Acceleration:

Change in vel
w/ respect to time

$A\vec{V}g = \langle \vec{a} \rangle = \frac{\Delta \vec{V}}{\Delta T}$

The 4 Kinematics Equations

$V = V_0 + at$

$\Delta x = \frac{1}{2}(V_0 + v)t$

$\Delta x = V_0 t + \frac{1}{2}at^2$

$2a\Delta x = v^2 - V_0^2$

Free Fall Acceleration

$g = 9.8\ m/s^2$

Constant accel is
grav only in free fall

Check for Understanding 5:

a) Is it possible to tell from an object's ***acceleration by itself***, whether an object is speeding up or slowing down? Explain

no because you dont know
the velocity

b) What does it mean for an object to have ***negative acceleration?***

to travel in the opposite
direction.

Check for Understanding 6:

Say whether the following objects are in free fall, yes or no ?

1. An artificial satellite orbiting the earth Y
2. A ball, immediately after it's been thrown upwards in a vacuum Y
3. A projectile moving through the air, with no air resistance Y
4. A helium balloon floating up to the sky N

Example 1

A rocket takes off ***vertically*** from the launch pad with ***no initial velocity*** but a constant upward ***net acceleration of 2.25 m/s²***. At ***15.4 s*** after blastoff, the engines fail completely so the only force on the rocket from then on is the pull of gravity.

a) What is the ***maximum height*** the rocket will reach above the launch pad? b)How fast is the rocket moving at the instant before it crashes onto the launch pad?

a) $V = 15.4 \cdot 2.25$

$V = 34.65\ m/s$

$\Delta x = \frac{1}{2}at^2$

$\Delta x = \frac{1}{2} 2.25 \cdot 15.4^2$

$\Delta x = 266.805$

$61.25 + 266.805 = 328.06$

$2 \cdot -9.8 \cdot \Delta x = -34.65^2$

$\Delta x = \frac{-34.65^2}{2 \cdot -9.8}$

$\Delta x = 61.25$

b) $2(-9.8)328 = -v^2$

$\sqrt{2 \cdot 9.8 \cdot 328} = v$

$v \approx 80\ m/s$