



**The width of a certain rectangle is one more than four times it's height. Find the rate at which the area of the rectangle is changing with respect to the height.**



**1 2 3 4 5 6 7**

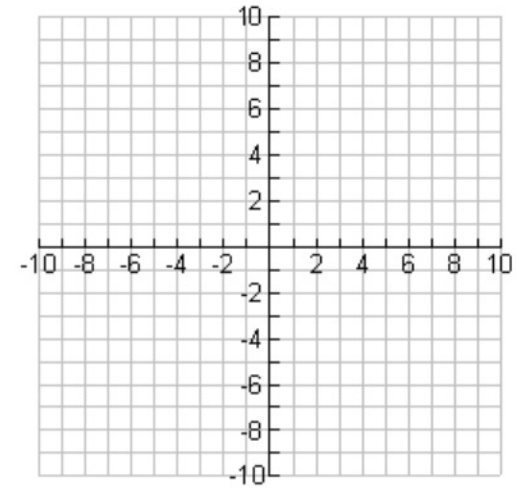
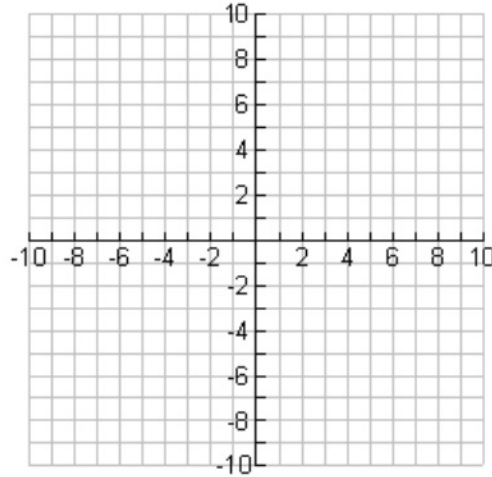
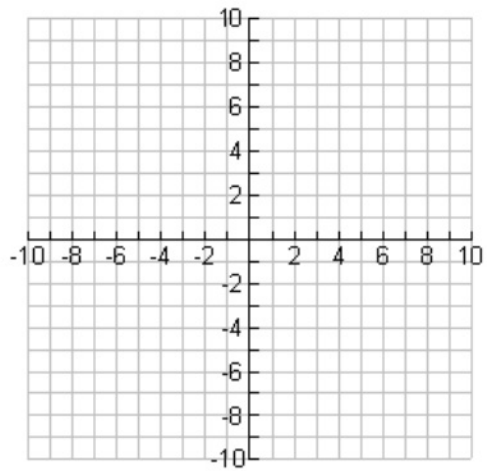


**Boyle's law relates the pressure of a gas to its temperature and volume with the equation  $p = k/v$ , where  $k$  is the temperature of the gas and  $v$  is the volume. How does the pressure change with respect to the change in volume?**





# Higher Order Derivatives



1 2 3 4 5 6 7



## Higher Order Derivatives

The position of an object can be modeled by,  
 $s(t) = 14t^2 + 34t - 5$  where  $s$  is the position and  
 $t$  is the time the object has been traveling.  
Find the velocity and acceleration with  
respect to time.



1 2 3 4 5 6 7

The velocity of a boat is modeled by,

$$v(t) = \frac{40t}{t^2 + 1}$$

where  $v(t)$  is the velocity measured in

feet and  $t$  is time in seconds. Find the acceleration of the boat.

1 2 3 4 5 6 7



## Derivatives

At time  $t = 0$ , a diver jumps from a platform that is 24 feet above the water. The position of the diver is given by the equation  $s(t) = -12t^2 + 12t + 24$ , where  $s$  is in feet and  $t$  is in seconds.

What is the diver's velocity after 1 second? When does the diver hit the water? What is the divers velocity at impact?



1 2 3 4 5 6 7



## Derivatives

The function that models the position of an object is  $f(t) = t^3 - 4$ . Find the average velocity over the interval  $[2, 3]$ .



1 2 3 4 5 6 7