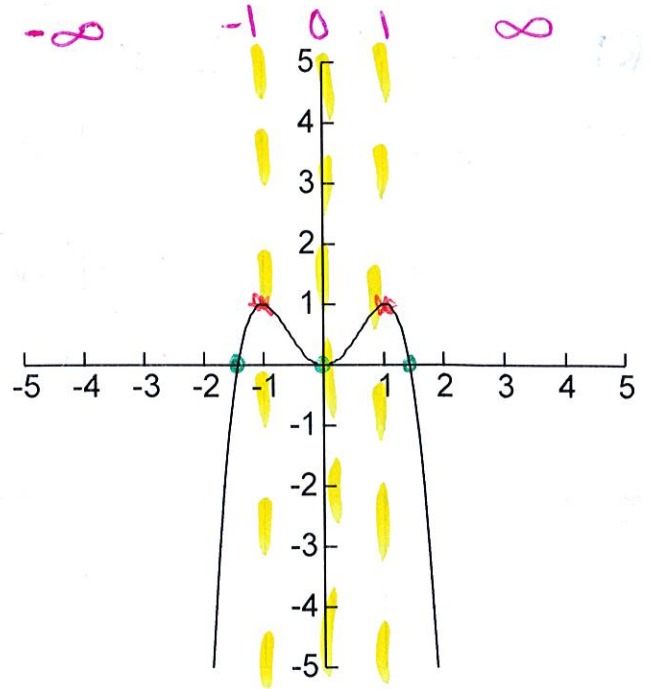


1. Answer each of the following questions for the graph (estimate the zeroes):

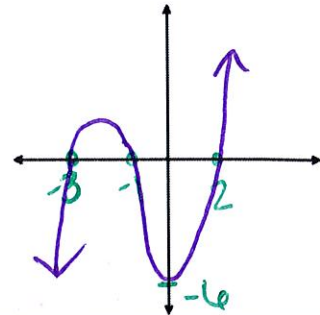
Domain: \mathbb{R}	Range: $(-\infty, 1]$
Increasing: $(-\infty, -1) \cup (0, 1)$	Decreasing: $(-1, 0) \cup (1, \infty)$
x-intercepts: $(-1.5, 0), (0, 0), (1.5, 0)$	y-intercept: $(0, 0)$
Rel. Max: $(-1, 1), (1, 1)$	Rel. Min: $(0, 0)$
Abs. Max: $(-1, 1), (1, 1)$	Abs. Min: ---
End Behavior: $x \rightarrow \infty, f(x) \rightarrow -\infty$ $x \rightarrow -\infty, f(x) \rightarrow -\infty$	
Min. degree: 4	Sign of leading Coeff.: negative



2. Sketch the graph by hand given that the zeroes are -3, -1, and 2. Then, answer each of the following questions for the graph. $f(x) = x^3 + 2x^2 - 5x - 6$

Domain: \mathbb{R} # of Zeros: 3

positive odd
 $x \rightarrow \infty, f(x) \rightarrow \infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$ # of Extrema: 2



3. Determine the end behavior and maximum number of extrema (u-turns):

$f(x) = -8x^5 - 7x^3 + 3x - 7$ <i>neg, odd</i> a) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema 4 $x \rightarrow -\infty, f(x) \rightarrow \infty$	$f(x) = 12 - 3x^3 + 5x^3 - 7x^4$ <i>neg, even</i> b) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema 3 $x \rightarrow -\infty, f(x) \rightarrow -\infty$
$f(x) = 12x^3 + 2x - 4$ <i>pos, odd</i> c) $x \rightarrow +\infty, f(x) \rightarrow \infty$ extrema 2 $x \rightarrow -\infty, f(x) \rightarrow -\infty$	$f(x) = 3x^2 - 4x + 8$ <i>pos, even</i> d) $x \rightarrow +\infty, f(x) \rightarrow \infty$ extrema 1 $x \rightarrow -\infty, f(x) \rightarrow \infty$

4. State the range & # of zeros for each of the following polynomials:

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

R: $(-\infty, 0]$ 2 zeros

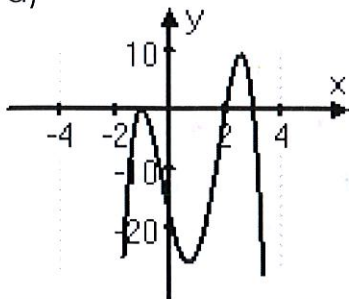


b) $h(x) = 3x^3 + 4x - 7$

R: $(-\infty, \infty)$ 3 zeros

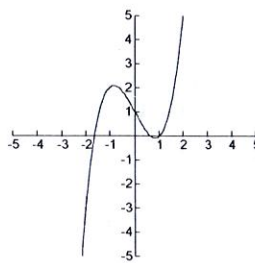
5. State the sign of the leading coefficient & the if the degree is even or odd:

a)



negative
even

b)



positive
odd

6. True or False:

a) The **domain** of a polynomial function is always $(-\infty, \infty)$.

True

b) The **range** of a quadratic polynomial function is always $(-\infty, \infty)$.

False

c) Cubic polynomials never have an absolute minimum or maximum.

True

d) For a polynomial, the relative max can never be the same as the absolute max.

False

Solve the following polynomial inequalities: (final answers in interval notation)

7. $x^3 - 3x^2 - x + 3 < 0$

$(-\infty, -1) \cup (1, 3)$

8. $x^3 - x^2 \geq 12x$

$[-3, 0] \cup [4, \infty)$

9. $x^2 - 4x + 4 > 0$

$(-\infty, 2) \cup (2, \infty)$

10. $x^4 - 10x^2 + 9 \leq 0$

$[-3, -1] \cup [1, 3]$