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Space Physics I
HAND-IN PROBLEM #3

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Rocket launch

A vertically launching rocket has mass $m = 1000$ kg before launch of which 500 kg is fuel, which is all used up in 10 s. The exhaust speed of the gas from the rocket motor is 2000 m/s. Neglect air drag and the change of gravity with altitude.

- (a) Find the velocity of the rocket 30 s after ignition.
- (b) Find the maximum altitude the rocket will reach.
- (c) Discuss which of the two neglected effects, gravity gradient or air drag, is likely to give the largest error, and why.