1. **(2 points)** `Library/Rochester/setDiscrete1Logic/ur_dis_1_2.pg`

For each of the following sentences, determine whether an "inclusive or" or an "exclusive or" is usually what is meant by the sentence. Enter "I" for the inclusive case and "E" for the exclusive case.

___1. Lunch includes soup or salad.
___2. Publish or perish.
___3. Experience with C++ or Java is required.
___4. To enter the country you need a passport or a voter registration card.

2. **(5 points)** `Library/ASU-topics/setDiscrete/katie4.pg`
Use truth table to verify the distributive law by filling in the blanks with T or F as appropriate.

p	q	r	$q \vee r$	$p \wedge [q \vee r]$	$p \wedge q$	$p \wedge r$	$[p \wedge q] \vee [p \wedge r]$
T	T	T	___	___	___	___	___
T	T	F	___	___	___	___	___
T	F	T	___	___	___	___	___
T	F	F	___	___	___	___	___
F	T	T	___	___	___	___	___
F	T	F	___	___	___	___	___
F	F	T	___	___	___	___	___
F	F	F	___	___	___	___	___

3. **(5 points)** `Library/SDSU/Discrete/Logic/ttcontratautB4.pg`
Complete the truth table and determine whether or not the following statement is a tautology, a contradiction, or neither.

$$\sim (\sim p \wedge q) \wedge (p \vee q)$$

p	q	$\sim p \wedge q$	$\sim (\sim p \wedge q)$	$p \vee q$	$\sim (\sim p \wedge q) \wedge (p \vee q)$
T	T	___	___	___	___
T	F	___	___	___	___
F	T	___	___	___	___
F	F	___	___	___	___

The statement is a
- A. Tautology, because the statement is always true
- B. Tautology, because the statement is always false
- C. Contradiction, because the statement is always true
- D. Contradiction, because the statement is always false
- E. Neither

4. **(5 points)** `Library/Rochester/setDiscrete1Logic/ur_dis_1_7.pg`
Complete the following truth table by filling in the blanks with T or F as appropriate.

p	q	$\sim p$	$p \vee q$	$\sim p \wedge (p \vee q)$	$[\sim p \wedge (p \vee q)] \rightarrow q$
T	T	___	___	___	___
T	F	___	___	___	___
F	T	___	___	___	___
F	F	___	___	___	___

The proposition in the final column is
- A. a contradiction
- B. a tautology
- C. a contingency

5. **(5 points)** `Library/SDSU/Discrete/Logic/ttlogicequivA5.pg`
Complete the truth table and determine whether or not

$$\sim (p \wedge q) \equiv \sim p \vee \sim q$$

p	q	$p \wedge q$	$\sim (p \wedge q)$	$\sim p$	$\sim q$	$\sim p \vee \sim q$
T	T	___	___	___	___	___
T	F	___	___	___	___	___
F	T	___	___	___	___	___
F	F	___	___	___	___	___

Are the two statements equivalent?
- A. Yes, the columns are identical.
- B. No, the rows are not identical.
- C. Yes, the rows are identical.
- D. No, the columns are not identical.

6. **(5 points)** `Library/Rochester/setDiscrete1Logic/ur_dis_1_9.pg`
Complete the following truth table by filling in the blanks with T or F as appropriate.

p	q	$p \rightarrow q$	$\sim p$	$\sim q$	$\sim q \rightarrow \sim p$
T	T	___	___	___	___
T	F	___	___	___	___
F	T	___	___	___	___
F	F	___	___	___	___

"$p \rightarrow q$" and "$\sim q \rightarrow \sim p$" are
- A. not logically equivalent
- B. not logically comparable
- C. logically equivalent

7. **(6 points)** `Library/SDSU/Discrete/Logic/ttlogicequivA6.pg`
Complete the following truth table.

p	$\sim p$	$\sim\sim p$	$p \wedge \sim p$	$p \vee \sim p$	$p \wedge T$	$p \vee T$
T	——	——	——	——	——	——
F	——	——	——	——	——	——

$\sim\sim p$ is equivalent to which statement?

- A. p
- B. T
- C. F
- D. $\sim p$

$p \wedge \sim p$ is equivalent to which statement?

- A. $\sim p$
- B. F
- C. p
- D. T

$p \vee \sim p$ is equivalent to which statement?

- A. p
- B. $\sim p$
- C. T
- D. F

$p \wedge T$ is equivalent to which statement?

- A. F
- B. T
- C. p
- D. $\sim p$

$p \vee T$ is equivalent to which statement?

- A. T
- B. $\sim p$
- C. F
- D. p

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8. **(5 points)** `Library/ASU-topics/setDiscrete/katie5.pg`
Complete the following truth table by filling in the blanks with T or F as appropriate.

p	q	r	$p \to q$	$p \to r$	$[p \to q] \vee [p \to r]$	$q \vee r$	$p \to [q \vee r]$
T	T	T	——	——	————	——	————
T	T	F	——	——	————	——	————
T	F	T	——	——	————	——	————
T	F	F	——	——	————	——	————
F	T	T	——	——	————	——	————
F	T	F	——	——	————	——	————
F	F	T	——	——	————	——	————
F	F	F	——	——	————	——	————

"$[p \to q] \vee [p \to r]$" and "$p \to [q \vee r]$" are

- A. not logically comparable
- B. logically equivalent
- C. not logically equivalent

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9. **(3 points)** `Library/SDSU/Discrete/Logic/formallogicA19.pg`
Negate the following statement:

If Mary fails her classes, then she cannot graduate.

p: Mary fails her classes
q: Mary can graduate

Write the statement in formal logic:

- A. $p \to q$
- B. $p \to \sim q$
- C. $q \to p$
- D. $\sim p \to q$

Negate the logic:

- A. $\sim p \wedge \sim q$
- B. $\sim p \vee \sim q$
- C. $\sim p \wedge q$
- D. $p \wedge q$

Rewrite the negated logic in English

- A. Mary does not fail her classes and she cannot graduate
- B. Mary fails her classes and she can graduate
- C. Mary does not fail her classes or she cannot graduate
- D. Mary does not fail her classes and she can graduate

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10. **(3 points)** `Library/NAU/setFoundations/MAT320_0201.pg`

Assign truth values to the propositions P, Q, and R so that the given proposition is false. Use T for true and F for false.

$$[P \implies (Q \wedge R)] \implies [(P \wedge Q) \vee R]$$

Answer: P: ——— Q: ——— R: ———

11. (2 points) `Library/SDSU/Discrete/Logic/formallogicB16.pg`
Negate the following statement:

$$(p \land \sim q) \to (r \lor s)$$

Choose the correct statement:

- A. $(p \land \sim q) \lor (r \lor s)$
- B. $(\sim p \lor q) \land (\sim r \land \sim s)$
- C. $(p \land \sim q) \lor (\sim r \land \sim s)$
- D. $(p \land \sim q) \land (\sim r \land \sim s)$

12. (2 points) `Library/SDSU/Discrete/Logic/formallogicB23.pg`
Negate the following statement.

Billy and Bob are applying for the same job, but only one will succeed.

p: Billy gets the job
q: Bob gets the job

Choose the correct statement:

- A. $(\sim p \land q) \land (p \land \sim q)$
- B. $(p \land \sim q) \lor (\sim p \land q)$
- C. $(\sim p \lor q) \land (p \lor \sim q)$
- D. $(\sim q \lor p) \lor (q \lor \sim p)$

13. (2 points) `Library/SDSU/Discrete/Logic/formallogicB24.pg`
Negate the following statement.

Billy and Bob are applying for the same job, but only one can succeed.

p: Billy gets the job
q: Bob gets the job

Choose the correct statement:

- A. $p \land q$
- B. $\sim (p \land q)$
- C. $p \lor q$
- D. $\sim (p \lor q)$