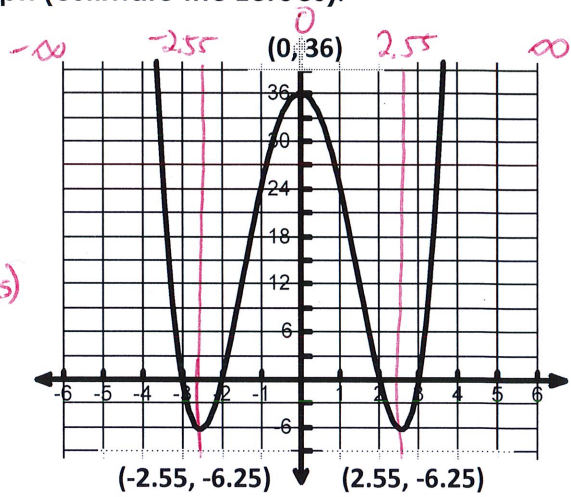


Algebra 2

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

Domain: $\mathbb{R}$	Range: $[-6.25, \infty)$
Increasing: $(-2.55, 0) \cup (2.55, \infty)$	Decreasing: $(-\infty, -2.55) \cup (0, 2.55)$
x-intercepts: $x = -3, -2, 2, 3$	y-intercept: $(0, 36)$
Rel. Max: $(0, 36)$	Rel. Min: $(-2.55, -6.25) (2.55, -6.25)$
Abs. Max: $\emptyset$	Abs. Min: $(-2.55, -6.25) (2.55, -6.25)$
End Behavior:	$x \rightarrow \infty, f(x) \rightarrow \infty$ $x \rightarrow -\infty, f(x) \rightarrow \infty$
Min. degree <u>4</u>	Sign of leading Coeff. <u>+</u>
Symmetry: <u>Across the y-axis</u>	



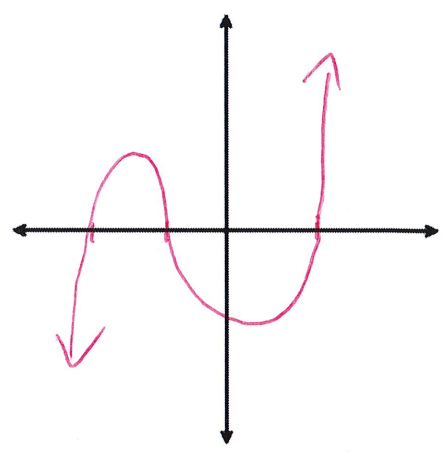
2. Sketch the graph by hand given that the zeroes are -1, -2, and 2. Then, answer each of the following questions for the graph. (Use a graphing calculator to help)

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

Domain:  $\mathbb{R}$  Range:  $\mathbb{R}$

$x \rightarrow \infty, f(x) \rightarrow \infty$   
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$

# of zeros: 3 # of extrema: 2



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

$f(x) = -3x^4 + 2x^2 - x + 2$ $\cap$ a) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema <u>3</u> $x \rightarrow -\infty, f(x) \rightarrow -\infty$	$f(x) = 2 - 4x^2 - 3x^4 - x^2$ $\cap$ b) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema <u>3</u> $x \rightarrow -\infty, f(x) \rightarrow -\infty$
$f(x) = 7x^4 + 2x^2 - 4x^6$ $\cup$ c) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema <u>5</u> $x \rightarrow -\infty, f(x) \rightarrow -\infty$	$f(x) = -2x^3 - x + 5$ $\searrow$ d) $x \rightarrow +\infty, f(x) \rightarrow -\infty$ extrema <u>2</u> $x \rightarrow -\infty, f(x) \rightarrow \infty$

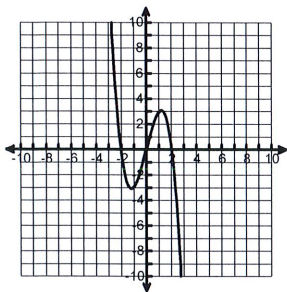
4. State the # of ZEROS and the range for the polynomials:

a)  $f(x) = x^2 - 4$   
 # of Zeros: 2  
 Range:  $[-4, \infty)$

b)  $h(x) = -5x^3 + 3$   
 # of Zeros: 3  
 Range:  $\mathbb{R}$

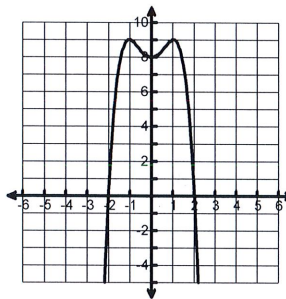
5. State the sign of the leading coefficient & whether the degree is Even or Odd

a)



-  
odd

b)



-  
even

6. The function  $f(x) = 2x^2 - 3x - 10$  has a y-intercept at which of the following points?

a.  $(0, -2)$

b.  $(0, 10)$

c.  $(0, -10)$

d.  $(0, 2)$

7. The function  $f(x) = 3x - 4x^3 + 2x^2 + 1$  has how many zeros and what is the number of extrema?

a. Zeros: 3 Extrema: 2

c. Zeros: 1 Extrema: 0

b. Zeros: 4 Extrema: 5

d. Zeros: 5 Extrema: 4

8. What is the range for the function  $f(x) = x - x^3 - 3$ ?

a.  $(-\infty, -3]$

b.  $[-3, \infty)$

c.  $[0, -3]$

d.  $(-\infty, \infty)$

State the Symmetry (Odd, Even, Neither)

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

Neither

10.  $g(x) = 3x^4 - 2x^2 + 1x^0$

Even

11.  $h(x) = x^5 - 3x^3$

Odd

True or False

12. The range of a quartic function is always  $(-\infty, \infty)$

False

U

13. Odd Degree Polynomials have an Absolute Max or Absolute Min

False

↗

14. A Quadratic function with a negative leading coefficient will have an Absolute Maximum

True

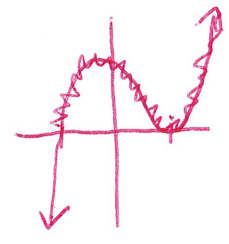
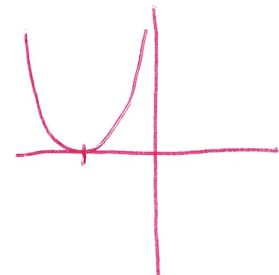
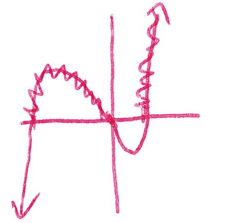
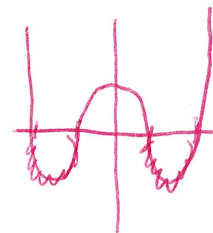
∩

15. A Cubic Function will have 3 extrema

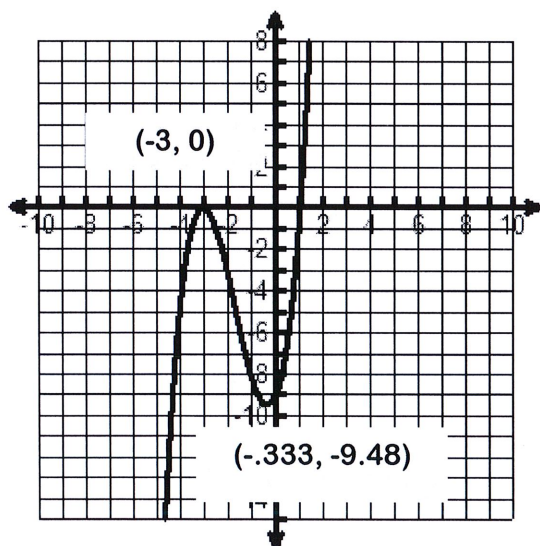
False

∩  
∪

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

<p>16. <math>(x^3 - 2x^2 - 4x + 8) \geq 0</math></p> <p><math>x^2(x-2) - 4(x-2) \geq 0</math></p> <p><math>(x-2)(x^2-4) \geq 0</math></p> <p><math>(x-2)(x+2)(x-2)</math></p> <p><math>x = 2, -2, 2</math></p> <p><math>\star</math></p>  <p><math>[-2, \infty)</math></p>	<p>17. <math>x^2 + 6x &lt; -9</math></p> <p><math>x^2 + 6x + 9 &lt; 0</math></p> <p><math>(x+3)(x+3) &lt; 0</math></p> <p><math>x = -3, -3</math></p>  <p>No Solution</p>
<p>18. <math>x^3 + 4x^2 &gt; 12x</math></p> <p><math>x^3 + 4x^2 - 12x &gt; 0</math></p> <p><math>x(x^2 + 4x - 12) &gt; 0</math></p> <p><math>x(x+6)(x-2) &gt; 0</math></p> <p><math>x = 0, -6, 2</math></p>  <p><math>(-6, 0) \cup (2, \infty)</math></p>	<p>19. <math>x^4 - 5x^2 + 4 \leq 0</math></p> <p><math>(x^2 - 4)(x^2 - 1) \leq 0</math></p> <p><math>(x+2)(x-2)(x+1)(x-1) \leq 0</math></p> <p><math>x = -2, 2, -1, 1</math></p>  <p><math>[-2, -1] \cup [1, 2]</math></p>

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



Domain: $\mathbb{R}$	Range: $\mathbb{R}$
Increasing: $(-\infty, -3) \cup (-0.333, \infty)$	Decreasing: $(-3, -0.333)$
x-intercepts: $x = -3, -3, 1$	y-intercept: $(0, -9)$
Rel. Max: $(-3, 0)$	Rel. Min: $(-0.333, -9.48)$
Abs. Max: $\emptyset$	Abs. Min: $\emptyset$
End Behavior: $x \rightarrow \infty, f(x) \rightarrow \infty$ $x \rightarrow -\infty, f(x) \rightarrow \infty$	
Min. degree: 3	Sign of leading Coeff.: +
Symmetry? None	