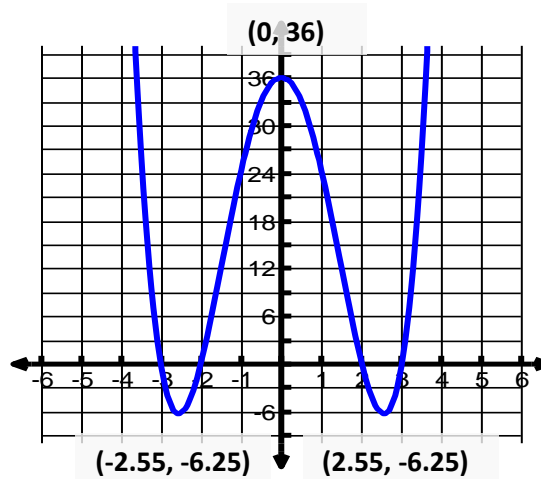


1. Answer each of the following questions for the graph (estimate the zeroes):

| | |
|---------------|---|
| Domain: | Range: |
| Increasing | Decreasing: |
| x-intercepts: | y-intercept: |
| Rel. Max: | Rel. Min: |
| Abs. Max: | Abs. Min: |
| End Behavior: | $x \rightarrow \infty, f(x) \rightarrow$ _____ $x \rightarrow -\infty, f(x) \rightarrow$ _____ |
| Min. degree | Sign of leading Coeff. |



2. Sketch the graph by hand given that the zeroes are -3, -2, and 1. Then, answer each of the following questions for the graph. (Use a graphing calculator to help)

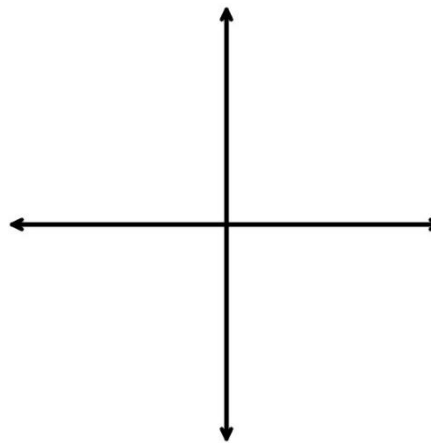
$$f(x) = x^3 + 4x^2 + x - 6$$

Domain: _____ Range: _____

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

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

of extrema: _____



3. Determine the end behavior, the max number of extrema, and draw a sketch (small):

| | |
|--|---|
| $f(x) = -3x^4 + 2x^2 - x + 2$ a) $x \rightarrow +\infty, f(x) \rightarrow$ _____ extrema _____ $x \rightarrow -\infty, f(x) \rightarrow$ _____ | $f(x) = 2 - 4x^2 - 3x^4 - x^2$ b) $x \rightarrow +\infty, f(x) \rightarrow$ _____ extrema _____ $x \rightarrow -\infty, f(x) \rightarrow$ _____ |
| $f(x) = 7x^4 + 2x^2 - 4x^6$ c) $x \rightarrow +\infty, f(x) \rightarrow$ _____ extrema _____ $x \rightarrow -\infty, f(x) \rightarrow$ _____ | $f(x) = -2x^3 - x + 5$ d) $x \rightarrow +\infty, f(x) \rightarrow$ _____ extrema _____ $x \rightarrow -\infty, f(x) \rightarrow$ _____ |

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

a) $f(x) = x^2 - 4$
of Zeros: _____

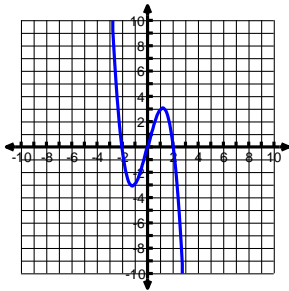
Range: _____

b) $h(x) = -5x^3 + 3$
of Zeros: _____

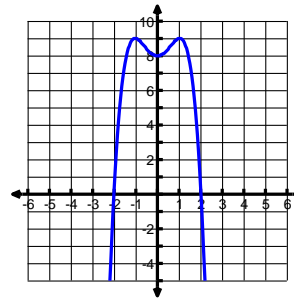
Range: _____

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

a)



b)



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 $f(x) = x - x^3 - 3$?

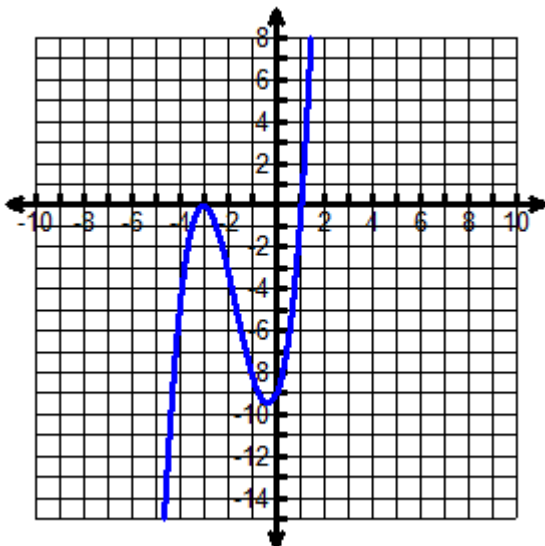
a. $(-\infty, -3]$

b. $[-3, \infty)$

c. $[0, -3]$

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

9. Answer each of the following questions for the graph: $f(x) = x^3 + 5x^2 + 3x - 9$



| | |
|---------------|---|
| Domain: | Range: |
| Increasing | Decreasing: |
| x-intercepts: | y-intercept: |
| Rel. Max: | Rel. Min: |
| Abs. Max: | Abs. Min: |
| End Behavior: | $x \rightarrow \infty, f(x) \rightarrow \underline{\hspace{2cm}}$ $x \rightarrow -\infty, f(x) \rightarrow \underline{\hspace{2cm}}$ |
| Min. degree | Sign of leading Coeff. |