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MATH1061 — DISCRETE MATHEMATICS
First Semester Examination, June 2001 (continued)

4. (a) (3 marks) Let a, b, c be any integers.
Are the following true or false?
(State true or false in each box; no need to give reasons.)

(i) If $a \mid b$ and $a \mid c$, then $a \mid (b - c)$.

(ii) If $a \mid b$ and $b \mid c$, then $a \mid c$.

(iii) If $a \mid b^2$ then $a \mid b$.

- (b) (5 marks) One (at least) of (i), (ii) or (iii) in part (a) is true! For whichever is true, give a proof of that true statement. For whichever is false, give a counterexample.

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5. (12 marks)

- (a) Find all solutions to the equation $m^2 - n^2 = 63$ for which both m and n are positive integers. (Hint: $m^2 - n^2 = (m + n)(m - n)$.)