More Chapter 2 Practice

1) A rectangle is drawn in quadrant one with one corner at the origin such that the base along the x-axis and the left side is along the y-axis. The corner diagonal from the origin is on the curve $f(x)=\frac{4-x}{2+x}$ in the 1st quadrant.
   a) Make a sketch of the situation including one such rectangle.
   b) Write a function $A(x)$ that gives the area of the rectangle.
   c) What is the maximum area of all possible such rectangles?

2) Given the polynomial: $f(x)=10x^3+7.5x^2-54.85x+37.95$
   a) Find the roots of the Polynomial. Explain how you got your answer and/or show your work.
   b) Find the intervals on which the polynomial is increasing and decreasing.

3) Given the polynomial: $f(x)=10x^3+6.5x^2-56.7x+41.4$
   a) Find the roots of the Polynomial. Explain how you got your answer and/or show your work.
   b) Find the intervals on which the polynomial is increasing and decreasing.

4) A triangle is drawn completely in quadrant one with its base along the x-axis and its base vertices at the origin and at the zero of $f(x)$ given below. The remaining vertex of the triangle is on $f(x)$. $f(x)=-x^3+6x^2-7x+7$
   a) Make a sketch of the situation including one such triangle.
   b) Write a function $A(t)$ that gives the area of the triangle as a function of t, where t is the x-coordinate of the ***top*** of the triangle.
   c) Graph $A(t)$ and $f(x)$ together (clearly t is along the x-axis!) in a coordinate system. State your relevant window dimensions.
   d) What is the maximum area of all possible such triangles?