

1. Find all rational solutions of the following equations:

$$x^2 + y^2 + 3 = 0,$$

$$x^2 + y^2 - 3 = 0,$$

$$x^2 - xy + y^2 - 4x + 2y + 4 = 0,$$

$$x^2 + y^2 + z^2 = 1.$$

2. Find all integer solutions of the following equations:

$$x^2 + y^2 - 5z^2 = 0,$$

$$x^2 - 3y^2 + z^2 = 0.$$