Answerkey:

1a) $X^D X^d$ – in order for individual II-2 to produce an affected son, she must be a carrier for DMD.

1b) 100%. Because individual I-2 is affected, she can only pass on a recessive DMD allele to her sons. This means that all of her sons will have DMD

1c) 25%, In order for a daughter to be affected, she must have a genotype $X^d X^{d.}$ There is a 1 in 4 chance that they will produce a child with this genotype (parents $X^d Y$ and $X^D X^d$

2a) 50% A cross between I-1 and I-2 would produce two offspring with unattached earlobes (Ee) and two offspring boxes with attached earlobes (ee)

2b) Ee, II-3 must have a heterozygous genotype because he has a mother with attached earlobes, but shows the dominant condition.

3a) 75% This cross has a ¾ chance of producing individuals that have at least on D allele (both parents heterozygous). Because dimples D is dominant, these individuals will have dimples.

3b) 50%, A cross between II-1 and II-2 would produce two boxes with dimpled offspring (Dd) and two boxes with non-dimpled offspring (dd)