
Problem 1. (1 point)

Enter "T" for each true proposition, "F" for each false proposition and "N" for each statement which is not a proposition.

- ___1. $5+7=10$.
- ___2. $x+y=y+x$ for every pair of real numbers x and y .
- ___3. All insects are ants.
- ___4. $2+3=5$.
- ___5. All ants are insects.
- ___6. $x+1=5$ if $x=1$.
- ___7. Do not pass go.
- ___8. This statement is false.

Answer(s) submitted:

- F
- T
- F
- T
- T
- F
- N
- N

submitted: (correct)

recorded: (correct)

Problem 2. (1 point)

What is the negation of the following: "If I vote in the election then I feel enfranchised."

- A. I don't vote or I feel enfranchised.
- B. If I feel enfranchised then I vote in the election.
- C. I vote in the election and I feel enfranchised.
- D. I vote in the election or I feel disenfranchised.
- E. If I feel disenfranchised then I don't vote.
- F. If I don't vote then I feel enfranchised.
- G. If I vote in the election then I feel enfranchised.
- H. I don't vote and I feel enfranchised.
- I. I vote in the election and I feel disenfranchised.
- J. I vote in the election or I feel enfranchised.
- K. If I don't vote then I feel disenfranchised.

What is the negation of the following: "If I form a study group then I raise my grades."

- A. I form a study group or I raise my grades.
- B. If I form a study group then I raise my grades.
- C. I work alone or I raise my grades.
- D. I form a study group and I raise my grades.
- E. If I work alone then I raise my grades.
- F. I work alone and I raise my grades.
- G. If I work alone then I lower my grades.
- H. If I raise my grades then I form a study group.
- I. If I lower my grades then I work alone.
- J. I form a study group or I lower my grades.
- K. I form a study group and I lower my grades.

What is the negation of the following: "If this triangle has two 45 degree angles then it is a right triangle."

- A. this triangle has two 45 degree angles or it is not a right triangle.
- B. If this triangle does not have two 45 degree angles then it is not a right triangle.
- C. this triangle has two 45 degree angles and it is a right triangle.
- D. this triangle has two 45 degree angles and it is not a right triangle.
- E. If this triangle does not have two 45 degree angles then it is a right triangle.
- F. this triangle does not have two 45 degree angles and it is a right triangle.
- G. this triangle has two 45 degree angles or it is a right triangle.
- H. If it is a right triangle then this triangle has two 45 degree angles.

- I. If it is not a right triangle then this triangle does not have two 45 degree angles.
- J. this triangle does not have two 45 degree angles or it is a right triangle.
- K. If this triangle has two 45 degree angles then it is a right triangle.

What is the negation of the following: "If I go to Paris then I visit the Eiffel Tower."

- A. I don't go to Paris and I don't visit the Eiffel Tower.
- B. I go to Paris or I don't visit the Eiffel Tower.
- C. I go to Paris and I don't visit the Eiffel Tower.
- D. If I don't visit the Eiffel Tower then I don't go to Paris.
- E. I go to Paris or I visit the Eiffel Tower.
- F. If I don't go to Paris then I don't visit the Eiffel Tower.
- G. I don't go to Paris or I visit the Eiffel Tower.
- H. If I visit the Eiffel Tower then I go to Paris.
- I. If I go to Paris then I visit the Eiffel Tower.
- J. I go to Paris and I visit the Eiffel Tower.
- K. If I don't go to Paris then I visit the Eiffel Tower.

Answer(s) submitted:

- I
- K
- D
- C

submitted: (correct)

recorded: (correct)

Problem 3. (1 point)

Let $I(x)$ be the statement "x has an Internet connection", let $C(x,y)$ be the statement "x and y have chatted over the internet". Express each of the following statements in terms of $I(x)$ and $C(x,y)$, quantifiers, and logical connectives. Let the universe of discourse for the variables x and y consist of all students in your class. Put the appropriate letter next to the corresponding symbolic form.

- ___1. $\forall x(I(x)) \rightarrow \exists y(x \neq y \wedge C(x,y))$
- ___2. $\neg(C(Rachel, Chelsea))$
- ___3. $\exists x \exists y(y \neq x \wedge \forall z \neg(C(x,z) \wedge C(y,z)))$
- ___4. $\exists x \exists y(y \neq x \wedge \neg C(x,y))$
- ___5. $\forall x \neg C(x, Bob)$
- ___6. $\exists x(I(x) \wedge \forall y(I(y) \rightarrow y = x))$
- ___7. $\exists x \neg I(x)$
- ___8. $C(Jan, Sharon)$

a) Rachel has not chatted over the internet with Chelsea.

b) Jan and Sharon have chatted over the internet.

c) No one in the class has chatted with Bob.

d) Someone in your class does not have internet connection.

e) There are two students in your class who have not chatted over the internet.

f) Exactly one student in your class has an internet connection.

g) Everyone in your class with an internet connection has chatted over the internet with at least one other student in your class.

h) There are at least two students in your class who have not chatted with the same person in your class.

Answer(s) submitted:

- G
- A
- H
- E
- C
- F
- D
- B

submitted: (correct)

recorded: (correct)

Problem 4. (1 point)

Determine the truth value of the following statements if the universe of discourse is the set of real numbers.

(Enter **T** for true, or **F** for false.)

- ___1. $\exists x(x^2 = -1)$
- ___2. $\exists x(x^2 + 2 > 1)$
- ___3. $\exists x(x^2 = 2)$
- ___4. $\exists x \forall y(xy = 0)$
- ___5. $\forall x(x^2 \neq x)$
- ___6. $\exists x(x^2 > x)$

Answer(s) submitted:

- F
- T
- T
- T
- F
- T

submitted: (correct)

recorded: (correct)

Problem 5. (1 point)

Let $C(x)$ be the statement "x has a cat", let $D(x)$ be the statement "x has a dog" and let $F(x)$ be the statement "x has a ferret". Express each of the following statements in terms of $C(x)$, $D(x)$, and $F(x)$, quantifiers, and logical connectives. Let the universe of discourse consist of all students in your class. Put the appropriate letter next to the corresponding symbolic form.

- ___1. $\exists x(C(x)) \wedge (\exists x D(x)) \wedge (\exists x F(x))$
- ___2. $\neg \exists x(C(x) \wedge D(x) \wedge F(x))$
- ___3. $\exists x(C(x) \wedge F(x) \wedge \neg D(x))$
- ___4. $\forall x(C(x) \vee D(x) \vee F(x))$
- ___5. $\exists x(C(x) \wedge D(x) \wedge F(x))$

- a) A student in your class has a cat, a dog, and a ferret.
- b) All students in your class have a cat, a dog, or a ferret.
- c) Some student in your class has a cat and a ferret but not a dog.
- d) No student in this class has a cat, a dog, and a ferret.
- e) For each of the three animals, cats, dogs, and ferrets, there is a student in your class who has one of these animals.

Answer(s) submitted:

- E
- D
- C
- B
- A

submitted: (correct)

recorded: (correct)

Problem 6. (1 point)

Complete the following truth table by filling in the blanks with T or F as appropriate.

p	q	r	$p \rightarrow q$	$\sim p$	$\sim p \rightarrow r$	$[p \rightarrow q] \vee [\sim p \rightarrow r]$
T	T	F	_____	_____	_____	_____
T	T	T	_____	_____	_____	_____
T	F	T	_____	_____	_____	_____
F	F	T	_____	_____	_____	_____
T	F	F	_____	_____	_____	_____
F	F	F	_____	_____	_____	_____
F	T	T	_____	_____	_____	_____

Answer(s) submitted:

- T
- F
- T
- T
- T

- F
- T
- T
- F
- F
- T
- T
- T
- T
- T
- T
- F
- F
- T
- T
- T
- T
- T
- T
- T

submitted: (correct)
 recorded: (correct)