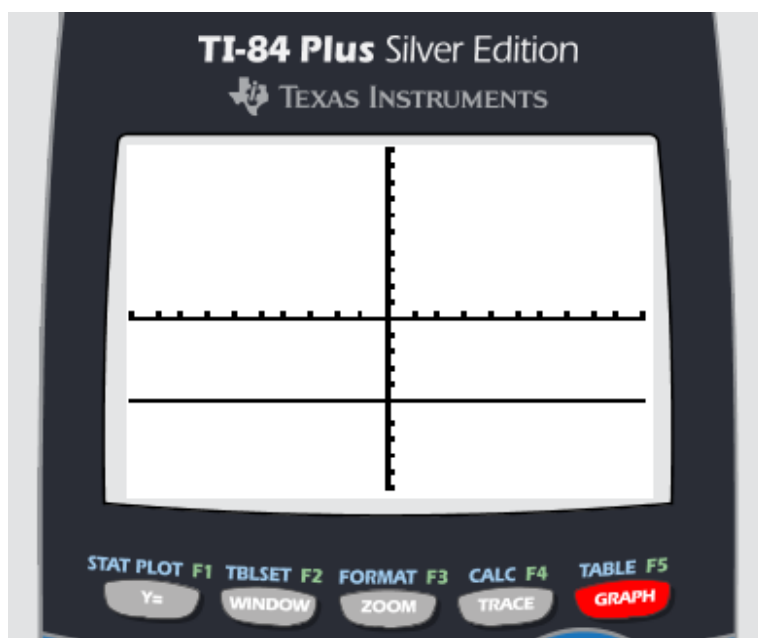
How many U-turns are there? **3**

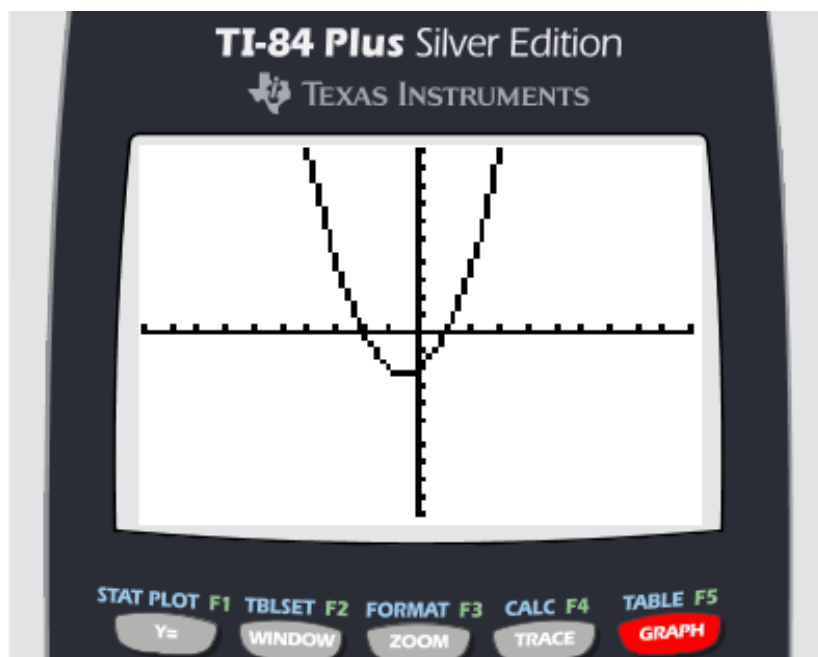
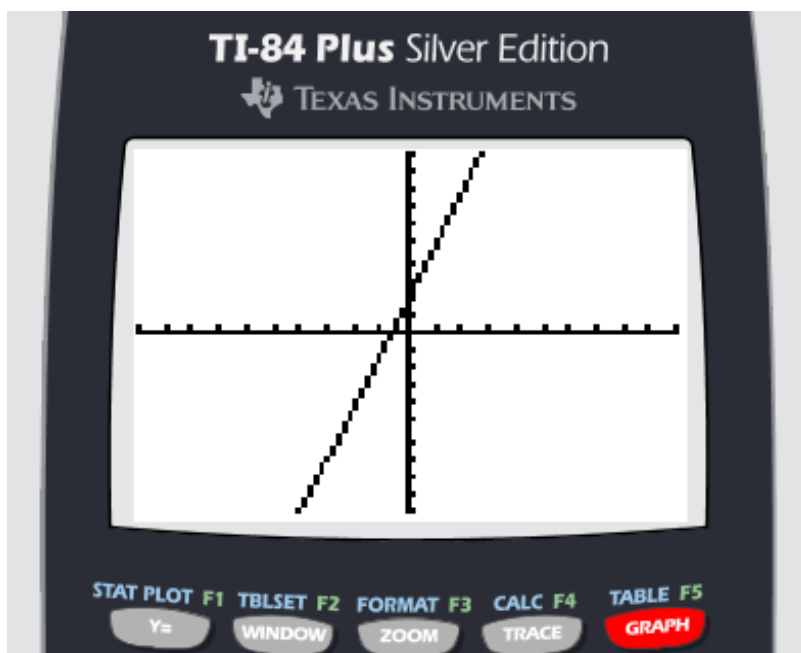
Is the degree even or odd? **even**

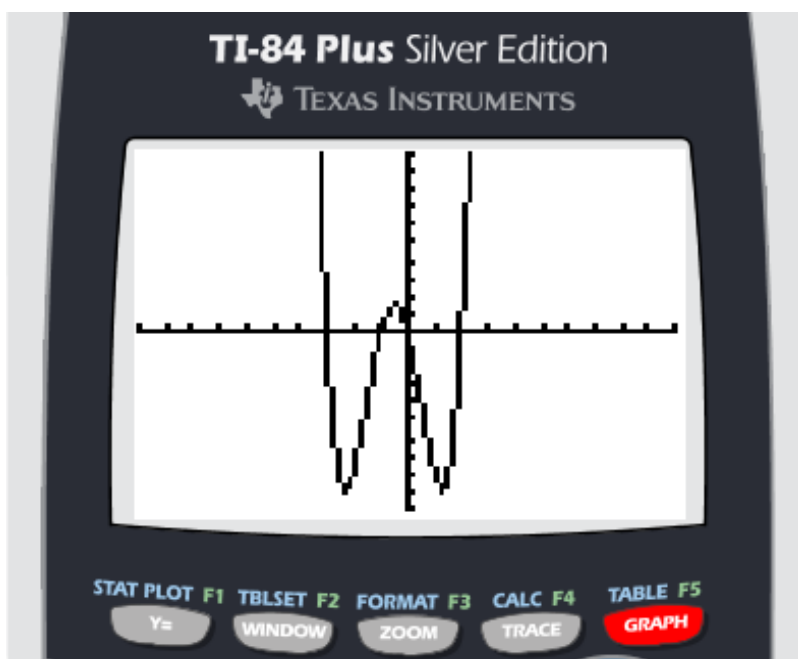
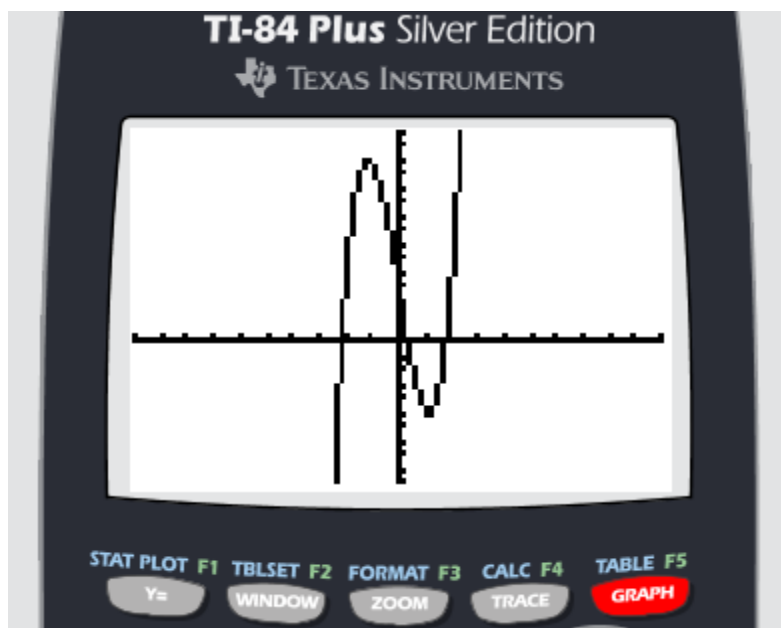
Is the leading coefficient pos. or neg.? **negative**

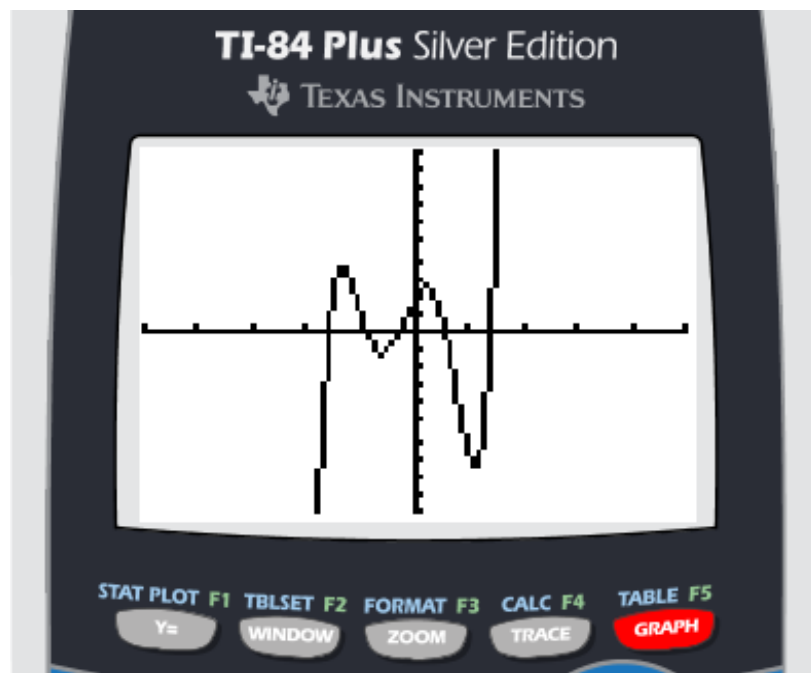
Describe the end behavior. **falling on left & right**

	Function	Degree	Name	Sketch of General Shape		Max. Turns	Number of Zeros	End Behavior	
				$a_n > 0$	$a_n < 0$			$a_n > 0$	$a_n < 0$
★	$y = -5$								
★	$y = 3x + 2$								
★	$y = x^2 + x - 2$								
★	$y = 3x^3 - 12x + 4$								
★	$y = x^4 + 2x^3 - 5x^2 - 6x$								
★	$y = 6x^5 + 5x^4 - 15x^3 - 10x^2 + 5x + 2$								









END BEHAVIOR OF A POLYNOMIAL FUNCTION

	a is positive		a is negative	
	left	right	left	right
n is even				
n is odd				

Practice: Describe the end behavior of each function below.

1. $-2x^5 + 3x^2 - x - 5$

2. $6x^4 + x^3 - 2x^2 - 4x + 1$

3. $-7x^6 + 8x^3 - 5$

4. $5x^3 + x^2 - x - 9$