

Math 171 - Quiz 10

November 7, 2018

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Let $g(x) = x^4 + \cos(20x)$. Without looking at the graph of g , determine whether the graph is concave up or concave down at the point where $x = 0.7$.

$$g'(x) = 4x^3 - 20\sin 20x$$

$$g''(x) = 12x^2 - 400 \cos 20x$$

$$g''(0.7) = -48.815 < 0$$

Graph is CD at $x = 0.7$

2. (2 points) Evaluate the limit. Show work to justify your result.

$$\lim_{x \rightarrow \infty} \frac{2x^2 + 7x - 3}{5x^2 - x} \cdot \frac{1/x^2}{1/x^2}$$

$$= \lim_{x \rightarrow \infty} \frac{2 + \frac{7}{x} - \frac{3}{x^2}}{5 - \frac{1}{x}} = \frac{2 + 0 - 0}{5 - 0}$$

$$= \frac{2}{5}$$

3. (2 points) Find the horizontal asymptote(s) of the graph of R .

$$R(x) = \frac{4x^6 + 7x^2 + 1}{2x^7 - 8x^6 + 7x^3 + 5}$$

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H.A. is $y = 0$

4. (3 points) Evaluate the limit. Show work to justify your result.

$$\lim_{x \rightarrow -\infty} \frac{7x - 10}{\sqrt{9x^2 - 4x}} \cdot \frac{\sqrt{x^2}}{\sqrt{x^2}}$$

$$\left. \begin{array}{l} \sqrt{x^2} = -x \\ \text{SINCE} \\ x < 0 \end{array} \right\}$$

$$= \lim_{x \rightarrow -\infty} \frac{7x - 10}{\sqrt{9x^2 - 4x}} \cdot \frac{-x}{\sqrt{x^2}}$$

$$= \lim_{x \rightarrow -\infty} \frac{-7 + \frac{10}{x}}{\sqrt{9 - \frac{4}{x}}} = \frac{-7}{3}$$