HW 3.6 35, 59, 67, 51, 81, 83

35.) $f(x) = x^3 - 5x^2 - 11x + 11$

$\text{Max}\{1, |-5| + |-11| + |11|\} = \text{Max}\{1, 27\} = \underline{27}$

$1 + \text{Max}\{|-5|, |-11|, |11|\} = 1 + 11 = \underline{12}$

$\boxed{\text{Bound} = 12}$

* when graphing, make Xmin = -12, Xmax = 12 to start. Then adjust, if necessary, from there.

51.) $f(x) = 2x^4 - 3x^3 - 21x^2 - 2x + 24$

Find the real zeros. Then use the real zeros to factor.

* use calc to find real zeros (max real zeros is 4)

$x = -2, -\frac{3}{2}, 1, 4$ [All found by using the zero function on your calculator 2nd Trace -> Zero]

Factored Form

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

59.) Find the real zeros of f rounded to two dec. places.

$f(x) = x^4 - 1.4x^3 - 33.71x^2 + 23.94x + 292.41$

Zeros at $x = -3.8$ w/mult 2 ; 4.5 w/mult 2

* Since both zeros touch the x-axis, use the <u>min</u> function on your calcs to solve.

67.) Find the real solutions to $3x^3 - x^2 - 15x + 5 = 0$

use calc to find all 3 real solutions

- graph and use 2nd trace → zero

$x = \pm 2.24, .\bar{3}$ or $\pm\sqrt{5}, \frac{1}{3}$

* you could do synthetic division w/ $\frac{1}{3}$ & the original function to find that $\pm\sqrt{5}$ are also zeros.

81.) Find K such that $f(x) = x^3 - Kx^2 + Kx + 2$ has the factor $x - 2$.

* If $x-2$ is a factor, then $x = 2$ is a zero.

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

$0 = 8 - 4K + 2K + 2 \rightarrow 0 = -2K + 10 \rightarrow \boxed{K = 5}$

83.) What is the remainder when $f(x) = 2x^{20} - 8x^{10} + x - 2$ is divided by $x - 1$?

* use the remainder theorem

$f(1) = 2(1)^{20} - 8(1)^{10} + 1 - 2$

$f(1) = -7$, therefore the remainder is $\boxed{-7}$