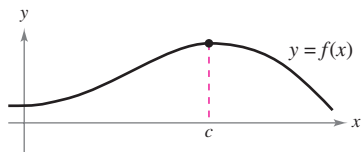
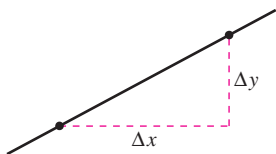


## Without Calculus

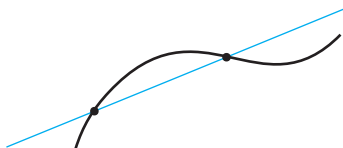
Value of  $f(x)$   
when  $x = c$



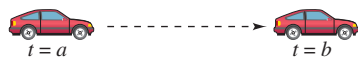
Slope of a line



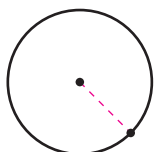
Secant line to  
a curve



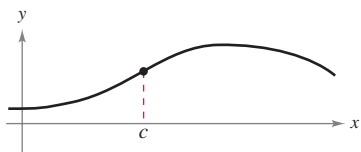
Average rate of  
change between  
 $t = a$  and  $t = b$



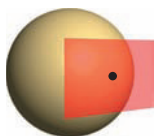
Curvature  
of a circle



Height of a  
curve when  
 $x = c$



Tangent plane  
to a sphere

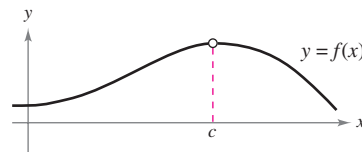


Direction of  
motion along  
a straight line

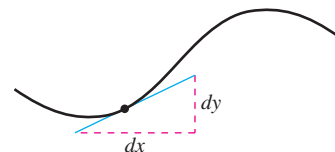


## With Differential Calculus

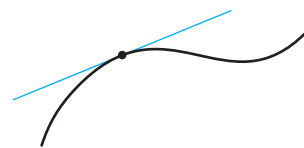
Limit of  $f(x)$  as  
 $x$  approaches  $c$



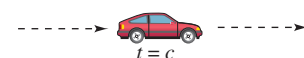
Slope of a curve



Tangent line to  
a curve



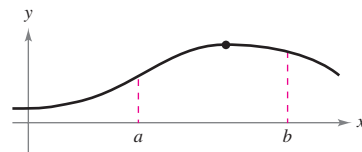
Instantaneous  
rate of change  
at  $t = c$



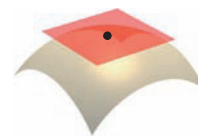
Curvature  
of a curve



Maximum height  
of a curve on  
an interval



Tangent plane  
to a surface



Direction of  
motion along  
a curved line



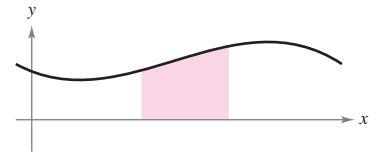
## Without Calculus

## With Integral Calculus

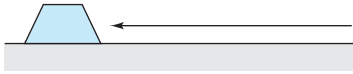
Area of a rectangle



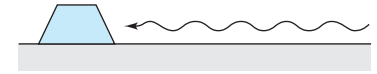
Area under a curve



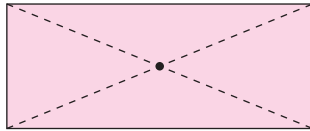
Work done by a constant force



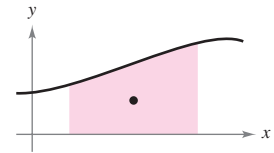
Work done by a variable force



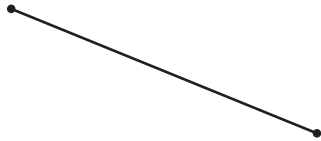
Center of a rectangle



Centroid of a region



Length of a line segment



Length of an arc



Surface area of a cylinder



Surface area of a solid of revolution



Mass of a solid of constant density



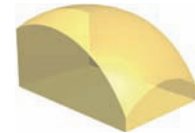
Mass of a solid of variable density



Volume of a rectangular solid



Volume of a region under a surface



Sum of a finite number of terms

$$a_1 + a_2 + \cdots + a_n = S$$

Sum of an infinite number of terms

$$a_1 + a_2 + a_3 + \cdots = S$$