1. Find the derivative of the function.

*h*(*t*) = *t*2(3*t* + 9)3

1. Find the derivative of the function.

f(x) = ((x + 7)/(x - 7))^5

1. Find the derivative of the function.

f(x) = sqrt(x^2 + 7)/sqrt(x^2 - 7)

Find the derivative of the function.

1. *f*(*x*) =

|  |
| --- |
| *ex* + *e*−*x* |
| *------------* |
| 2 |

Find the derivative of the function.

1. *f*(*x*) =

|  |
| --- |
| 3 ln *x* |
| *---------------*  *x*4 |
|  |

Find dy/du, du/dx, and dy/dx when y and u are defined as follows.

y = √u u = 5x - 7x2

dy/du =

du/dx=

dy/dx=

1. Find an equation of the tangent line to the graph of the function at the given point.

f(x) = ((x + 1)/(x - 1))^2; \ \ \(3, 4\)

*y* =

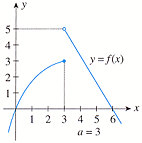
1. The population of Americans age 55 and older as a percentage of the total population is approximated by the function

*f*(*t*) = 10.72(0.9*t* + 10)0.3      (0 ≤ *t* ≤ 20)

where *t* is measured in years, with *t* = 0 corresponding to the year 2000. At what rate was the percentage of Americans age 55 and older changing at the beginning of 2006? (Round your answer to four decimal places.)  
% per year =   
  
At what rate will the percentage of Americans age 55 and older be changing in 2019? (Round your answer to four decimal places.)  
% per year =  
  
What will be the percentage of the population of Americans age 55 and older in 2019? (Round your answer to two decimal places.)  
% per year =

1. Use the graph of the function *f* to find the limits at the indicated value of *a*, if the limit exists.

|  |  |
| --- | --- |
| lim_(x->(a^-))f(x) = |  |
| lim_(x->(a^+))f(x) = |  |
|  |  |



1. Find the indicated one-sided limits, if they exist.

*f*(*x*) =

|  |  |  |
| --- | --- | --- |
| http://www.webassign.net/wastatic/wacache202cb962ac59075b964b07152d234b70/watex/img/leftbrace1.gif | −*x* + 2 | if *x* ≤ 0 |
|  | 3*x* + 4 | if *x* > 0 |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| −*x* + 2 | if *x* ≤ 0 | |
| 3*x* + 4 | if *x* > 0 | |
| lim *x*→0+ *f*(*x*) | | = | |  |
| lim *x*→0− *f*(*x*) | | = | |  |

1. Determine all values of *x* at which the function is discontinuous.

f(x) = (x^2 - 9 x + 20)/(x^2 - 4 x)

*x* = (smaller value)  
*x* = (larger value)

1. For what value of *k* will the function *f* be continuous on (-∞,∞)?

f(x) = {((x^2 - 49)/(x + 7) text( if ) x != -7, k text( if ) x = -7)

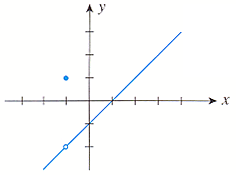
1. Determine all values of *x* at which the function is discontinuous.

f(x) = 1/((x - 7)(x - 8))

*x* = (smaller value)  
*x* = (larger value)

1. Determine the values of *x*, if any, at which the function is discontinuous. At each number where *f* is discontinuous, state the condition(s) for continuity that are violated. (Select all that apply.)

$$ f(x)=\left\{
    \begin{array}{rcl}
    \vspace{8pt} \dfrac{x^2-1}{x+1} \quad \text{if} \quad x \ne -1 \\
    1 \quad \text{if} \quad x=-1 \\
    \end{array}
    \right. $$



Which of these are true? Select all that apply.

\text(The function)\ f \text(is discontinuous at)\ x = -1 \text(because)\ f \text(is not defined at)\ x = -1.\text(The function)\ f \text(is discontinuous at)\ x = -1 \text(because)\ lim_(x -> -1)f(x) \text(does not exist.)

The function of x is discontinuous at x = -1 (because) lim\_(x 🡪-1)f(x) (exists, but this limit is not equal to)\ f(-1).

\text(The function)\ f \text(is continuous everywhere because the three conditions for continuity are satisfied for all values of)\ x.

1. The following graph shows the amount of home heating oil remaining in a 200-gal tank over a 120-day period (*t* = 0 corresponds to October 1). For which value(s) of *t* is the function discontinuous. (Enter your answers as a comma-separated list.)

|  |  |  |
| --- | --- | --- |
| *t* | = |  |

