Simple Genetics Practice Problems

1. For each genotype, indicate whether it is heterozygous (HE) or homozygous (HO)

<table>
<thead>
<tr>
<th>Genotype</th>
<th>HE</th>
<th>HO</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>li</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jj</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Li</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pp</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. For each of the genotypes below, determine the phenotype.

- **Purple flowers are dominant to white flowers**
  - PP
  - Pp
  - pp
- **Brown eyes are dominant to blue eyes**
  - BB
  - Bb
  - bb
- **Round seeds are dominant to wrinkled**
  - RR
  - Rr
  - rr
- **Bobtails are recessive (long tails dominant)**
  - TT
  - Tt
  - tt

3. For each phenotype, list the genotypes. (Remember to use the letter of the dominant trait)

- **Straight hair is dominant to curly.**
  - _________ straight
  - _________ straight
  - _________ curly
- **Pointed heads are dominant to round heads.**
  - _________ pointed
  - _________ pointed
  - _________ round

4. Set up the square for each of the crosses listed below. The trait being studied is round seeds (dominant) and wrinkled seeds (recessive)

   |   |   |
---|---|---|
| Rr x rr |   |   |

What percentage of the offspring will be round?

   |   |   |
---|---|---|
| Rr x Rr |   |   |

What percentage of the offspring will be round?
Practice with Crosses. Show all work!

5. A TT (tall) plant is crossed with a tt (short plant).
What percentage of the offspring will be tall? ________

6. A Tt plant is crossed with a Tt plant. What percentage of the offspring will be short? ________

7. A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR). What percentage of the offspring will be homozygous (RR)? ________

8. A homozygous round seeded plant is crossed with a homozygous wrinkled seeded plant. What are the genotypes of the parents? ________ x ________
What percentage of the offspring will also be homozygous? ________

9. In pea plants purple flowers are dominant to white flowers. If two white flowered plants are cross, what percentage of their offspring will be white flowered? ________

10. A white flowered plant is crossed with a plant that is heterozygous for the trait. What percentage of the offspring will have purple flowers? ________

11. Two plants, both heterozygous for the gene that controls flower color are crossed. What percentage of their offspring will have purple flowers? ________
What percentage will have white flowers? ________
12. In guinea pigs, the allele for short hair is dominant.
   What genotype would a heterozygous short haired guinea pig have? ______
   What genotype would a purebreeding short haired guinea pig have? ______
   What genotype would a long haired guinea pig have? ______

13. Show the cross for a pure breeding short haired guinea pig and a long haired guinea pig.
   What percentage of the offspring will have short hair? ______

14. Show the cross for two heterozygous guinea pigs.
   What percentage of the offspring will have short hair? ______
   What percentage of the offspring will have long hair? ______

15. Two short haired guinea pigs are mated several times. Out of 100 offspring, 25 of them have long hair. What are the probable genotypes of the parents? ______ x ______
   Show the cross to prove it!