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A rocket of mass m is fired vertically upward from rest. The rocket's engine produces a thrust of constant magnitude F for t_{thrust} seconds. Determine the time it takes the rocket to reach its apex (t_{apex}) as a function of F , t_{thrust} , m , and g .

Free-Body Diagram



Mathematical Analysis

Event 1:

Event 2:

Questions

If $g = 0 \text{ m/s}^2$, what should t_{apex} equal? Does your function agree with this observation?

If $F = mg$, what should t_{apex} equal? Does your function agree with this observation?

For what value of F would $t_{\text{apex}} = 2t_{\text{thrust}}$?

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