Discrete Mathematics and Proof Unit 1 practice: Saying a conditional without if-then

Name _____ Date _____ Period _____

1. Write each conditional without an arrow, as an or-statement, and drop any $\neg\neg$.

(a) $A \to C$

(b) $\neg E \to G$

(c) $C \to \neg G$

(d) $\neg A \to \neg E$

(e) $G \to A$

(f) $E \to C$

2. Negate each conditional. Write the answer as an and-statement, with every $\neg$ on a single letter.

(a) $A \to D$

(b) $\neg A \to E$

(c) $D \to \neg E$

(d) $\neg E \to \neg A$

(e) $(A \wedge D) \to E$

(f) $A \to (D \wedge E)$

3. Answer each one. Write statements in symbols, with every $\neg$ on a single letter.

(a) Write $K \vee L$ as a conditional.

(b) Which values of L and M make $\neg L \to M$ false?

(c) Lily says the negation of $A \to B$ is $A \to \neg B$. Find the mistake and write the correct negation.

(d) For whole numbers n: "if n is a multiple of 10 and of 15, then n is a multiple of 150." Write the and-statement a counterexample satisfies, and give the smallest positive counterexample.

4. (a) A bike rental shop has the rule: "If a rider is under 16, the rider wears a helmet." On Sunday 10 riders under 16 rented bikes, and 6 of them wore a helmet; 2 riders aged 16 or older had no helmet. Write the rule as an or-sentence. For how many riders is your or-sentence false?

(b) Hannah says: "If the tide is high, the path is under water." Write this as an or-sentence, then write its negation as an and-sentence.

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