Started on	Friday, 28 January 2022, 9:45 AM PST
State	Finished
Completed on	Friday, 28 January 2022, 11:45 AM PST
Time taken	2 hours
Grade	**123.00** out of 123.00 (**100**%)

Information

[Questions 1-4] Imagine an autosomal co-dominant trait with three different alleles: A, B, and C. For each of the following families, identify the possible nondisjunction events (rare mistakes during meiosis) that could explain the genotype of the offspring. Assume no recombination occurs.

Question 1

Correct

3.00 points out of 3.00

Parent 1 has genotype BB and Parent 2 has genotype BC. They have a triploid offspring that has genotype BBC.

This could have occurred through non-disjunction in meiosis I of Parent 1.

Select one:

- True ✔
- False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'True'.

Question 2

Correct

3.00 points out of 3.00

Parent 1 has genotype AC and Parent 2 has genotype BC. They have a triploid offspring that has genotype ACC.

This could have occurred through non-disjunction in meiosis I of Parent 2.

Select one:

- True
- False ✔

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'False'.

Question **3**

Correct

3.00 points out of 3.00

Parent 1 has genotype AC and Parent 2 has genotype BC. They have a triploid offspring that has genotype ABC.

This could have occurred through non-disjunction in meiosis I of Parent 1.

Select one:

- True ✔
- False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'True'.

Question 4

Correct

3.00 points out of 3.00

Parent 1 has genotype AC and Parent 2 has genotype AB. They have a triploid offspring that has genotype ABC.

This could have occurred through non-disjunction in meiosis II of Parent 2.

Select one:

- True
- False ✔

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'False'.

Information

[Questions 5 - 7] You are a genetic counselor and are meeting with a couple where both individuals are heterozygous for primary ciliary dyskinesia (a rare recessive autosomal disorder). They are planning on starting a family and are interested in knowing the probability that their children may or may not have primary ciliary dyskinesia.

Question **5**

Correct

3.00 points out of 3.00

If they have two children, what is the probability that only their first child will have primary ciliary dyskinesia?

- a. 3/16 ✔
- b. 6/16
- c. 9/16
- d. 10/16
- e. None of the other answer choices are correct

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Use the multiplication and sum rule

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

The correct answer is:
3/16

Question 6

Correct

3.00 points out of 3.00

If they have two children, what is the probability that both children will be affected?

- a. 3/16
- b. 7/16
- c. 9/16
- d. 10/16
- e. None of the other answer choices are correct ✔

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Use the multiplication and sum rule

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

The correct answer is:
None of the other answer choices are correct

Question 7

Correct

3.00 points out of 3.00

If they have two children, what is the probability that both children will have the same genotype?

- a. 4/16
- b. 7/16
- c. 6/16 ✔
- d. 10/16
- e. None of the other answer choices are correct

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Use the multiplication and sum rule

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

The correct answer is:
6/16

Information

[Questions 8-11] Natalie (an XX individual) and Daniel (an XY individual) are concerned about having a child with polycystic kidney disease, which causes cysts to develop on the kidneys and loss of kidney function over time. This condition, which is very rare, has affected both Natalie's uncle (her mother's brother) and younger brother and Daniel's father and oldest brother. No one else in either family has the condition.

Question 8

Correct

3.00 points out of 3.00

Polycystic kidney disease is most-likely an X-linked recessive trait

Select one:

- True ✔
- False

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'True'.

Question 9

Correct

3.00 points out of 3.00

Based on their family history, what is the probability Natalie and Daniel's first child will be affected by polycystic kidney disease?

- a. 1/4
- b. 1/8 ✔
- c. 3/8
- d. 1/16
- e. 3/16
- f. 1/32
- g. 3/32
- h. 1/36
- i. None of the other answer choices are correct

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is:
1/8

Question 10

Correct

3.00 points out of 3.00

The couple is also concerned about their child inheriting hemophilia, another rare disease, which is X-linked. Natalie's brother, Daniel's father, and Daniel's sister both have hemophilia. No one else in either family has the condition.

The probability that Natalie and Daniel's first child is an XX individual and has hemophilia is 1/2.

Select one:

- True
- False ✔

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'False'.

Question 11

Correct

3.00 points out of 3.00

The couple is also concerned about their child inheriting hemophilia, another rare disease, which is X-linked. Natalie's brother, Daniel's father, and Daniel's sister both have hemophilia. No one else in either family has the condition.

The probability that Natalie and Daniel's first child will be a girl affected by both diseases is 2/36.

Select one:

- True
- False ✔

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'False'.

Information

[Question 12-15] You are working with a plant breeding program and cross-breed a true-breeding plant with white flowers with another true-breeding plant with white flowers. The F_1 progeny all have red flowers. The F_1 plants were then allowed to self-fertilize, and among F_2 plants there are red, and white-flowered individuals with a phenotypic ratio of 9 red: 7 white.

Question 12

Correct

3.00 points out of 3.00

Flower colors are determined by two genes

Select one:

- True ✔
- False

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Week 2 clicker questions

Week 4 lab

The correct answer is 'True'.

Question 13

Correct

3.00 points out of 3.00

All red flowered plants from the F2 generation must be heterozygous for color gene(s).

Select one:

- True
- False ✔

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Week 2 clicker questions

Week 4 lab

The correct answer is 'False'.

Question **14**

Correct

3.00 points out of 3.00

All white flowered plants from the F2 generation will have the same genotype.

Select one:

- True
- False ✔

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Week 2 clicker questions

Week 4 lab

The correct answer is 'False'.

Question 15

Correct

3.00 points out of 3.00

All red flowered plants must have at least one dominant allele for one of the genes.

Select one:

- True ✔
- False

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Week 2 clicker questions

Week 4 lab

The correct answer is 'True'.

Information

[Questions 16–18] Brian has a maternal grandmother (i.e. his mother's mother) who is affected by Gaucher disease. Amber has a paternal grandmother (i.e. her father's mother) that is affected by Gaucher disease. Gaucher disease is a rare disorder and no one else in either family has the condition.

Question 16

Correct

3.00 points out of 3.00

The probability that Amber is a carrier of Gaucher's disease is greater than the probability that Brian is a carrier of Gaucher's disease.

Select one:

- True
- False ✔

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'False'.

Question 17

Correct

3.00 points out of 3.00

The probability that Brian and Amber's first child would be affected is 1/9.

Select one:

- True
- False ✔

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'False'.

Question 18

Correct

3.00 points out of 3.00

After the birth of their first child, Amber is diagnosed with Gaucher's disease. The probability their second child will have Gaucher's disease is 1/6.

Select one:

- True
- False ✔

Distinguish between dominant, recessive, autosomal, *X*-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

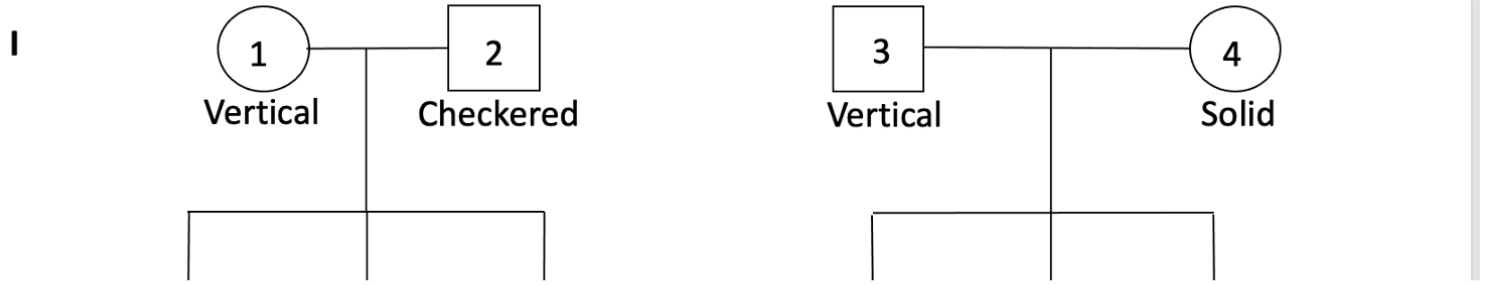
Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is 'False'.

Information

[Questions 19-24] In Cat-Tien tropical forest, there is an exotic nocturnal nightjar. The feather pattern of this bird tail is determined by **a single autosomal gene** with **three alleles** that exhibit an unknown hierarchy of dominance. Genetic testing shows that individuals I-3 and III-2 are each homozygous. Use this information and the pedigree to answer the following questions.



Question 19

Correct

3.00 points out of 3.00

Even though II-4, II-5, and II-6 siblings have the same phenotype, their genotypes are different.

Select one:

- True
- False ✔

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question 20

Correct

3.00 points out of 3.00

II-3 is homozygous.

Select one:

- True
- False ✔

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question **21**

Correct

3.00 points out of 3.00

The probability that II-1 is heterozygous is:

- a. 0
- b. 1/4
- c. 1/2 ✔
- d. 1
- e. Unable to determine

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is:
1/2

Question **22**

Correct

3.00 points out of 3.00

Vertical is recessive to Solid.

Select one:

- True
- False ✔

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question **23**

Correct

3.00 points out of 3.00

Solid is dominant over Horizontal.

Select one:

- True
- False ✔

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question **24**

Correct

3.00 points out of 3.00

What is the probability that the first offspring of IV-3 and IV-4 is vertical?

- a. 0
- b. 1/4 ✔
- c. 1/2
- d. 1
- e. Unable to determine

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

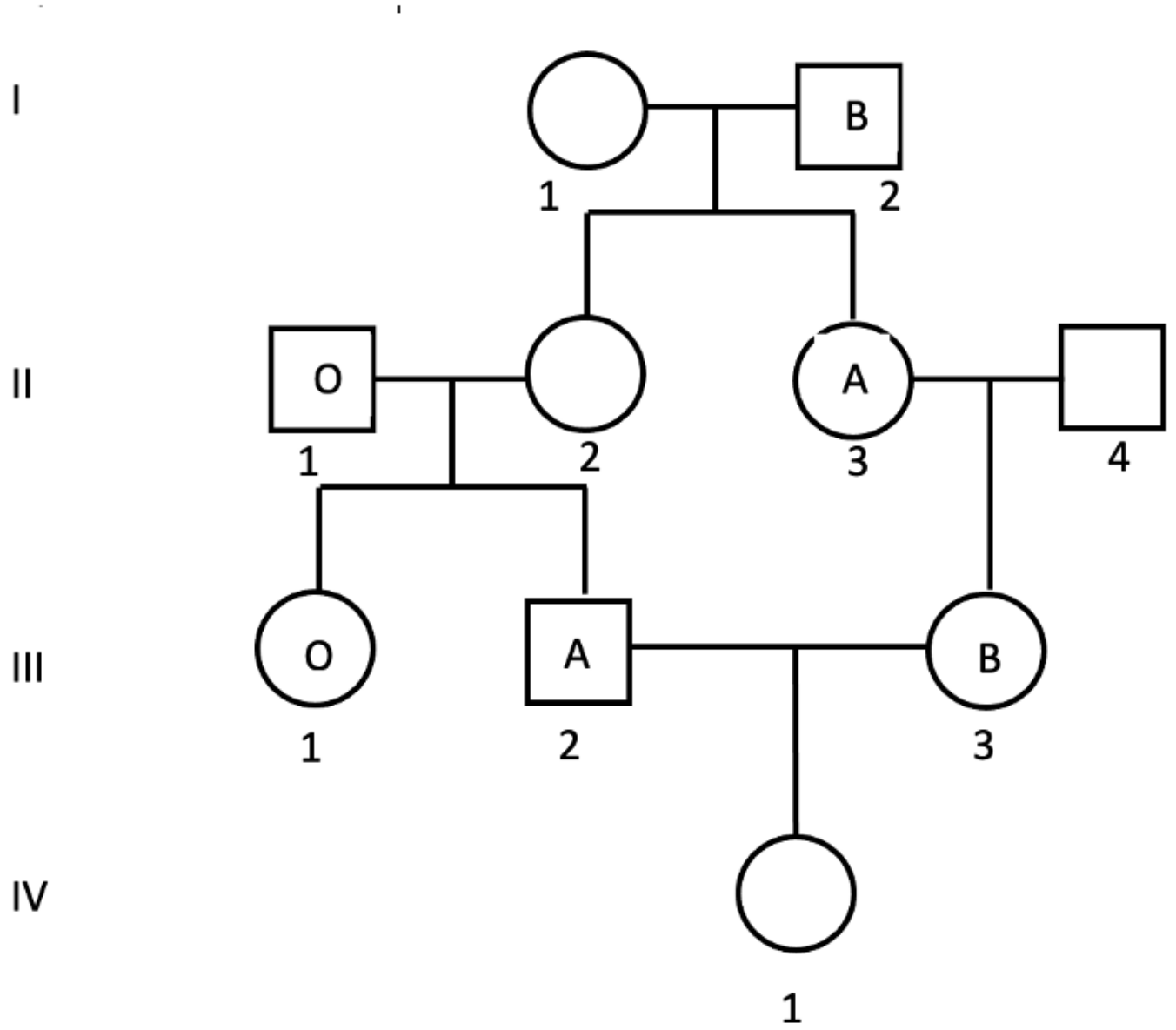
Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is:
1/4

Information

[Questions 25-26] Recall that ABO blood groups exhibit a co-dominant pattern of inheritance: I^A and I^B are codominant and i is recessive to both I^A and I^B. A human pedigree and the ABO blood types of some of the members of the family are shown in the figure below.



Question **25**

Correct

3.00 points out of 3.00

Individual II-2 could be blood type AB.

Select one:

- True
- False ✔

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question **26**

Correct

3.00 points out of 3.00

Individual IV-1 has an equal probability of being blood type O or blood type AB.

Select one:

- True ✔
- False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

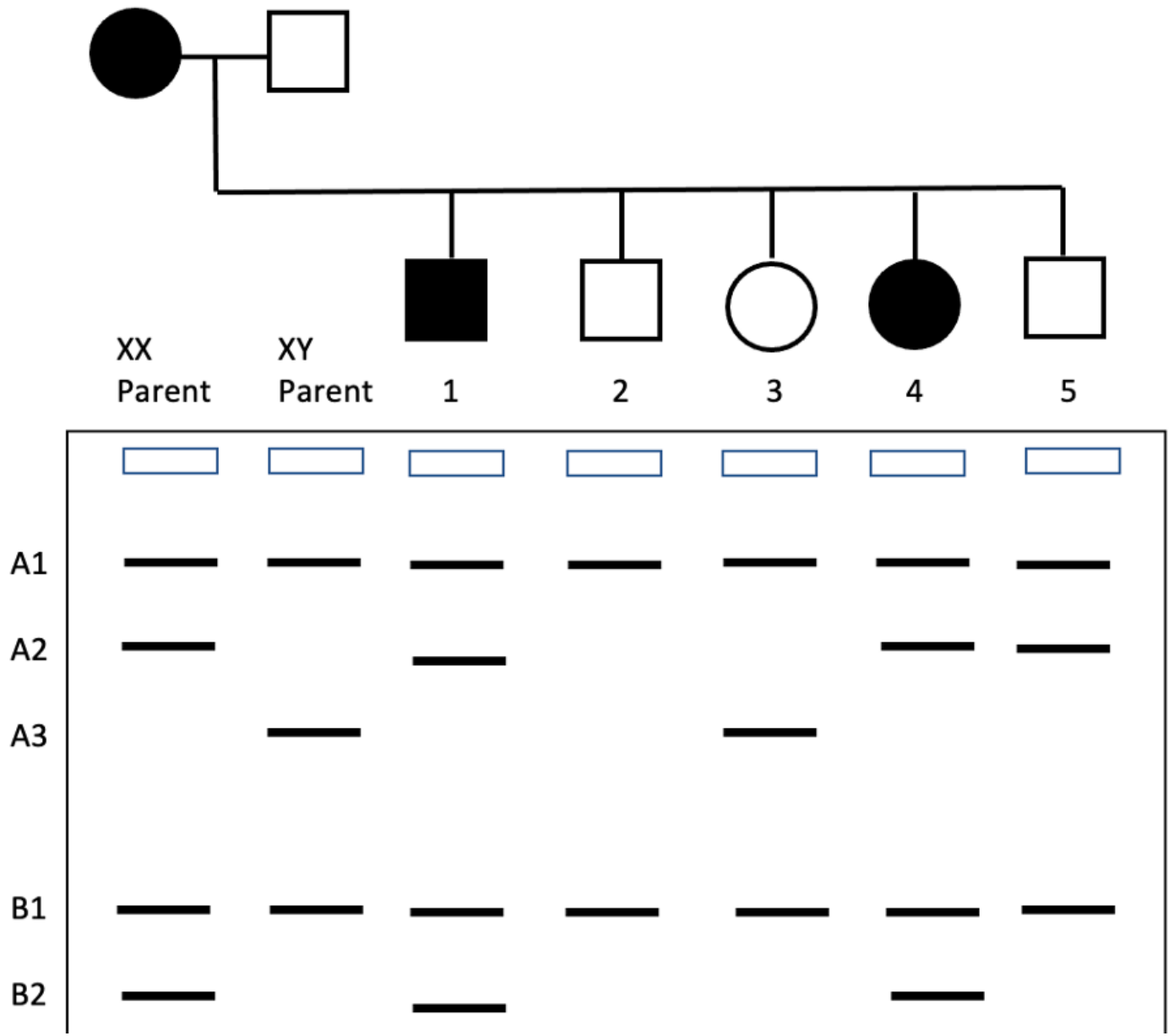
Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'True'.

Information

[Questions 27 – 30] Two generations of a family are depicted in this pedigree. The gel below shows the banding pattern for two VNTRs, *A* and *B*, each with three alleles (denoted A_1, A_2, A_3 and B_1, B_2, B_3, respectively). Some individuals in the pedigree are also affected with an autosomal dominant disorder, and their symbols in the pedigree are filled.



Question **27**

Correct

3.00 points out of 3.00

Allele B2 could be a marker for the disorder.

Select one:

- True ✔
- False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3

The correct answer is 'True'.

Question **28**

Correct

3.00 points out of 3.00

The genotype of individual 2 is:

a. A1A1/B1B1

b. A1B1/Y

c. A1B1/A1B1 ✔

d. A1B3/A1B3

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3

The correct answer is:
A1B1/A1B1

Question **29**

Correct

3.00 points out of 3.00

Individual 5 must inherit a non-recombinant chromosome from their XY parent.

Select one:

- True ✔
- False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3

The correct answer is 'True'.

Question **30**

Correct

3.00 points out of 3.00

Which chromosome did individual 1 inherit from their XY parent?

a. A1B2

b. A3B3

c. A1B1 ✔

d. A2B2

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

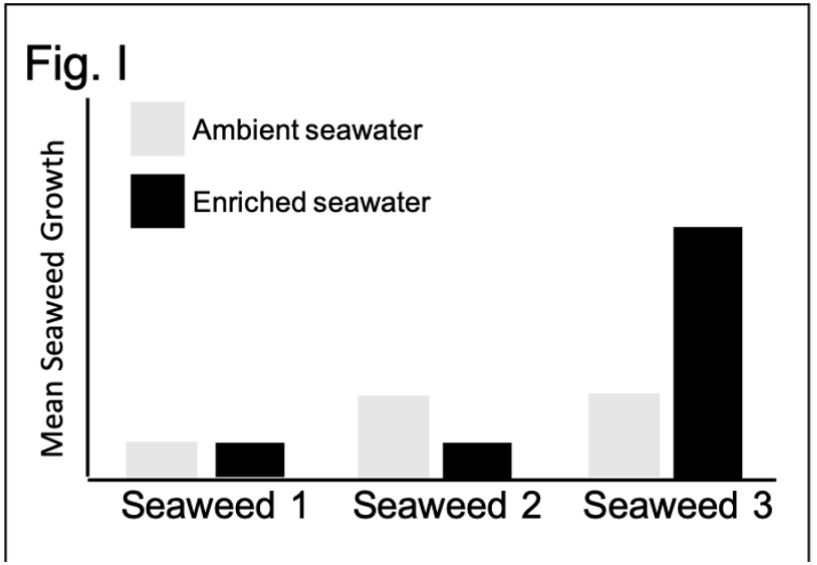
CQs Week 3

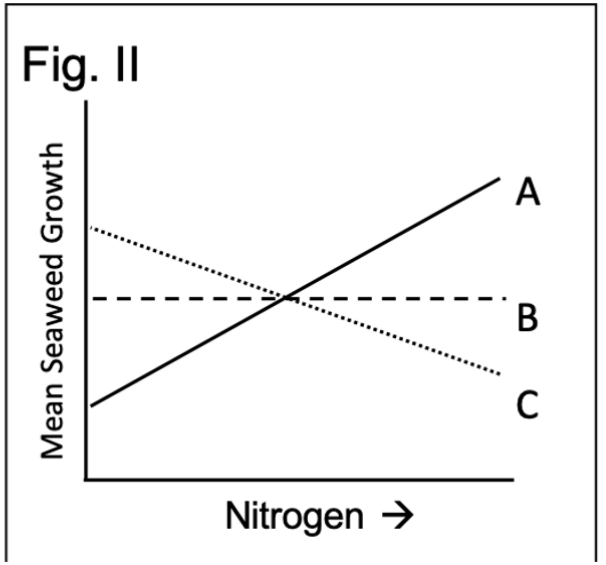
PEQs Week 3

The correct answer is:
A1B1

Information

[Questions 31-32] You are studying how seaweed (marine algae) could respond to increased nitrogen that can enter the ocean during a sewage spill. You collect three different species of seaweed (1, 2, and 3) and bring them back to the outdoor lab to run a controlled experiment. You separate each species of seaweed into multiple small individual seawater tanks, where all of the tanks have the same temperature and access to sunlight. For each species, to half of the tanks you give the seaweed ambient seawater (no added nutrients) and in half of the tanks you give the seaweed nutrient enriched water (added nitrogen). The results of your experiment are shown in Figure I below.





Question 31

Correct

3.00 points out of 3.00

The environmental response to nitrogen is strongest in seaweed species 1.

Select one:

- True
- False ✔

Interpret experiments to determine the relative influences of genes versus the environment on a given phenotype

Evaluate how genes and the environment can interact to influence a phenotype

Week 3 clicker questions

The correct answer is 'False'.

Question 32

Correct

3.00 points out of 3.00

Based on these results, which line [A, B, or C] from Figure II (the right panel above) best illustrates environmental influence on growth for seaweed species 3?

- a. Line A ✔
- b. Line B
- c. Line C

Interpret experiments to determine the relative influences of genes versus the environment on a given phenotype

Evaluate how genes and the environment can interact to influence a phenotype

Week 3 clicker questions

The correct answer is:
Line A

Information

[Question 33 and 34] You are doing a breeding experiment with bees. In your initial cross, the parents are true breeding. The female parent has long wings and thick stripes (WWTT), the male parent has short wings and thin stripes (wwtt). All the flies in the F1 generation have long wings and thick stripes.

Question **33**

Correct

3.00 points out of 3.00

The genotype of all flies in the F1 generation is WwTt.

Select one:

- True ✔
- False

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions

The correct answer is 'True'.

Question 34

Correct

3.00 points out of 3.00

You now take an F1 female and cross her with a true breeding male with short wings and thin stripes. You count 1000 offspring in the F2 generation. If the wing and stripe genes were linked and no recombination occurred, you would expect to get:

250 Long wing, thin stripes (Wwtt)

250 Long wing, thick stripes (WwTt)

250 Short wing, thick stripes (wwTt)

250 Short wing, thin stripes (wwtt)

Select one:

- True
- False ✔

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions

The correct answer is 'False'.

Question **35**

Correct

3.00 points out of 3.00

When you count the F2 generation, you really get

69	Long wing, thin stripes (Wwtt)
407	Long wing, thick stripes (WwTt)
81	Short wing, thick stripes (wwTt)
443	Short wing, thin stripes (wwtt)

Based on this result, you can determine the recombination frequency between the wing and stripe gene is 7.5%

Select one:

- True
- False ✔

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions

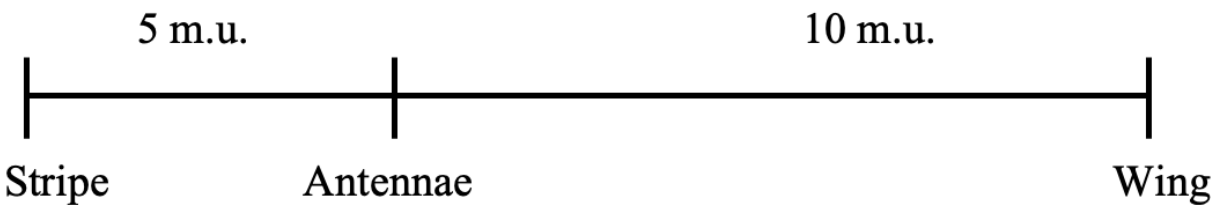
The correct answer is 'False'.

Question **36**

Correct

3.00 points out of 3.00

A series of bee matings shows that the recombination frequency between the gene for wing length and the gene for antenna length is 10% (i.e. the genetic distance between them is 10 map units). The figure shows a correct genetic map for the three genes:



Select one:

- True ✔
- False

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions

The correct answer is 'True'.

Information

[Questions 37-38] Use the figure below to answer questions 37 and 38.

The graphs shown depict the relative proportions of individuals affected with a certain condition (darker shaded bar) and individuals not affected (lighter bar) for individuals carrying only A-T, only G-C, or both A-T and G-C alleles of a single-nucleotide polymorphism (SNP).

A B C

Question **37**

Correct

3.00 points out of 3.00

Which graph shows a pattern that suggests that the *G - C* allele is a risk factor for a dominant disease?

a. Graph A

b. Graph B

c. Graph C

d. Graph D ✔

e. Graph E

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Week 3 Clicker questions

The correct answer is:
Graph D

Question 38

Correct

3.00 points out of 3.00

Which graph shows a pattern that suggests that the A - *T* allele is a risk factor for a recessive disease?

- a. Graph A ✔
- b. Graph B
- c. Graph C
- d. Graph D
- e. Graph E

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Week 3 Clicker questions

The correct answer is:
Graph A

Question 39

Correct

3.00 points out of 3.00

Individuals with genotypes *AaBbCcDD* and *AaBbCcDD* are crossed. Assuming independent segregation and complete dominance for each trait, the expected proportion of the progeny that will have at least one dominant allele at each locus is:

a. 81/256

b. 12/16

c. 27/64 ✔

d. 9/16

e. None of the other answer choices are correct

Visualize how meiosis produces four haploid gametes

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Week 2 clicker questions

The correct answer is:
27/64

Question 40

Correct

3.00 points out of 3.00

Individuals with the genotypes *AaBbCcddeeff* and *AabbccDDEeFF* are crossed. Assuming independent segregation and complete dominance for each trait, the expected proportion of the progeny that will be homozygous for all of the genes is 0.

Select one:

- True ✔
- False

Visualize how meiosis produces four haploid gametes

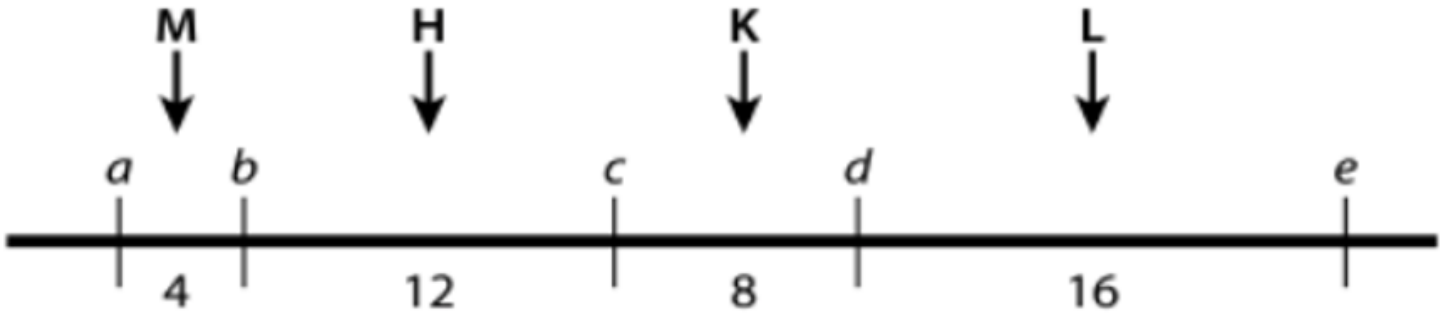
Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Week 2 clicker questions

The correct answer is 'True'.

Information

41-1 The genetic map shown here depicts the locations of five single-nucleotide polymorphisms (SNPs, designated *a*-*e*) on an autosome and the frequency of recombination (in percent) between adjacent SNPs. The region includes a genetic risk factor *Q* for a disease, which may be located in region M, H, K, or L along the chromosome.



Pedigree studies indicate that the frequencies of recombination between each of the SNPs and *Q* are as follows:
percent recombination *a*-*Q* equals 20%
percent recombination *b*-*Q* equals 16%
percent recombination *c*-*Q* equals 4%
percent recombination *d*-*Q* equals 4%
percent recombination *e*-*Q* equals 20%

Question 41

Correct

3.00 points out of 3.00

What is the most likely position of *Q* in the genetic map?

a. position H

b. position M

c. position K ✔

d. position L

e. None of the other answer choices are correct

The correct answer is:
position K

◄ Discussion forum

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Midterm I - Reflection ... ►