

BC Calculus
Lesson 3.8 Higher order Derivatives

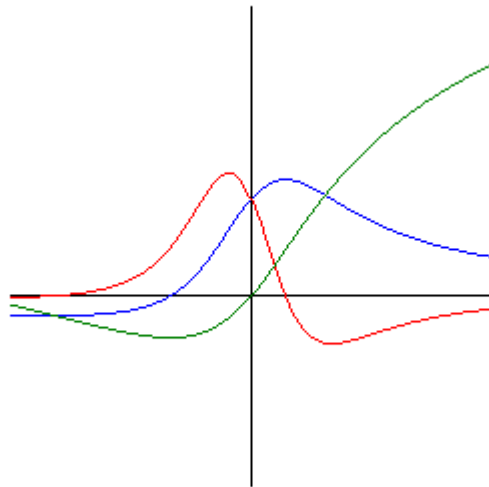
1. Find the $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for each function given:

a. $y = \frac{1}{x+2}$

b. $y = 4x^3 - 2x + 3$

c. $xy + y^2 = \cos(x + y)$

2. Given the graph below of y , y' , and y'' , identify which graph is which.



3. The height of a ball thrown vertically upward is given by $h(t) = 80t - 16t^2 + 5$, where h is given in feet and t in seconds.
- Find a function that gives the velocity of the ball at time t .
 - Find a function that gives the acceleration of the ball at time t .
 - Find the position, velocity, and acceleration of the ball at time $t = 1$.
 - Find the position, velocity, and acceleration of the ball at time $t = 3$.
4. The height of a stone thrown vertically upward from the surface of the moon is given by $h(t) = 10t - 0.83t^2$, where h is given in meters and t in seconds.
- Find a function that gives the velocity of the stone at time t .
 - Find a function that gives the acceleration of the stone at time t .
5. Find a formula for $f^{(n)}(x)$, if $f(x) = \frac{1}{x}$
6. Find $f^{47}(x)$ if $f(x) = \sin x$
7. Find $f^{47}(x)$ if $f(x) = \sin(2x)$