

Section 10.8 Notes

System of NonLinear Equations

Introduction

- A *system of nonlinear equations* is any system where one or more of the equations is not linear.

For example,

$$3x - y = 2$$

$$4x^2 + y = 7$$

- To solve these systems, we go back to using either substitution or elimination.
- With systems of nonlinear equations, you could have *any* number of solutions - 0, 1, 2, 3, etc. or infinitely many.

1 Substitution

Examples

1.

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

$$x - y = 5$$

$(2, -3)$ and $(1, -4)$

2.

$$x + y = 4$$

$$xy = 3$$

$(1, 3)$ and $(3, 1)$

2 Elimination

Examples

1.

$$x^2 - y^2 = 2$$

$$2x^2 - y^2 = 4x - 1$$

$(3, -\sqrt{7})$ and $(3, \sqrt{7})$

2.

$$\frac{1}{x^3} - \frac{2}{y} = -3$$

$$\frac{2}{x^3} + \frac{3}{y} = 1$$

$(-1, 1)$