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Fall 2020 - LIFESCI7B-2 - KANE / KREMER

Started on Thursday, 29 October 2020, 6:58 PM PDT**State** Finished**Completed on** Thursday, 29 October 2020, 8:47 PM PDT**Time taken** 1 hour 49 mins**Grade** **117.00** out of 123.00 (95%)**Information**

[Questions 1-4] The gene for nose shape is found on the X chromosome. Round nose is dominant to pointed nose. Human individuals with XXY (an additional X chromosome) are designated male. Individuals with XO (only one X chromosome) are designated female. Assume recombination does not occur. For each of the following families, identify the possible nondisjunction events (rare mistakes during meiosis) that could explain the phenotype of the offspring.

Question 1

Correct

3.00 points out of 3.00

An XX parent with a round nose and an XY parent with a round nose have a son with Klinefelter Syndrome (genotype XXY) with a pointed nose.

Nondisjunction must have occurred in meiosis 2 of the XX parent.

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](#)[Lab Week 2](#)

The correct answer is 'True'.

**Question 2**

Correct

3.00 points out of 3.00

An XX parent with a pointed nose and an XY parent with a round nose have a daughter with a round nose. This daughter has Turner Syndrome (genotype XO; one X chromosome).

Nondisjunction could have occurred in meiosis 1 of the XX parent.

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

Lab Week 2

The correct answer is 'True'.

Question 3

Correct

3.00 points out of 3.00

An XX parent with a pointed nose and an XY parent with a round nose have a son with Klinefelter Syndrome (genotype XXY) with a pointed nose.

Nondisjunction could have occurred in meiosis 2 of the XY parent.

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

Lab Week 2

The correct answer is 'False'.

**Question 4**

Correct

3.00 points out of 3.00

An XX parent with a round nose and an XY parent with a pointed nose have a son with Klinefelter Syndrome (genotype XXY) with a pointed nose.

Nondisjunction could have occurred in meiosis 2 of the XY parent.

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

Lab Week 2

The correct answer is 'False'.

Information

[Questions 5 - 7] Suppose there are two individuals that are heterozygous for PKU (a rare recessive autosomal disorder).

Question 5

Correct

3.00 points out of 3.00

If they have two children, what is the probability that only their second child will have PKU?

Select one:

- a. 9/16
- b. 3/4
- c. None of the answer choices are correct.
- d. 1/4
- e. 3/16 ✓

Your answer is 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

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

Pre-class objective:

Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

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 unaffected?

Select one:

- a. 12/16
- b. 9/16
- c. 10/16
- d. 1/16
- e. 4/16



Your answer is 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

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

Pre-class objective:

Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is: 9/16

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 phenotype?

Select one:

- a. 9/16
- b. 12/16
- c. 10/16
- d. 1/16



Your answer is 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

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

Pre-class objective:

Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is: 10/16



Information

[Questions 8-11] Annabeth (an XX individual) and Percy (an XY individual) are concerned about having a child with Moebius syndrome, which causes complete facial degeneration. This condition, which is very rare, has affected both Annabeth's aunt (her mother's sister) and Percy's brother. No one else in either family has the condition.

Question 8

Correct

3.00 points out of 3.00

Meobius disease is most-likely an X-linked dominant 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 'False'.

Question 9

Correct

3.00 points out of 3.00

Based on their family history, what is the probability Annabeth and Percy's first child will be affected by Meobius disease?

Select one:

- a. 2/36
- b. 1/36
- c. 9/36
- d. 8/36



Your answer is correct.

Create a pedigree from a scenario

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

Clicker questions Weeks 2 and 3

Lab Week 3

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is: 2/36

**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. Annabeth's brother and Percy's brother both have hemophilia. No one else in either family has the condition.

The probability that Annabeth and Percy's first child has hemophilia is $1/8$.

Select one:

- True ✓
- False

Create a pedigree from a scenario

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

Clicker questions Weeks 2 and 3

Lab Week 3

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

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. Annabeth's brother and Percy's brother both have hemophilia. No one else in either family has the condition.

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

Select one:

- True
- False ✓

Create a pedigree from a scenario

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

Clicker questions Weeks 2 and 3

Lab Week 3

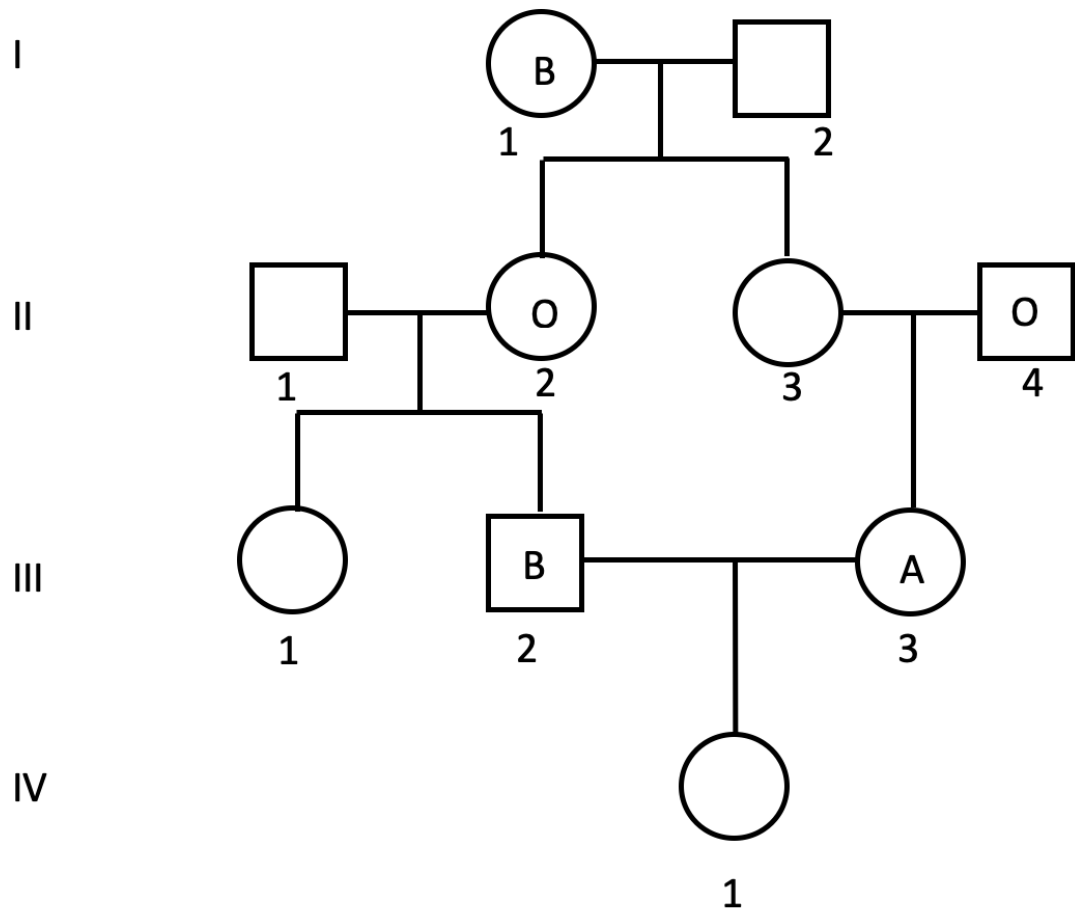
Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.



Information

[Questions 12–13] 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.



Question 12

Correct

3.00 points out of 3.00

The probability that individual IV-1 has blood type AB is equal to the probability that II-3 is blood type B.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.

**Question 13**

Correct

3.00 points out of 3.00

Individual III-1 could be blood type A.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

Information

[Questions 14-18] Alex and Anna are two people who are considering having children together. Alex, his father, and his mother all have blood type B. His younger sister and his brothers have blood type O. Anna, her mother, and her younger brother all have blood type A. Anna's sister and older brother both have blood type O. Anna's father has type B.

Question 14

Correct

3.00 points out of 3.00

The probability that their first child will have blood type A is 1/2.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.

**Question 15**

Correct

3.00 points out of 3.00

The probability that their first child will have blood type O is 1/6.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

Question 16

Correct

3.00 points out of 3.00

The probability that their first child will have blood type B is 1/3.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

Question 17

Correct

3.00 points out of 3.00

The probability that their first child will have blood type AB 1/6.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.



Question 18

Correct

3.00 points out of 3.00

If they have two children, the probability only one of them will be type O is $\frac{3}{8}$.

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

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.

Question 19

Correct

3.00 points out of 3.00

Organisms that are heterozygous for three loci $AaBbCc$ and $AaBbCc$ 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. $\frac{9}{64}$
- b. $\frac{27}{64}$ ✓
- c. $\frac{7}{16}$
- d. $\frac{3}{4}$

Your answer is 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:
 $\frac{27}{64}$



Question 20

Correct

3.00 points out of 3.00

Organisms 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 $1/16$.

Select one:

- True
- False ✓

Visualize how meiosis produces four haploid gametes

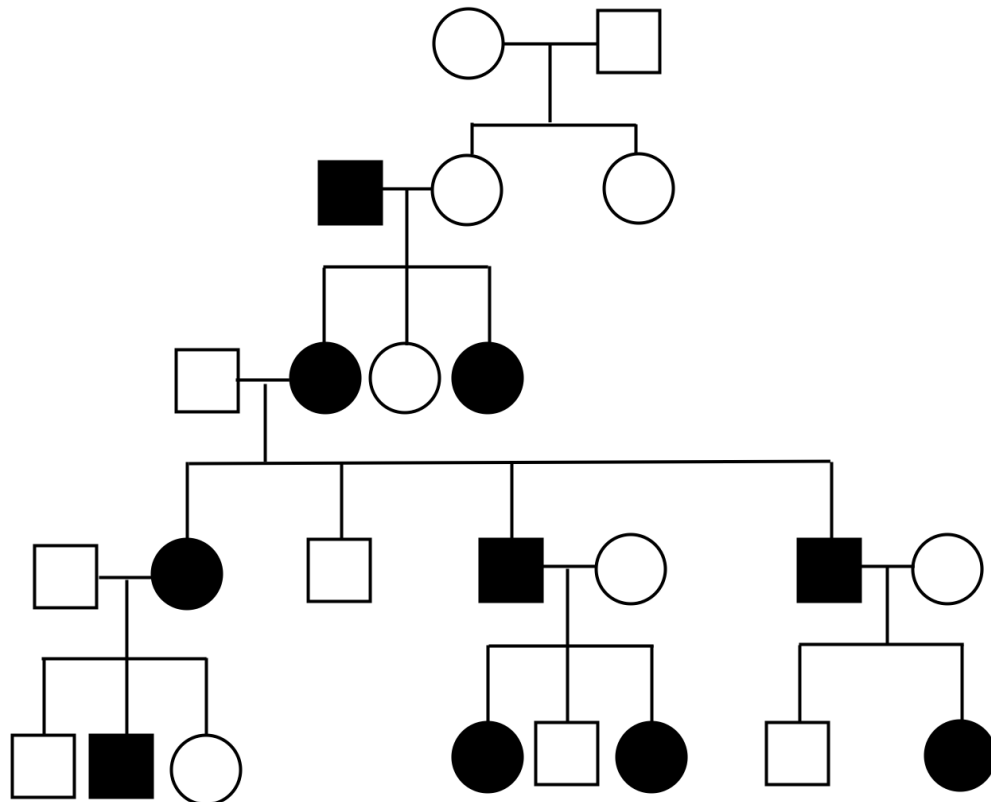
Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles

Week 2 clicker questions

The correct answer is 'False'.

Information

[Questions 21-24] Consider the pedigree shown below.



**Question 21**

Correct

3.00 points out of 3.00

The trait shown in this pedigree could be autosomal dominant.

Select one:

- True ✓
- False

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

Visualize how meiosis produces four haploid gametes

Week 2 clicker questions

Week 3 lab

The correct answer is 'True'.

Question 22

Correct

3.00 points out of 3.00

The trait shown in this pedigree could be autosomal recessive.

Select one:

- True ✓
- False

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

Visualize how meiosis produces four haploid gametes

Week 2 clicker questions

Week 3 lab

The correct answer is 'True'.

Question 23

Correct

3.00 points out of 3.00

The trait shown in this pedigree could be X-linked dominant.

Select one:

- True
- False ✓

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

Visualize how meiosis produces four haploid gametes

Week 2 clicker questions

Week 3 lab

The correct answer is 'False'.



Question 24

Correct

3.00 points out of 3.00

The trait shown in this pedigree could be X-linked recessive.

Select one:

- True
- False ✓

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

Visualize how meiosis produces four haploid gametes

Week 2 clicker questions

Week 3 lab

The correct answer is 'False'.

Information

[Questions 25–28]

You are doing a breeding experiment with fruit flies. In the parental generation you cross two true-breeding flies. The female parent is brown and wingless (BBnn) and the male parent is black with normal wings (bbNN). All of the flies in the F1 generation are brown and have normal wings.

Question 25

Incorrect

0.00 points out of 3.00

You then cross a true-breeding black wingless male with a female from the F1 generation. The genotype of the male is BbNn.

Select one:

- a. False
- b. True



Your answer is incorrect.

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

Week 2 and 3 clicker questions

The correct answer is: False

**Question 26**

Correct

3.00 points out of 3.00

You count 1600 offspring in the F2 generation. If the wing and the color traits were linked and no recombination occurred, you would expect to count:

0 = brown, winged flies

800 = black, winged flies

800 = brown, wingless flies

0 = black, wingless flies

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 3 clicker questions

The correct answer is 'True'.

Question 27

Correct

3.00 points out of 3.00

When you count the F2 generation, you really get:

85 = brown winged flies

728 = black winged flies

712 = brown wingless flies

75 = black wingless flies

The recombination frequency between these two genes is 10%.

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 3 clicker questions

The correct answer is 'True'.



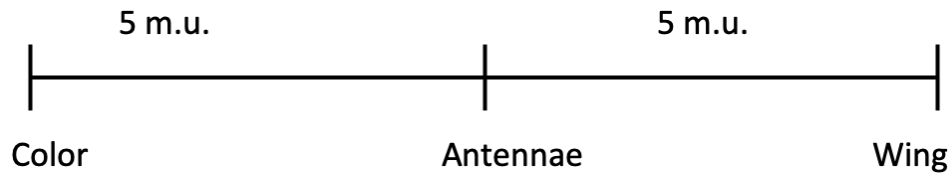
Question 28

Correct

3.00 points out of 3.00

A series of fruit fly matings shows that the recombinant frequency between the gene for wing size and the gene for antenna length is 5%.

The following represents an accurate chromosomal map of these 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 3 clicker questions

The correct answer is 'True'.

Information

[Question 29-30] In the shepherd's purse plant (*Capsella bursa-pastoris*), the characteristic of seed shape is controlled by two genes. For individuals where both genes are present in the homozygous recessive state, seeds are ovoid. When the dominant allele for either gene is present, the seeds are triangular.

**Question 29**

Correct

3.00 points out of 3.00

If two heterozygotes for both genes are crossed, what is the proportion of offspring with triangular seeds?

Select one:

- a. 15/16
- b. 3/16
- c. 7/16
- d. 9/16
- e. 1/16



Your answer is correct.

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: 15/16

Question 30

Correct

3.00 points out of 3.00

If two heterozygotes for both genes are crossed, what is the probability that they will have an offspring who is homozygous recessive for one gene and have at least one dominant allele for the other locus?

Select one:

- a. 15/16
- b. 6/16
- c. 7/16
- d. 1/16
- e. 3/16



Your answer is correct.

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

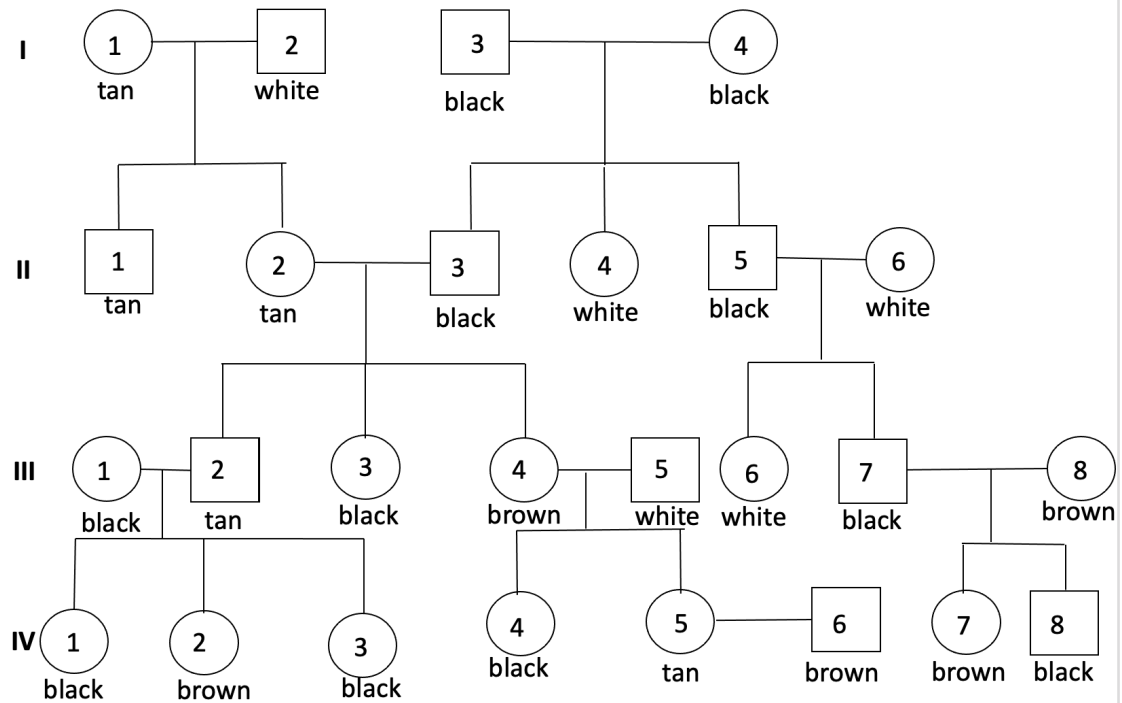
Week 4 lab

The correct answer is: 6/16



Information

[Questions 31-33] The pedigree below shows the inheritance of fur color in pygmy deer. There are four different fur colors: black, brown, tan, and white. Fur color in deer is determined by a single autosomal gene with three alleles that exhibit an unknown hierarchy of dominance. Genetic testing shows that individuals I-2 and II-6 are each homozygous. Use this information and the pedigree to answer the following questions.



Question 31

Correct

3.00 points out of 3.00

II-2 and II-3 can produce an offspring with white fur.

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'.

**Question 32**

Correct

3.00 points out of 3.00

III-4 and III-5 cannot produce an offspring with white fur

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'.

Question 33

Correct

3.00 points out of 3.00

What is the probability that III-7 and III-8 will have a tan offspring

- a. 0
- b. 1
- c. 1/2
- d. 1/4 ✓
- e. 3/4

Your answer is correct.

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

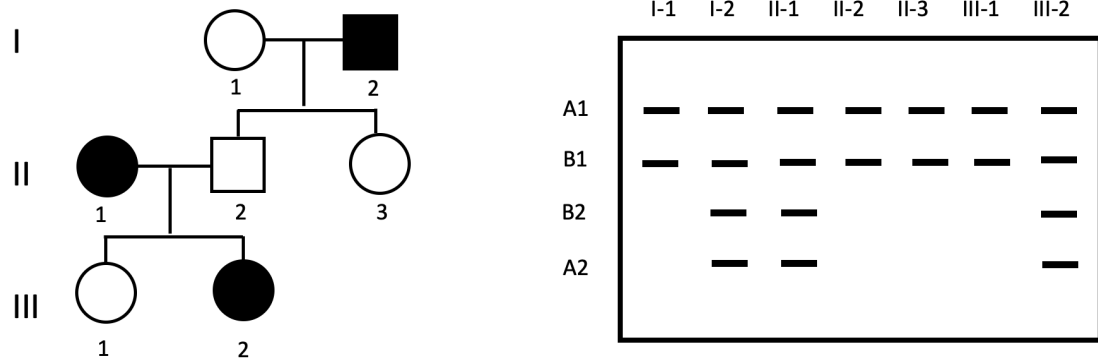
The correct answer is:

1/4



Information

[Questions 34–35] Huntington's disease is a neurodegenerative disease with an autosomal dominant inheritance pattern. The affected gene (*HTT*) is very large, so sequencing the gene to look for mutations is not practical. Instead, you have identified two VNTR regions (A and B) very close to the *HTT* gene that can be readily analyzed using PCR. You test the two VNTR regions to see if there are any alleles that are linked to mutant alleles of the *HTT* gene. The pedigree and your results are shown below.



Question 34

Incorrect

0.00 points out of 3.00

The A1 allele could be linked with the *HTT* allele in I-2.

Select one:

- True ✘
- False

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

[Week 3 clicker questions](#)

[Week 2 lab](#)

The correct answer is 'False'.

Question 35

Correct

3.00 points out of 3.00

Allele A2 could be used as a genetic marker for Huntington's disease.

Select one:

- True ✔
- False

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

[Week 3 clicker questions](#)

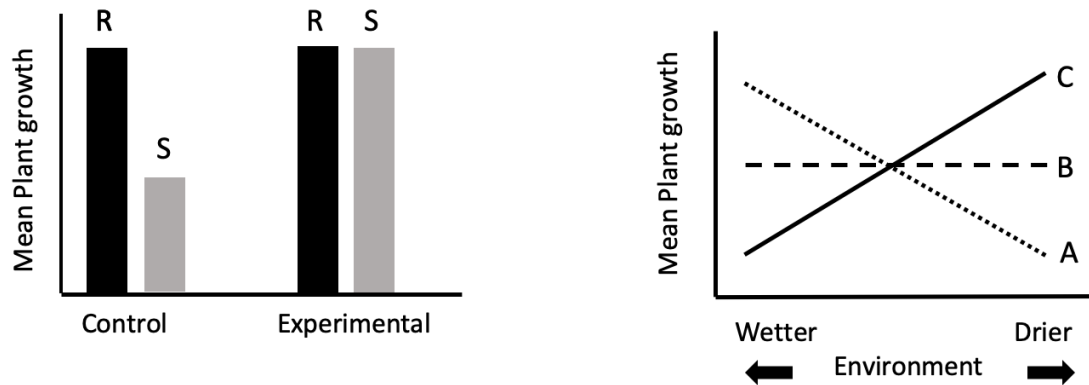
[Week 2 lab](#)

The correct answer is 'True'.



Information

[Questions 36–37] You are studying two populations of the California poppy, the official state flower of California, for their ability to tolerate drought. You transplant individuals from each population, R and S, into both a control greenhouse and an experimental greenhouse. In the control greenhouse, you simulate their typical growing conditions, but in the experimental greenhouse, you simulate a hotter and drier drought-like environment. These are the results of your experiment:



Question 36

Correct

3.00 points out of 3.00

Based on these results, which line [A, B, or C] from the figure on the right above best illustrates environmental influence on plant growth in population S?

Select one:

- a. Line A
- b. Line B
- c. Line C



Your answer is correct.

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 C

Question 37

Correct

3.00 points out of 3.00

Based on these data, there is not enough information to determine which population has a stronger response to drought.

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

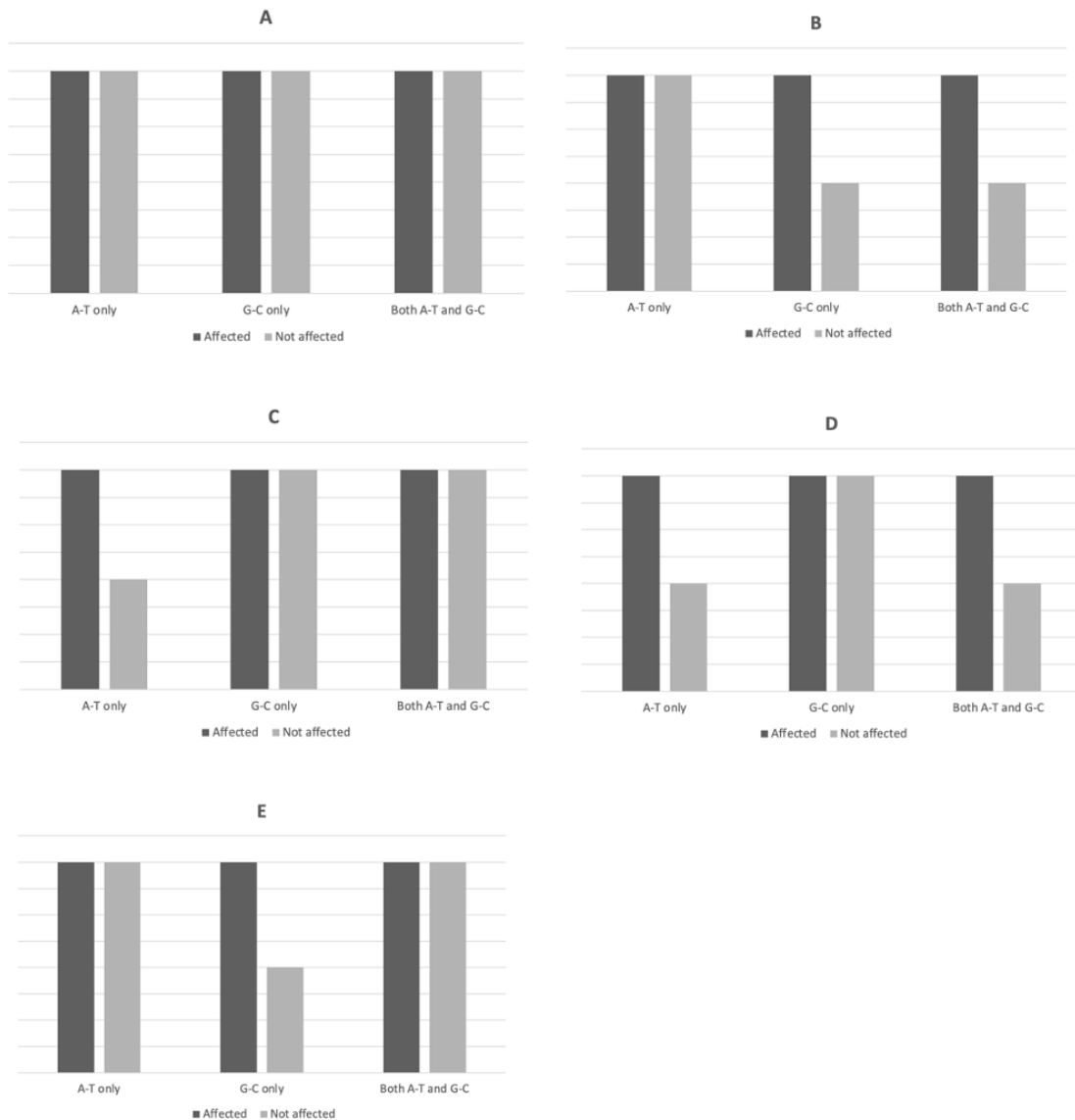
The correct answer is 'False'.



Information

[Questions 38-39] Use the figure below to answer questions 38 and 39.

The graphs shown depict the relative proportions of individuals affected with a certain condition (darker shaded bar) and individuals not affected (light bar), in individuals carrying only A-T, only G-C, or both A-T and G-C alleles of a single-nucleotide polymorphism (SNP). (Note: the Y-axis in each of these graphs represents relative abundance)



**Question 38**

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?

Select one:

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



Your answer is correct.

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

Week 3 Clicker questions

The correct answer is: Graph B

Question 39

Correct

3.00 points out of 3.00

Which graph shows a pattern that suggests that neither SNP is a risk factor for the disease?

Select one:

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



Your answer is correct.

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

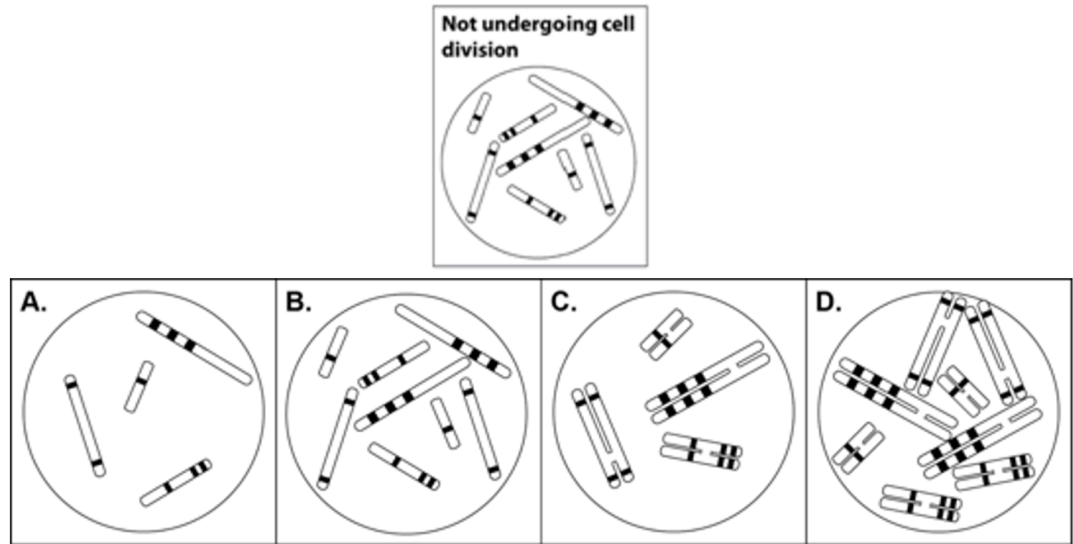
Week 3 Clicker questions

The correct answers are: Graph A, Graph C



Information

[Question 40] The diagram immediately below depicts chromosomes in a living cell that is not currently undergoing cellular division. Solid lines crossing the chromosome represent genes, and assume that chromosomes of identical length with identical patterns of crossing lines have identical genes.



Question 40

Correct

3.00 points out of 3.00

Panel D shows the cell after replication has occurred, but before meiosis I is complete.

Select one:

- True ✓
- False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Week 1 handout and clicker questions

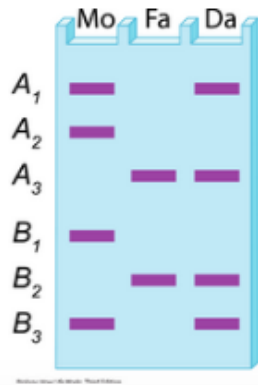
Lab Week 2

The correct answer is 'True'.



Information

In the gel diagram shown here, *A* and *B* are both *X*-linked VNTRs with three alleles (denoted A_1, A_2, A_3 and B_1, B_2, B_3 , respectively). Mo and Fa show the banding patterns corresponding to the genotypes of mother (XX parent) and father (XY parent) in a mating, and Da is the banding pattern corresponding to the genotype of a daughter.



Question 41

Correct

3.00 points out of 3.00

What is the mother's genotype?

Select one:

- a. A_1B_3/A_3B_2
- b. A_1B_1/A_2B_3
- c. A_1B_1/A_3B_3
- d. A_1B_3/A_2B_2
- e. None of the other choices are correct



Your answer is correct.

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

Week 2 Clicker questions

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

[← Mechanisms datasheet ...](#)

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