1. Determine if \( x = -3 \) is contained in the solution set of the inequality \( \frac{-x + 5}{2} \leq -2(3x - 5) \)? [KU/2] 

YES

2. Determine the y-intercept (algebraically) of the cubic function that has x-intercepts at 2, 3, and -5 and passes through the point (-3, -180). [KU/4] 

\((0, -90)\)

3. Solve the following polynomial equations fully. [KU/12]

\[ A) \quad -2x^4 + 26x^2 - 24x = 0 \quad [4] \quad x = -4, 0, 1, 3 \]

\[ B) \quad \frac{x(x^2 - 4)}{2} = \frac{5}{6}x^2 - \frac{10}{3} \quad [4] \quad x = -2, 5/3, 2 \]

\[ C) \quad 5x^2(x + 4) = -9x - 2(x^2 + 2) \quad [4] \quad x = \frac{-1 \pm 2i}{5} \text{ and } x = -4 \]

4. Solve the following inequalities. Express answers using interval notation. [APP/10]

\[ A) \quad -10x + 3 \geq 2x - 3 \quad [2] \quad x \in \left( -\infty, \frac{1}{2} \right] \]

\[ B) \quad -6x^2(x - 1)^2(x - 3) > 0 \quad [4] \quad x \in (-\infty, 0) \]

\[ \quad x \in (0, 1) \]

\[ \quad x \in (1, 3) \]

\[ C) \quad -3x < \frac{x + 4}{2} \geq 2(x - 4) \quad [4] \quad x \in \left( -\frac{4}{7}, \frac{20}{3} \right] \]

5. A) Determine the value of “k” such that \((x + 2)\) is a factor of the polynomial function

\[ y = 4x^4 - 3kx^3 + (k - 4)x^2 - 4x \] \[ \text{[APP/2]} \quad k = -2 \]

B) Sketch the polynomial function \( y = 4x^4 - 3kx^3 + (k - 4)x^2 - 4x \) from above on the grid below. (Include an appropriate scale for full marks) [APP/4] 

\[ f(x) = 2x(x-1)(2x+1)(x+2) \]

6. Determine when \( f(x) > g(x) \) if \( g(x) = 2x - 6 \) and \( f(x) = 7x^3 - 16x^2 - 15x \). [APP/4]

\[ x \in \left( -1, \frac{2}{7} \right) \text{ and } x \in (3, \infty) \]