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Carl Mummert*, Department of Mathematics, 1 John Marshall Drive, Huntington, WV 25755,
and **Alaeddine Saadaoui** and **Sean Sovine**. *The modal logic of Reverse
Mathematics*. Preliminary report.

Reverse Mathematics is a research program in mathematical logic that studies the implications between well-known mathematical theorems. The two main kinds of results are that a theorem S implies a theorem T , or that a theorem S does not imply a theorem T , relative to a system of basic axioms. We establish a theoretical foundation for automated theorem proving of Reverse Mathematics results by characterizing the logic of these implications and non-implications. The implication relationship in Reverse Mathematics is distinct from the material conditional, because the claim that “ S materially implies T ” may have different truth values in different models, while the Reverse Mathematics result that S implies T shows that every model of the basic axioms that satisfies S also satisfies T . This implication relation between theorems is most naturally viewed as a strict implication as in modal logic. The logic we obtain, which we call s-logic, is a fragment of the classically studied modal logic known as S5. We present complete sets of inference rules for s-logic and two important fragments (Received September 16, 2013)