

(Genetic inheritance (alleles, Punnett squares, genetic crosses, family trees))

Q1.a)(2019)

Rr / rR

Q1.b)(2019)

C^WC^W

Q1.c)(2019)

parental genotypes / gametes

correct for both parents:

C^RC^W C^RC^W / C^R and C^W

genotypes of offspring correctly
derived in a Punnett square:

C^RC^R C^RC^W C^WC^W

correct identification of
phenotypes from their cross:

C^RC^R = red

C^RC^W = pink

C^WC^W = white

Q1.d)(2019)

answer correctly derived from

Question 05.4

to match stated phenotypes

Q2.a)(2020)

Dd / dD

has **D** because has Dupuytren's

and has **d** because child /

person 6 is homozygous

recessive **or** does not have

Dupuytren's **or** is **dd**

Q2.b)(2020)

male / person 7 gametes
correct: **D** and **d**

female / person 8 gametes
correct: **d** and **d**

correct derivation of offspring
genotypes:
Dd Dd dd dd

offspring with Dupuytren's
identified

probability correct from the
correct identification given

Q2.c)(2020)

female(s) / person(s) 3 / 11 / 12
have Dupuytren's

females don't have Y
chromosome

or

Dupuytren's is passed from
fathers / 1 / 7 to daughters / 3 /
12, (so is not on the Y
chromosome)

Q3.a)(2022)

parents without MSUD have a
child with MSUD

Q3.b)(2022)

gametes correct:

N + n and **N + n**

correct derivation of offspring
genotypes:

NN Nn Nn nn

correct phenotype for each
genotype

correct probability:

0.25 / ¼ / 25% / 1 in 4

Q4.a)(2024)

(person **1**) has polydactyly so
must have **D**

has offspring / (person) **5** who
does not have polydactyly so
must have **d** from person **1**

or

person **5** does not have
polydactyly so must be **dd** and
must inherit **d** from person **1**

Q4.b)(2024)

Female / **6**'s gametes correct

D + d

Male / **7**'s gametes correct

d + d

correct derivation of offspring
genotypes: **Dd Dd dd dd**

Dd correctly identified as
polydactyly in **only** half of
offspring

Q4.c)(2024)

CF allele is recessive

to have CF, must have 2 CF alleles

chance of having one CF allele
is $\frac{1}{50}$

(chance of having two CF alleles
is)

$$\frac{1}{50} \times \frac{1}{50} = \frac{1}{2500}$$