ANSC 595
Mixed Models for Genetic Evaluations
Homework #2
Due Wednesday, February __

Name:_____

Exercise 1: Estimating Fixed Effects in Dairy Cattle

A dairy farm recorded the milk yield (kg) of three groups of cows under different diets:

Diet	Milk Yield (kg)
A	28, 30, 32
B	35, 36, 34
C	40, 42, 39

Assuming the simple model:

$$y = \mu + \beta d + e$$

where:

- μ is the overall mean;
- β is the diet effect (A as the reference),
- $e \sim N(0,\sigma^2)$

TASK: Compute the BLUE estimates for μ and the effects of diets B and C.

Exercise 2: Estimating Breeding Values in pre-weaning gain (WWG) of beef calves

A farmer has recorded pre-weaning gain (WWG) of beef caves:

Calves	SEX	sire	dam	WWG (kg)
4	M	1	UNKNOWN	4.5
5	F	3	2	2.9
6	F	1	2	3.9
7	M	4	5	3.5
8	M	3	6	5.0

Assume the model:

$$y = p_i + a_i + e$$

where:

- y= the WWG of the calf
- pi= the effect of the sex
- calves assumed to be reared under the same management condition
- σ2a = 20
- σ2e = 40

TASK: Compute the effect of the sex and the breeding value of each animal.