

- (1) Decide whether each of the following is true or false. If the statement is true, prove it. If it is false, give a counter-example.
- (a) If $9 - 3b^2$ is rational, then b must be rational.
 - (b) If b is rational, then $9 - 3b^2$ must be rational.
- (2) Prove that $b = \sqrt{\frac{4 - 2\sqrt{3}}{7}}$ is an algebraic number that is not rational.
- (Hint: First show this for $\sqrt{1 + \sqrt{5}}$ since it's easier and then mimic this proof for the given b)*

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