

Genetics assignment – PKU – Answers

1. See WB 1.3 for an example (round: female, square: male etc.)
2. Recessive, see 5, 6 and 13
Once with 5 and 6 having Aa, 12 AA/Aa, 13: aa
Once with 5, 6 and 12 having aa and 13 having AA/Aa which is not possible.
3. 1, 3, 4, 6, 7, 9, 10, 15, 16, 18 → Aa
12, 14 → Aa of AA
2, 4, 8, 11, 13, 17, 19, 20 → aa
4. 18: Aa marries aa, so the chance will be $\frac{1}{2}$ (50%).
5. 0% (not possible)
6. Yes, 17 is aa. When a sperm donor is Aa or AA, you can select the AA and the child will not have PKU. With Aa the chance to a child with PKU is $\frac{1}{2}$. At this moment (Aa x aa) the chance is $\frac{1}{2}$.
7. At his moment (aa x aa) the chance is 100%. With a sperm donor it can become 0% when you select for a person with AA and $\frac{1}{2}$ with a person with Aa.
8. No, look at 5, 6 and 13
9. A could be AA or Aa or aa, the wife has AA. So the kids can't have the disease.

b) is an extra question, not needed for the test

For A to have aa = 1 out of 18.000

For A to have AA/Aa = 17.999 out of 18.000

The chance for A to have aa is 1 out of 18.000. The chance for the kids to have Aa is also 1 out of 18.000 (parents will have aa x AA then) + $\frac{1}{2}$ * 17.999 out of 18.000 (parents are Aa x AA).

There is no chance to have aa for the kids.

The chance to AA is $\frac{3}{4}$ * 17.999 out of 18.000