

Quiz 8

ⓘ This is a preview of the published version of the quiz

Started: Nov 1 at 1:12pm

Quiz Instructions

This quiz has three (3) multiple-choice problems and three (3) problems that require an exact numerical answer. For each problem that requires a numerical answer, the answer will be an integer. Each problem is worth one (1) or two (2) points.

Question 1	2 pts
<p>Let $r(x) = \cos(-500x)$. Use the first derivative to determine whether r is increasing or decreasing at the point where $x = 0.15$.</p>	
$r'(x) = -\sin(-500x) \cdot (-500)$ $= 500 \sin(-500x)$	
<p><input checked="" type="radio"/> Increasing</p> <p><input type="radio"/> Decreasing</p>	
$r'(0.15) = 500 \sin(-75) \approx 193.9 > 0$	

Question 2	2 pts
<p>Suppose the function $f(x)$ and its derivative $f'(x)$ are defined for all real numbers. The only critical numbers of $f(x)$ are $x = -3$ and $x = 1.5$. Use this information and the information given below to find the unique relative maximum value of $f(x)$.</p>	
<p>$f'(-8) = -5, \quad f'(-2) = 1.25, \quad f'(1) = 2, \quad f'(3) = -6, \quad f(-8) = 15, \quad f(1.5) = -1$</p>	
<div style="border: 1px solid black; width: 200px; height: 30px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">-1</div>	
SEE ATTACHED SHEET.	

$g(1) = 5$
 $(1, g(1))$
 IS THE
 INF. PT.

Question 3	2 pts
<p>Let $g(x) = 5x^7 - 7x^6 + 8x - 1$. The graph of g has a single inflection point. Find the y-coordinate of the inflection point.</p>	
$g'(x) = 35x^6 - 42x^5 + 8$ $g''(x) = 210x^5 - 210x^4 = 210x^4(x-1) = 0$	
$\Rightarrow x = 0, x = 1$	
<div style="border: 1px solid black; width: 200px; height: 30px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">5</div>	

Question 4

2 pts

Use the second derivative to determine whether the graph of $y = x^3 + \sin(10x)$ is concave up or concave down at the point where $x = 0.65$.

$$\frac{dy}{dx} = 3x^2 + 10 \cos(10x)$$

Concave down

Concave up

$$\frac{d^2y}{dx^2} = 6x - 100 \sin(10x)$$

$$\frac{d^2y}{dx^2} \Big|_{x=0.65} \approx -17.6 \Rightarrow CD$$

Question 5

1 pts

Determine the horizontal asymptote of the graph of $y = \frac{\sin x}{x}$.

$x = 0$

$y = 1$

$y = 0$

The graph does not have a horizontal asymptote.

SEE EXAMPLE 4 IN THE LECTURE 26 NOTES.

Question 6

1 pts

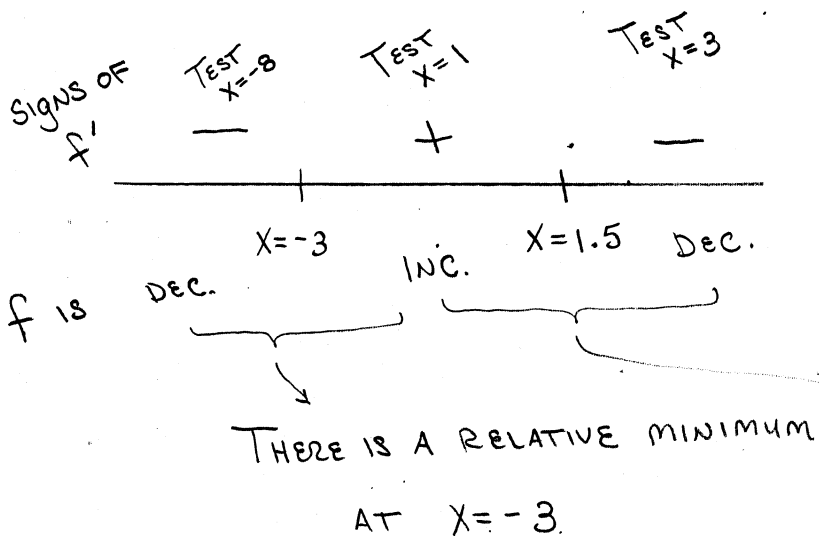
Determine the limit: $\lim_{x \rightarrow \infty} \frac{\sqrt{4x^2 + x}}{1 - x} \cdot \frac{\frac{1}{\sqrt{x^2}}}{\frac{1}{x}} = \lim_{x \rightarrow \infty} \frac{\sqrt{4 + \frac{1}{x}}}{\frac{1}{x} - 1} = \frac{\sqrt{4}}{-1} = -2$

$\sqrt{x^2} = x$ For positive x .

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Quiz 8 - Question 2



There is a relative maximum at $x = 1.5$.

$$f(1.5) = -1$$