

MAT3-119 Calculus of a Single Variable I

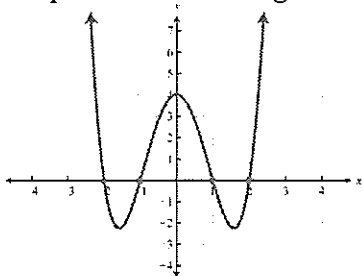
Quiz 3 November 6, 2015

solution

name

You must show your work for full credit on this quiz.

1. (6 pts.) The graph of a second derivative of a function g is shown below. Use this graph to answer questions about g .



- a. Where does g have points of inflection?

g'' changes sign: $-2, -1, 1, 2$

- b. On what intervals is g concave down?

$g'' < 0$ $(-2, -1) \cup (1, 2)$

- c. Suppose g has a stationary point when $x = 0$. Is this a local max or local min?

2nd der test $g'' > 0$ local min

2. (6 pts.) Use the definition of a derivative as a limit of a difference quotient to find $f'(x)$ where $f(x) = x^2$ at $x = 1$.

$$\begin{aligned}
 f'(1) &= \lim_{h \rightarrow 0} \frac{f(1+h) - f(1)}{h} = \lim_{h \rightarrow 0} \frac{(1+h)^2 - 1}{h} \\
 &= \lim_{h \rightarrow 0} \frac{1 + 2h + h^2 - 1}{h} \\
 &= \lim_{h \rightarrow 0} \frac{2h + h^2}{h} \\
 &= \lim_{h \rightarrow 0} 2 + h = 2
 \end{aligned}$$

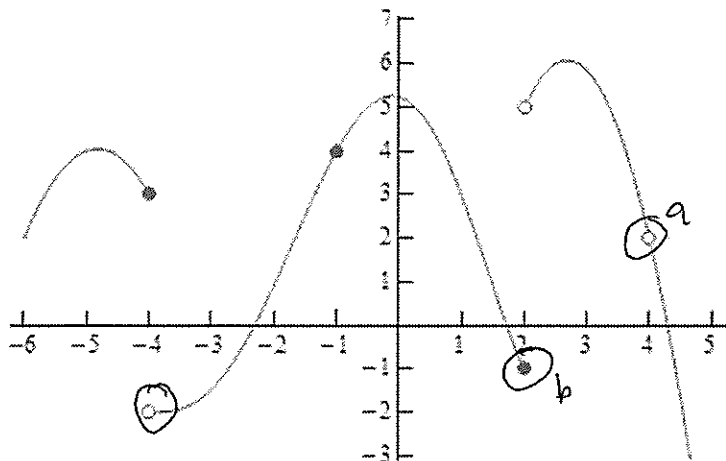
MAT3-119 Calculus of a Single Variable I

Quiz 4 November 9, 2015

Solution

12 points possible

1. Let f be the function given by the graph below. Find the following limits or say they don't exist.



a. $\lim_{x \rightarrow 4} f(x)$ 2

b. $\lim_{x \rightarrow 2^-} f(x)$ -1

c. $\lim_{x \rightarrow -4^+} f(x)$ -2

d. $\lim_{x \rightarrow 2} f(x)$ DNE

2. Find the first and second derivatives of the following functions. Show your work.

a. $x^4 - 7x$

$$y' = 4x^3 - 7 \quad y'' = 12x^2$$

b. $x^{-2} + x^{1/2}$

$$y' = -2x^{-3} + \frac{1}{2}x^{-1/2}$$

$$y'' = 6x^{-4} - \frac{1}{4}x^{-3/2}$$