Answers to Practice Thought Questions/ Problems for Week 5

1) Both genetic and environmental effects are present.
MZT (0.64) > DZT (0.44) shows a genetic effect
MZT (0.64) > MZA (0.50) shows an environmental effect

2) Nothing. It could easily be "both" genetic and environmental. All you showed was that there IS a genetic effect, not that there ISN'T an environmental (soil) one.

3) The phenotypic variance for the F1 was 0.02667
The phenotypic variance for the F2 was 0.09467
The F1 variance is assumed to be environmental.
The F2 variance is assumed to be a combination of genetic and environmental.
The difference is 0.068, which would be the genetic component of variance (Vg).
Heritability = Vg / Vp = 0.068 / 0.09467 = 0.718

4) 10% genetic, 90% environmental

5) The difference in weight between the overall population and selected group (S) is 3-1 = 2.
The heritability is 0.25. So, you expect the weight to be reduced (since you selected SMALLER ducks) by 2 * 0.25 = 0.5. So, the final weight should be 2.5kg.

6) Many possibilities. The amount of genetic variation within your population of ducks may be different from the other farmer's ducks. There may be more or less environmental variation affecting weight in your ducks. Etc.

7) $N_t = N_0 e^{rt}$
$16487 = 10000\ e^{r100}$
Divide both sides by 10000
$1.6487 = e^{r100}$
Take natural log (ln) of both sides
$0.5 = r\ 100$
Divide both sides by 100
r = 0.005 is the intrinsic rate of increase (b-d)

8) r = b - d
0.005 = 0.03 - d
d = 0.025 frogs per year