

Foundation Separate version — Higher Tier (★) questions removed.

**Q1. Explain the inheritance of cystic fibrosis. Include the terms recessive, carrier and allele.**

[3 marks]

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**Q2. Two carrier parents ( $Ff \times Ff$ ) are expecting a child. Use a Punnett square to calculate the probability the child (a) has cystic fibrosis, (b) is a carrier.**

[3 marks]

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**Q3. Polydactyly is caused by a dominant allele (D). Explain why polydactyly is more likely to appear in every generation of a family than cystic fibrosis.**

[3 marks]

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**Total: 9 marks**

**Q1 (3 marks)**

*Explain the inheritance of cystic fibrosis. Include the terms recessive, carrier and allele...*

- Cystic fibrosis caused by a RECESSIVE allele (f) [1]
- Two copies of the allele needed to have the condition (ff genotype) [1]
- Carriers (Ff): heterozygous — carry allele but are unaffected [1]

**Q2 (3 marks)**

*Two carrier parents (Ff × Ff) are expecting a child. Use a Punnett square to calculate the...*

- Punnett square: FF, Ff, Ff, ff [1]
- (a) ff: 1 in 4 / 25% probability of cystic fibrosis [1]
- (b) Ff: 2 in 4 / 50% probability of being a carrier [1]

**Q3 (3 marks)**

*Polydactyly is caused by a dominant allele (D). Explain why polydactyly is more likely to ...*

- Polydactyly: dominant — only ONE copy of D needed to show the condition [1]
- An affected person (Dd or DD) will always pass D to approximately 50% of children [1]
- Cystic fibrosis: recessive — BOTH parents must carry f and there is only 25% chance per child if both are carriers [1]