Name:_____ Date: _____

Complete the following table using each polynomial function:

Function	Leading Coeff (+ or -)	Degree	End Behavior
1. $f(x)=x^3-x^2-8x+12$	+	3 odd	As $x\to\infty$ $f(x)\to$ ∞ As $x\to-\infty$ $f(x)\to$ $-\infty$
2. $f(x)=3x^3-12x+4$	+	3 odd	As $x\to\infty$ $f(x)\to$ ∞ As $x\to-\infty$ $f(x)\to$ $-\infty$
3. $f(x)=-2x^3+4x^2+x-2$	-	3 odd	As $x\to\infty$ $f(x)\to$ $-\infty$ As $x\to-\infty$ $f(x)\to$ ∞
4. $f(x)=x^4+5x^3+5x^2-x-6$	+	4 even	As $x\to\infty$ $f(x)\to$ ∞ As $x\to-\infty$ $f(x)\to$ ∞
5. $f(x)=-x^4+2x^3-5x^2-6x$	-	4 even	As $x\to\infty$ $f(x)\to$ $-\infty$ As $x\to-\infty$ $f(x)\to$ $-\infty$

Use the equations to answer the following:

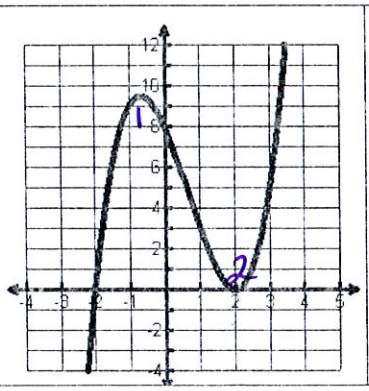
Function	Degree	Max # of Extrema (-1)
6. $f(x)=x^3-x^2-8x+12$	3	2
7. $f(x)=-12x^2+4$	2	1
8. $f(x)=x^4+2x^3-5x^2-6x$	4	3

Given the graphs, state the Max # of Extrema and the Least Possible Degree

9.

# of Extrema 2 (U-Turns)

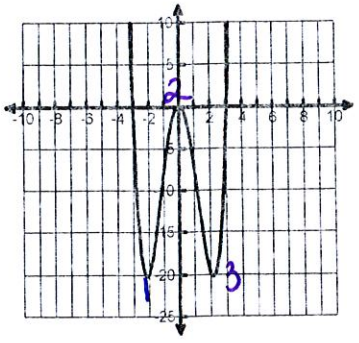
Least possible degree 3 (Extrema +1)



10.

# of Extrema 3

Least possible degree 4



Determine the end behavior and maximum number of extrema (u-turns) w/o calculator:

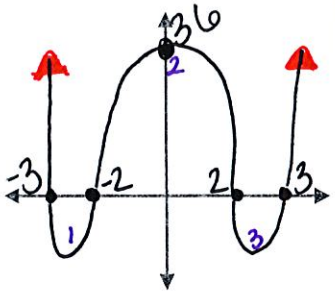
Degree - 1

$f(x) = -8x^5 - 7x^3 + 3x - 7$ neg, odd	$f(x) = 12 - 3x^3 + 5x^3 - 7x^4$ neg, even
11. $x \to +\infty$ $f(x) \to -\infty$ extrema 4	12. $x \to +\infty$ $f(x) \to -\infty$ extrema 3
$x \to -\infty$ $f(x) \to \infty$	$x \to -\infty$ $f(x) \to -\infty$
$f(x) = 1 - 3x - 2x^2 - 5x^3 + 7x^4 - 12x^5$ neg, odd	$f(x) = -7x^3 + 343$ neg, odd
13. $x \to +\infty$ $f(x) \to -\infty$ extrema 4	14. $x \to +\infty$ $f(x) \to -\infty$ extrema 2
$x \to -\infty$ $f(x) \to \infty$	$x \to -\infty$ $f(x) \to \infty$

Find the number of zeros, y-int, & end behavior. Sketch the graph:

15. $x^4 - 13x^2 + 36 = 0$ positive, even
given zeros: $-3, -2, 2, 3$

Label graph w/ zeros & y-int!

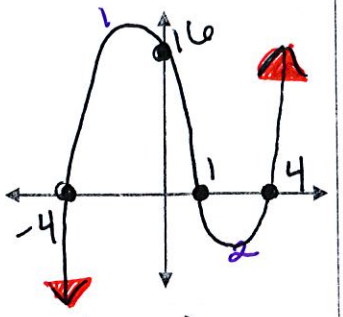


# of Zeros: 4 Y-Int: (0,36)

$x \to +\infty$ $f(x) \to \infty$

$x \to -\infty$ $f(x) \to \infty$ max # of extrema 3

16. $x^3 - x^2 - 16x + 16 = 0$ positive, odd
given zeros: $-4, 1, 4$



# of Zeros: 3 Y-Int: (0,16)

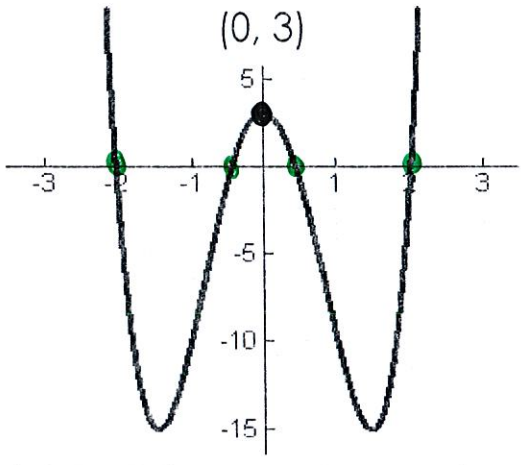
$x \to +\infty$ $f(x) \to \infty$

$x \to -\infty$ $f(x) \to -\infty$ max # of extrema 2

Answer all of the following questions for the following graph:

17.

$-\infty$ -1.5 0 1.5 ∞



(-1.5, -15) (1.5, -15)

Domain: $(-\infty, \infty)$	Range: $[-15, \infty)$
Increasing: $(-1.5, 0) \cup (1.5, \infty)$	Decreasing: $(-\infty, -1.5) \cup (0, 1.5)$
x-intercepts: $(-2,0)(-.5,0)(.5,0)(2,0)$	y-intercept: $(0,3)$
Abs. Max: NA	Abs. Min: $(-1.5,-15)$ $(1.5,-15)$
Rel. Max: $(0,3)$	Rel. Min: $(-1.5,-15)$ $(1.5,-15)$
Min. degree 4	Sign of leading Coeff. +

3 extrema +1

right side going up.