

Real and Complex Roots

Consider the equation $x^2 + px + q = 0$ where p and q are real numbers.

For what values of p and q does the equation have real solutions?

How do the (real or complex) roots of the equation change if p is held constant and q is changed? Plot the locus of the roots on an Argand diagram as q is changed.

How do the roots change if q is held constant and p is changed?

Investigate.