Warm Up Exercises: Unit 3, Forces

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1 Memory Bank

1. $\vec{F} = m\vec{a}$ ... Newton's 2nd Law

2 Chapter 4 - Forces

1. A particle of mass m is falling under the influence of gravity, but experiences a thrust force upwards $\vec{F}_t = kt\hat{j}$, making the net force $\vec{F}_{\rm Net} = kt\hat{j} - mg\hat{j}$. (a) Express the vertical *acceleration* as a function of time. (b) Express the vertical *velocity* as a function of time, assuming the vertical velocity is v_0 at $t = 0$. (c) If $v_0 = 3$ m/s, $m = 20$ kg, and $v(10) = 30$ m/s, what is k?

2. A 20,000 kg jet fighter lands on an aircraft carrier, moving at 108 km/hr. A tow cable grabs the aircraft and pulls it to a stop in 100 meters. (a) What is the average acceleration? (b) What force does the tow cable extert to stop the jet?