2.3B Product and Quotient Rules (2846413)

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1.   Question Details   LarCalc9 2.3.029. [1197547]

Find the derivative of the algebraic function.

$$f(x) = \frac{x - 11}{\sqrt{x}}$$

$f'(x) =$ $\dfrac{1}{2} \cdot \dfrac{x + 11}{x^{\frac{3}{2}}}$

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2.   Question Details   LarCalc9 2.3.031. [1196695]

Find the derivative of the algebraic function.

$$h(s) = (s^5 - 1)^2$$

$h'(s) =$ $10 \cdot \left(s^5 - 1\right) \cdot s^4$

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3.   Question Details   LarCalc9 2.3.038. [1889312]

Find the derivative of the algebraic function.

$$f(x) = \frac{c^4 - x^4}{c^4 + x^4}, \quad c \text{ is a constant.}$$

$f'(x) =$ $-\dfrac{8x^3 c^4}{(c^4 + x^4)^2}$

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4.   Question Details   LarCalc9 2.3.039. [1196568]

Find the derivative of the trigonometric function.

$$f(t) = t^3 \sin(t)$$

$f'(t) =$ $3 \cdot t^2 \cdot \sin(t) + t^3 \cdot \cos(t)$

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5.   Question Details   LarCalc9 2.3.041. [1196659]

Find the derivative of the trigonometric function.

$$f(t) = \frac{\sin(t)}{t}$$

$f'(t) =$ $\dfrac{\cos(t) \cdot t - \sin(t)}{t^2}$

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6.   Question Details   LarCalc9 2.3.046. [1048949]

Find the derivative of the trigonometric function.

$$h(x) = \frac{3}{x} - 8 \sec(x)$$

$h'(x) =$

$$-\frac{3}{x^2} - 8 \sec(x)\tan(x)$$

7.   Question Details   LarCalc9 2.3.049. [1197085]

Find the derivative of the trigonometric function.

$$y = -\csc(x) - \cos(x)$$

$y' =$

$$\csc(x) \cdot \cot(x) + \sin(x)$$

8.   Question Details   LarCalc9 2.3.053. [1197012]

Find the derivative of the trigonometric function.

$$y = 4x \sin(x) + x^6 \cos(x)$$

$y' =$

$$4 \cdot \sin(x) + 4 \cdot x \cdot \cos(x) + 6 \cdot x^5 \cdot \cos(x) - x^6 \cdot \sin(x)$$

9.   Question Details   LarCalc9 2.3.059. [1054340]

Evaluate the derivative of the function at the given point. Use a graphing utility to verify your result.

$$y = \frac{4 + \csc(x)}{8 - \csc(x)}, \left(\frac{\pi}{6}, 1\right)$$

$y' =$

$$-\frac{2}{3} \cdot 3^{\frac{1}{2}}$$

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10.   Question Details   LarCalc9 2.3.067. [1197146]
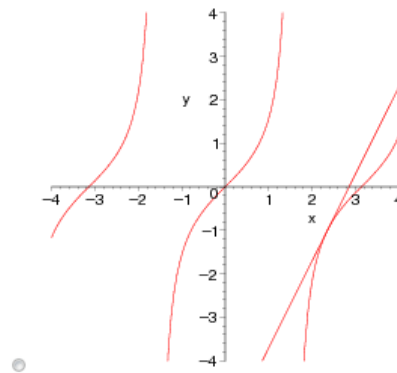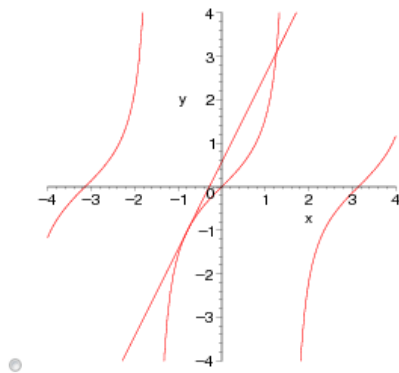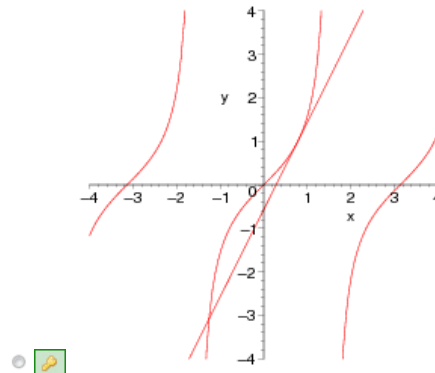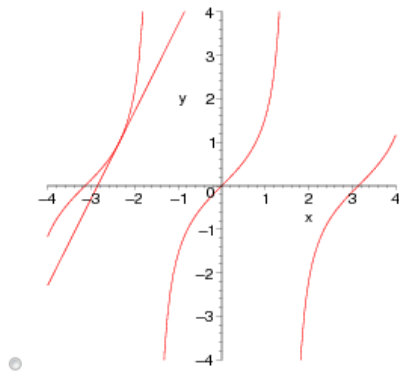
Consider the following.

$$f(x) = \tan(x), \quad \left(\frac{\pi}{4}, 1\right)$$

(a) Find an equation of the tangent line to the graph of *f* at the given point.

$y =$ $\boxed{2 \cdot x - \dfrac{1}{2} \cdot \pi + 1}$

(b) Use a graphing utility to graph the function and its tangent line at the point.

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11.   Question Details   LarCalc9 2.3.071. [1197689]
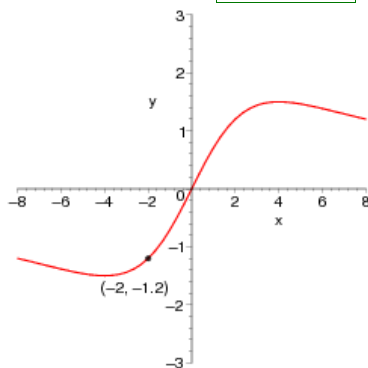
Find an equation of the tangent line to the graph at the given point.

$$f(x) = \frac{12x}{x^2 + 16}, \quad (-2, -1.2)$$

$y =$ $\boxed{0.36x - 0.48}$

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12.   Question Details   LarCalc9 2.3.074. [1047630]   -

Determine the point at which the graph of the function has a horizontal tangent line.

$$f(x) = \frac{7x^2}{x^2 + 4}$$

$(x, y) = ($ _____ 🔑 0, 0 $)$

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13.   Question Details   LarCalc9 2.3.075. [1048994]   -

Find the point(s), if any, at which the graph of f has a horizontal tangent.

$$f(x) = \frac{x^2}{x - 4}$$

$(x, y) = ($ _____ 🔑 0, 0 $)$ (smaller x-value)
$(x, y) = ($ _____ 🔑 8, 16 $)$ (larger x-value)

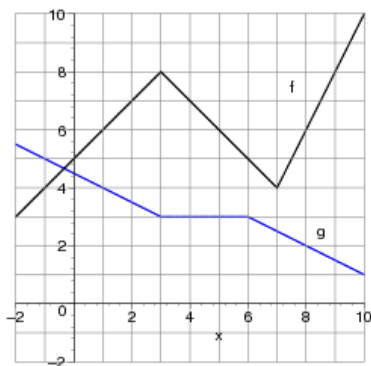**14.**   Question Details   LarCalc9 2.3.081. [1048963]   -

Use the graph of f and g.

$$p(x) = f(x)g(x)$$

$$q(x) = \frac{f(x)}{g(x)}$$

(a) Find $p'(2)$.
$p'(2) =$ _____ 🔑 0

(b) Find $q'(4)$.
$q'(4) =$ _____ 🔑 -1/3

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15.   Question Details   LarCalc9 2.3.083. [1197196]   -

The length of a rectangle is given by $9t + 9$ and its height is $\sqrt{t}$, where t is time in seconds and the dimensions are in centimeters. Find the rate of change of the area with respect to time.

$A'(t) =$ $\quad \boxed{\dfrac{27t + 9}{2\sqrt{t}}}$

16.   Question Details   LarCalc9 2.3.084. [1048989]

The radius of a right circular cylinder is given by $\sqrt{t+9}$ and its height is $\frac{1}{9}\sqrt{t}$, where t is time in seconds and the

dimensions are in inches. Find the rate of change of the volume with respect to time.

$$\frac{3t+9}{18t^{\frac{1}{2}}}\pi$$ in^3/s

17.   Question Details   LarCalc9 2.3.092. [1054338]

When satellites observe the Earth, they can scan only part of the Earth's surface. Some satellites have sensors that can measure the angle θ shown in the figure. Let h represent the satellite's distance from the Earth's surface and let r represent Earth's radius.
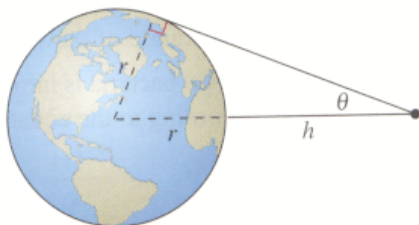
$h = r(\csc(\theta) - 1)$

Find the rate at which h is changing with respect to θ when $\theta = 75°$. (Assume $r = 3960$ miles. Round your answer to the nearest mile/radian.)

[   ]   ⚷ -1,099 mi/rad

18.   Question Details   LarCalc9 2.3.093.MI. [1267214]

Find the second derivative of the function.

$$f(x) = x^4 + 8x^3 - 9x^2 - 2x$$

$f''(x) =$ $12x^2 + 48x - 18$

19.   Question Details   LarCalc9 2.3.095. [1047703]

Find the second derivative of the function.

$$f(x) = x^{3/2}$$

$f''(x) =$ $\dfrac{3}{4\sqrt{x}}$

20.   Question Details   LarCalc9 2.3.097. [1047636]

Find the second derivative of the function.

$$f(x) = \frac{x}{x-7}$$

$f''(x) =$ $\dfrac{14}{(x-7)^3}$

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21.   Question Details   LarCalc9 2.3.099. [1197241]

Find the second derivative of the function.

$$f(x) = x \sin(x)$$

$f\ ''(x) =$ $\boxed{2 \cdot \cos\left(x\right) - x \cdot \sin\left(x\right)}$

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22.   Question Details   LarCalc9 2.3.105. [1048007]

Use the given information to find $f\ '(7)$.

$$f(x) = 8g(x) + h(x)$$
$$g(7) = 2 \text{ and } g'(7) = 6$$
$$h(7) = \text{-8 and } h'(7) = 1$$

$f\ '(7) =$ $\boxed{}$ 🔑 49

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23.   Question Details   LarCalc9 2.3.107. [1246975]

Use the given information to find $f\ '(2)$.

$$g(2) = 3 \quad \text{and} \quad g'(2) = -4$$
$$h(2) = -1 \quad \text{and} \quad h'(2) = 4$$
$$f(x) = \frac{g(x)}{h(x)}$$

$f\ '(2) =$ $\boxed{}$ 🔑 -8

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24.   Question Details   LarCalc9 2.3.108. [1048022]

Use the given information to find $f\ '(3)$.

$$f(x) = g(x)h(x)$$
$$g(3) = \text{-2 and } g'(3) = \text{-9}$$
$$h(3) = 7 \text{ and } h'(3) = \text{-7}$$

$f\ '(3) =$ $\boxed{}$ 🔑 -49

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25.   Question Details   LarCalc9 2.3.117. [1048006]

The velocity of an object in meters per second is $v(t) = 49 - t^2$, $0 \le t \le 6$. Find the velocity $v(2)$ and acceleration $a(2)$ of the object when $t = 2$.

$v(2) =$ $\boxed{}$ 🔑 45
$a(2) =$ $\boxed{}$ 🔑 -4

What can be said about the speed of the object when the velocity and acceleration have opposite signs?
The speed of the object is ---Select--- 🔑 decreasing , but the rate of that ---Select--- 🔑 decrease is ---Select--- 🔑 increasing .

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26.   Question Details   LarCalc9 2.3.118. [1048019]

An automobile's velocity starting from rest is given by the equation below, where v is measured in feet per second. (Round your answers to three decimal places.)

$$v(t) = \frac{90t}{3t + 15}$$

(a) Find the acceleration at 5 seconds.

[   ]   🔑 1.500   ft/sec^2

(b) Find the acceleration at 10 seconds.

[   ]   🔑 0.667   ft/sec^2

(c) Find the acceleration at 20 seconds.

[   ]   🔑 0.240   ft/sec^2

Assignment Details

Name (AID): **2.3B Product and Quotient Rules (2846413)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **Yes**
Author: **Goldsworthy, William (** bgoldsworthy@soroschool.org **)**
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