Math 2 Quiz 6 Thurs. 4/12/18  NAME ________  20 points possible

Work individually. No notes; no calculator. Show any work clearly.

1. Given \( y = f(x) = 4x^3 - 2x^2 - 24x - 18 \). Also, \((2x + 3)\) is a factor and \( \frac{f(x)}{2x+3} = 2x^2 - 4x - 6 \)
   Factor \( y = f(x) \) completely. Circle your answer. (5 pts.)

   \[ y = f(x) = (2x+3)(2x^2 - 4x - 6) \]
   \[ = (2x+3) \cdot 2 \cdot (x^2 - 2x - 3) \]
   \[ = 2 \cdot (2x+3) \cdot (x-3)(x+1) \]

2. Refer to the given \( f \) graph to answer the following: (2 pts. each)
   a) Is the degree of \( f \) even or odd?  \text{odd}  
   b) Is the leading coefficient positive or negative? \text{negative}  
   c) Which zero, if any, is a repeated zero?  \( x = -1 \)

3. Use the given information about a polynomial function \( y = f(x) \) to sketch a possible graph. (5 pts.)
   
   The degree of \( f \) is even  
   The leading coefficient is negative  
   The zeros of \( f \) are \( x = -1, x = -3, x = 2 \) (double)

4. Find the horizontal asymptote of \( y = f(x) = \frac{3x^3 - 2x}{x^2 + 5x - 7} \).
   
   Use the method demonstrated in class and at the end of Chapter 3.8. Clearly show all work. Circle your answer. Hint: A horizontal asymptote is a horizontal line with equation \( y = k \). (4 pts.)

   \[ \text{As } x \to \infty, \quad y = \frac{3x^3 - 2x}{x^2 + 5x - 7} \]
   \[ \quad = \frac{3 - \frac{2}{x}}{1 + \frac{5}{x} - \frac{7}{x^2}} \rightarrow \frac{3 - 0}{1 + 0 - 0} = \frac{3}{0} \quad \text{a.o. } x \to \infty \]
   
   So, \( y = \frac{3}{x} \) is the horizontal asymptote.