Quadratics and Circles and Midpoints, Oh My!

a) Create a factorable trinomial in the form $x^2 - sx + p = 0$

b) Let A be the point $(0, 1)$ and B be the point (s, p) where s and p are the values from part (a). Find the midpoint of segment AB, let's call it point M.

c) Plot the points A, B, and M.

d) Use a compass to graph the circle with center at M and diameter of segment AB.

e) Solve the quadratic equation in part (a).

f) What do you notice about the x-intercepts of the circle as they relate to the quadratic equation in part (a)?

Let's see if your hypothesis in part (f) is correct!
g) Find the exact length of the radius of the circle. (In other words, leave as a square root if not a perfect square.)

h) Write the equation of the circle.

i) Use the equation of the circle to calculate the x-intercepts of the circle algebraically.

j) Was your hypothesis in part (f) correct?

k) Try the process again with a different quadratic equation from part (a).

Will this work every time?
l) Let's start at step g) and do the problem in general. In other words, work the problem with the point A at $(0, 1)$ and the point B at (s, p). Explain your results.