Fill in the blanks: F and G represent antiderivatives for f and g

$F(x) =$ an antiderivative of $f(x)$	$f(x)$
$G(x)$ = an antiderivative of $g(x)$	$g(x)$
	3
	x^2
	x^3
	x^n *(where* $n \neq -1$*)*
	x^{-1}
	$13x^3$
	kf *(where* k *is a constant)*
	$x^2 + x^3$
	$f + g$ *and* $f - g$
	$\cos x$
	$\sin x$
	$\sec^2 x$
	$\frac{1}{1+x^2}$
	e^x
	a^x
	etc.

Suppose, on some interval I, that F and G are two antiderivatives for f, that is, $F' = G' = f$

Let $H = F - G$

Pick <u>any</u> two points x_1 and x_2 "at random" in the interval I. According to the Mean Value Theorem, we can write

$\frac{H(x_2) - H(x_1)}{x_2 - x_1}$ $=$ *(for some point c between* x_1 *and* x_2*)*

$=$

What do we conclude about the values $H(x_1)$ and $H(x_2)$?

Since x_2 and x_1 were <u>any</u> two "random" points from I,

we conclude that on the interval I, $H =$, and therefore:

Suppose a small metal ball is thrown upward, with a velocity of 64 ft/sec, at the edge of a cliff that is 1000 ft. high. Assume no forces (such as wind resistance) are acting on the ball except the force of gravity.

a) Find formulas for the acceleration, velocity and position of the ball that apply until the ball hits the ground.

b) How high is the ball after 3 seconds?

c) When does the ball hit the ground?

d) With what velocity does it hit the ground?