1. Factor each polynomial completely. Note that these are all trinomials with a leading coefficient other than 1. Check your factorization by multiplying out the factored version.

     a) $5y^2 - 16y + 3$ b) $3x^2 + 13x - 10$

     c) $6w^2 - 11w + 4$ d) $14y^2 + 15y - 9$

     e) $18r^2 + 27r + 9$ f) $35t^2 + 28t - 7$

     g) $4x^9 + 18x^8 + 14x^7$ h) $5r^2 + 17rx + 14x^2$

2. A rectangle has area $10x^2 + 3x - 27$ square centimeters, where x is some unknown number. Its two side lengths are nice, simple, linear binomials.

   a) What are lengths of the each side, expressed as an expression in x?

   b) Based on the previous answer, what must x be larger than to guarantee the rectangle has positive length and positive width?

3. When you stand on top of a certain skyscraper and throw a javelin straight up in the air, it eventually turns and falls all the way to the street below. Since the building height is 407 feet, and you throw the javelin with an initial speed of 14 feet per second, the height of the javelin after t seconds is

$$-16t^2 + 14t + 407$$

(That -16 has to do with how strong gravity is on Earth.)

   a) Factor that polynomial. This may take time. When you look for factor pairs of AC, there are 20 of them (not counting negatives). Use a simple calculator to help speed up finding the factor pairs.

   b) Based on the factorization, can you predict the time when the javelin will hit the ground?