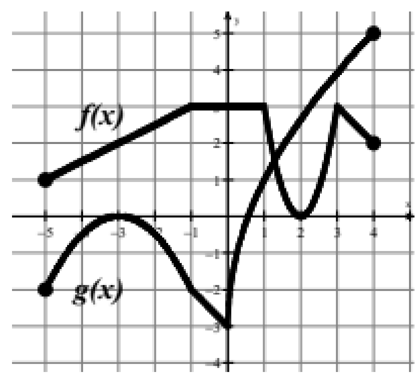
Unit 2 - Review

Score: _______/ 28 Name:____________________

$W(x)$ is the amount of water (in gallons) in Mr. Sullivan's backyard kiddie pool and t is the number of minutes since he turned his hose on to fill up his pool. Explain the meaning of $W'(5) = 2.7$.

The function f is defined on all real numbers such that $f(x) = \begin{cases} 2x^2 - ax + 6, & x < 3 \\ x + b, & x \geq 3 \end{cases}$. What values of a and b would make the function differentiable at $x = 3$?

The graphs of f and g are shown to the right. If $j(x) = g(f(x))$. Find the average rate of change of $j(x)$ on the interval $[-3, 4]$

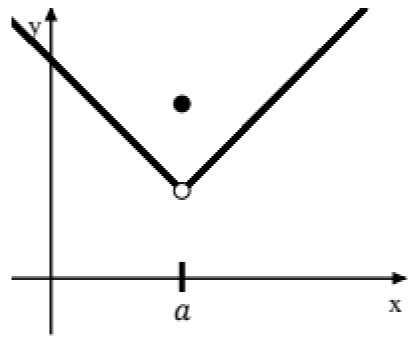


Find the value of the derivative at the given point. Round or truncate to three decimal places.

$f(x) = \frac{3x}{\ln(4-x)}$ at $x = 1$.

Find the equation of the tangent line to $f(x) = 4\ln x + 2x^3$ at $x = 1$.

The graph of $f(x)$ is shown to the right. Which of the following statements must be false?



(A) $f(a)$ exists.

(B) $f(x)$ is defined for $0 < x < a$.

(C) f is not continuous at $x = a$.

(D) $\lim_{x \to a} f(x)$ exists.

(E) $\lim_{x \to a} f'(x)$ exists

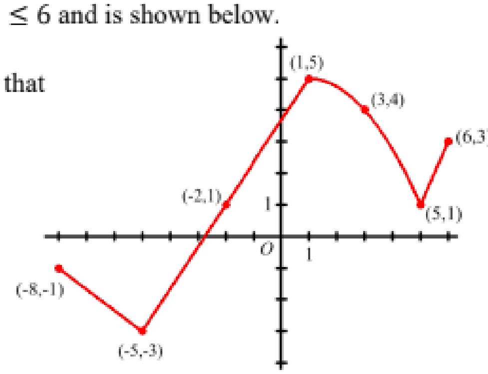
Use the table to find the value of the derivatives of each function

t	$d(t)$	$d'(t)$	$q(t)$	$q'(t)$
6	-4	-6	-2	1

If $g(t) = \left(1 - \frac{d(t)}{2}\right)(4q(t) - 2)$, find $g'(6)$.

At what x-value(s) does the function $f(x) = \frac{x^4}{4} - 5x^3 + 25x^2 - 30$ have a horizontal tangent?

A continuous function g is defined on the closed interval $-8 \le x \le 6$ and is shown below.



(a) Find the approximate value of $g'(4)$. Show the computations that lead to your answer.

(b) Let h be the function defined by $h(x) = \frac{g(x)}{x^2+1}$. Find $h'(-2)$.

Find the derivative of each function.

$r = 3\sqrt{t} - 7t$

$y = 5\ln x + \csc x$

$h(x) = \frac{\ln x}{3x}$

$d(t) = 6e^t(4 - t^2)$