

Homework 1: Due Jan 18th (Friday)

These problems should be reviews from highschool math. Sometimes there is more than one way to solve these problems. In those cases, any *correct* solution is acceptable.

- (1) Solve the following systems of equations:

(a)

$$5x + y = 59$$

$$x + 5y = 31$$

(b)

$$2x + 3y = 1$$

$$x - y = 10$$

(c)

$$a + b + c = 1$$

$$a + 2c = 5$$

$$2a + 2b + c = 0$$

- (2) Find three triples (x, y, z) so that

$$x + y + z = 0$$

$$2x + 3y + 4z = 1$$

- (3) John, Jeff, and Jessica are going on a road trip. John spends three times as much as Jeff and Jessica together. Jeff brought 100 dollars more than Jessica, but had the same amount money left over at the end. Jessica, on the other hand, spent only half as much money as Jeff. How much money did each of them spend on this trip?

- (4) Find the roots of the following polynomials.

(a) $x^2 + 2x - 3 = 0$

(b) $x^2 + x - 1 = 0$

(c) $2x^2 + x - 10 = 0$

(d) $(x + 2)(x + 5)(x - 1) = 0$

(e) $x^6 + 2x^3 - 3 = 0$ (Hint: Let $y = x^3$)

- (5) Factor $x^4 + x^2 + 1$. (Hint: The fastest way for this is to complete the square by adding and subtracting x^2 .)