

Given two functions are tangent at $x = a$. This means $f(a) = g(a)$ and $f'(a) = g'(a)$
 Sometimes you are not given the value of a , one needs to set up these two statements to find the value of a . Once you find the value of a , you can complete the question.

Equation of the tangent line:

Need slope: $f'(x_1) = m$ and point $(x_1, y_1 = f(x_1))$

Use equation $y = m(x - x_1) + y_1$

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Velocity is the derivative of the distance/position function.

Acceleration is the second derivative of the distance/position function.

The maximum height is right before it comes down. At this point there is a horizontal tangent line on the distance/position function. Which means the value of the velocity is? You need to find the time it takes to reach the max, then calculate the max height.

When the ball hits the ground what is its height?

Once you find the time, use that and your velocity function to find the speed (fast) the ball is going right before impact.

Reminder about true/false. If true you must write out the reason by using the rules to show that it is always true. If false you may show an example that shows that it is false.

True means always true

False means always false or sometimes true and sometimes false.