***Solution*** ***Section* 2.7 – Implicit Differentiation**

***Exercise***

Find  

***Solution***













***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***















 ***Divide every term by* 2**



***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***



 ***Divide by* 6 *both sides***











***Exercise***

Find  

***Solution***













***Exercise***

Find  

***Solution***













***Exercise***

Find  

***Solution***











***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***









***Exercise***

Find  

***Solution***







***Exercise***

Find  

***Solution***







***Exercise***

Find  

***Solution***

 ***Multiply all terms by*** 



















***Exercise***

Find  

***Solution***























***Exercise***

If , find the value of  at the point (2, 2).

***Solution***

























***Exercise***

Find :  and evaluate the derivative at the given point 

***Solution***















***Exercise***

Find the slope of the curve  at the point (−2, 1) and (−2, −1)

***Solution***

1 and −1

***Exercise***

Find the slope of the tangent line to the circle  at the point (5, 1)

***Solution***









***Exercise***

Find the slope of the tangent line to the circle  at the point (3, −4)

***Solution***







Slope: 

***Exercise***

Find an equation of the line tangent to the following curves at the given point



***Solution***





***Exercise***

Find an equation of the line tangent to the following curves at the given point



***Solution***











***Exercise***

Find an equation of the line tangent to the following curves at the given point



***Solution***













***Exercise***

Find an equation of the line tangent to the following curves at the given point



***Solution***









***Exercise***

Find the equation of the tangent line to the circle  at the point (2, 4)

***Solution***















***Exercise***

Find the lines that are (***a***) tangent and (***b***) normal to the curve  at the point (2, 3).

***Solution***







1. 





1. 





***Exercise***

Find the lines that are (***a***) tangent and (***b***) normal to the curve  at the point (−1, 0).

***Solution***







1. 

1. 

***Exercise***

Find the lines that are (***a***) tangent and (***b***) normal to the curve  at the point (0, π).

***Solution***







1. 



1. 



***Exercise***

Suppose that *x* and *y* are both functions of *t*, which can be considered to represent time, and that *x* and *y* are related by the equation 

Suppose further that when *x* = 2 and *y* = 3, then . Find the value of the  at that moment.

***Solution***













***Exercise***

A cone-shaped icicle is dripping from the roof. The radius of the icicle is decreasing at a rate of 0.2 *cm* per hour, while the length is increasing at a rate of 0.8 *cm* per *hour*. If the icicle is currently 4 *cm* in radius and 20 *cm* long, is the volume of the icicle increasing or decreasing and at what rate?

***Solution***

The volume of the cone is given by the formula: .



Given the values:







The volume is decreasing at a rate of 20 *cm*3 per *hour*.

***Solution*** ***Section* 2.8 – Derivatives of Logarithmic & Exponential Functions**

***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***











***Exercise***

Find the Derivatives of 

***Solution***

 ***Product Property***



 ***Power Property***

 ***Differentiate***



***Exercise***

Find the Derivatives of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***

 ***Quotient Rule***

 ***Product Rule***

 ***Power Rule***



***Exercise***

Find the Derivatives of 

***Solution***

***Exercise***

Find the Derivatives of 

***Solution***

Let u = x2 – 4 





***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***







***Exercise***

Find the derivative 

***Solution***









***Exercise***

Find the Derivatives of 

***Solution***





***Exercise***

Find the Derivatives of 

***Solution***











***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***









***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***

 ***Power Rule***

***Exercise***

Find the derivative 

***Solution***



 ***Power Rule***

***Exercise***

Find the derivative 

***Solution***

 ***Power Rule***



***Exercise***

Find the derivative 

***Solution***







***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative of 

***Solution***













***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***

















***Exercise***

Find the derivative of 

***Solution***



***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***











***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***

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***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***

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***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***



















***Exercise***

Find the derivative of 

***Solution***











***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the Derivatives of 

***Solution***

***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative 

***Solution***

 ***Power Rule***

***Exercise***

Find the Derivatives of 

***Solution***











***Exercise***

Find the Derivatives of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***







***Exercise***

Find the Derivatives of 

***Solution***



***Exercise***

Find the Derivatives of 

***Solution***





***Exercise***

Find the Derivatives of 

***Solution***



***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***









***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***































***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***





















***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***













***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***











***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative of 

***Solution***

***Exercise***

Find the derivative of 

***Solution***

***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***







***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***















***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***









***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***













***Exercise***

Use logarithmic differentiation to find the derivative of 

***Solution***











***Exercise***

Find the second derivative of 

***Solution***





***Exercise***

Find the equations of the tangent lines to  at the points (0, 1)

***Solution***



(0, 1) 







***Exercise***

Find the equations of the tangent lines to  at the points (1, *e*)

***Solution***



(1, *e*) 



***Exercise***

Find the equations of the tangent lines to  at 

***Solution***









⇒ 



***Exercise***

Find the equation of the tangent lines to  at the points (0, 4)

***Solution***







***Exercise***

The following formula accurately models the relationship between the size of a certain type of tumor and the amount of time that it has been growing:



where *t* is in months and is measured in cubic centimeters. Calculate the rate of change of tumor volume at 80 months.

***Solution***











***Exercise***

A yeast culture at room temperature (68° *F*) is placed in a refrigerator set at a constant temperature of 38° *F*. After *t* hours, the temperature *T* of the culture is given approximately by



What is the rate of change of temperature of the culture at the end of 1 *hour*? At the end of 4 *hours*?

***Solution***







***Exercise***

A mathematical model for the average age of a group of people learning to type is given by



Where  is the number of words per minute typed after *t* *hours* of instruction and practice (2 hours per day, 5 days per week). What is the rate of learning after 10 *hours* of instruction and practice? After 100 *hours*?

***Solution***





After 10 *hours* of instruction and practice, the rate of learning is 0.6 words/minute per hour of instruction and practice.



After 100 *hours* of instruction and practice, the rate of learning is 0.06 words/minute per hour of instruction and practice.

***Exercise***

The population of coyotes in the northwestern portion of Alabama is given by the formula, where *t* represents the time in years since 2000 (the year 2000 corresponds to  Find the rate of change of the coyote population in 2013 .

***Solution***





***Solution*** ***Section* 2.9 – Derivatives of Inverse Trigonometric Functions**

***Exercise***

Find the value of 

***Solution***





***Exercise***

Find the value of 

***Solution***





***Exercise***

Find the limit: 

***Solution***





***Exercise***

Find the limit: 

***Solution***



***Exercise***

Find the limit: 

***Solution***







***Exercise***

Find the derivative 

***Solution***







***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***







***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***



***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***









***Exercise***

Find the derivative 

***Solution***











***Exercise***

Find the derivative 

***Solution***





***Exercise***

Find the derivative 

***Solution***







***Exercise***

Find the derivative 

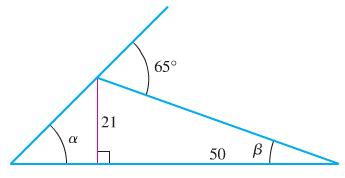
***Solution***





***Exercise***

Find the angle *α*

***Solution***











