

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

MATH101 - Section 02 (Term 153)

Date: July 24, 2016

Quiz 2

Duration: 30 minutes

Family Name: _____ ID #: _____ Serial #: _____

1. Evaluate the following limits or explain why they are not exist:

(a) $\lim_{x \rightarrow 3} \exp\left(\frac{9 - x^2}{|x - 2| - 1}\right)$

(b) $\lim_{t \rightarrow \infty} \frac{3t^{2/3} - t^{1/2}\sqrt{t^2 - 2t - 1}}{2t^{3/2} - t^{1/2}}$

(c) $\lim_{x \rightarrow -\infty} \left(\sqrt{x^2 + 8} - \sqrt{x^2 - 5x}\right)$

(3 + 3 + 3 = 9 points)

2. Use the **Intermediate Value Theorem (IVT)** to show that the graphs of the functions $f(x) = 7\sqrt{x^3 - 6x^2 + 9}$ and $g(x) = 8x^3 + 15x^2 - 3x + 4$ intersect at a point whose x - coordinate lies in the interval $[0, 1]$. **(5 points)**

Hint: Let $h(x) = f(x) - g(x)$.

3. For what value(s) of a and b is:

$$f(x) = \begin{cases} a - bx, & x \leq -3 \\ bx^2 - 13, & -3 < x < 1 \\ a \ln x - 9, & x \geq 1 \end{cases}$$

continuous at every x ?

(6 points)

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

MATH101 - Section 04 (Term 153)

Date: July 24, 2016

Quiz 2

Duration: 30 minutes

Family Name: _____ ID #: _____ Serial #: _____

For this quiz, you are given the following function:

$$f(x) = \frac{\sqrt{8x^3 + 27}}{|x - 2|^3 - 8}$$

1. Evaluate the following limits or explain why they are not exist:

(a) $\lim_{x \rightarrow 0} f(x)$

(b) $\lim_{x \rightarrow \infty} f(x)$

(c) $\lim_{x \rightarrow -\infty} f(x)$

(3 + 3 + 2 = 8 points)

2. Where is the function $f(x)$ continuous?

(3 points)

3. Use your answers, determine the horizontal and vertical asymptotes of the function $f(x)$.

(4 points)

4. Use the **Intermediate Value Theorem (IVT)** to show that the equation $f(x) + 1 = 0$ has a root between 1 and 2.

(5 points)