Math 229 – Quiz 2 – Zasada

SHORT ANSWER: Write the word or phrase that best complete each statement or answers the question. Show all work. Answers with inadequate work will receive a reduced score.

1) **The point P (1, 3) lies on the curve $y = \frac{3}{x^2}$. Estimate the value of the slope of the tangent line to the curve at P (1, 3).** $Q(x, 3/x^2)$

$$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\frac{3}{x^2} - 3}{x - 1}\frac{(x^2)}{(x^2)} = \frac{3 - 3x^2}{x^2(x-1)} = \frac{-3(x^2-1)}{x^2(x-1)}$$

$$= \frac{-3(x+1)\cancel{(x-1)}}{x^2\cancel{(x-1)}} = \frac{-3(x+1)}{x^2}$$

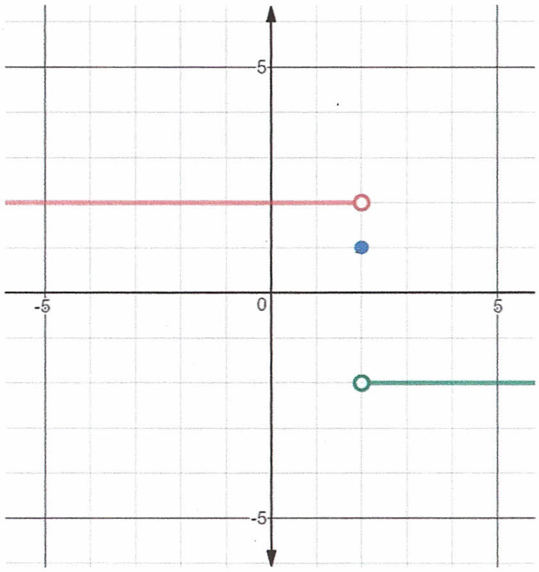
$$m = \lim_{x \to 1} \frac{-3(x+1)}{x^2} = \boxed{-6}$$

2) **Complete the table by computing $f(x)$ at the given values of x, accurate to five decimal places. Use the results to guess the indicated limit, if it exists, to three decimal places.**

$$\lim_{x \to -3} \frac{\sqrt{x+12} - 3}{x + 3} \approx \boxed{0.167}$$

x	-3.1	-3.01	-3.001	-3	-2.999	-2.99	-2.9
$f(x)$	0.16713	0.16671	0.166607		0.166666	0.166602	0.166620

3) Use the graph of the function to find each limit.



$\lim_{x \to 2^-} f(x) = 2$

$\lim_{x \to 2^+} f(x) = -2$

$\lim_{x \to 2} f(x) = \text{DNE}$

4) Evaluate the limit.

$$\lim_{x \to 9} \frac{3 - \sqrt{x}}{x - 9} \cdot \frac{(3+\sqrt{x})}{(3+\sqrt{x})}$$

$$= \lim_{x \to 9} \frac{9 - x}{(x-9)(3+\sqrt{x})} = \lim_{x \to 9} \frac{-1\cancel{(x-9)}}{\cancel{(x-9)}(3+\sqrt{x})} = \lim_{x \to 9} \frac{-1}{3+\sqrt{x}}$$

$$= \frac{-1}{3+3} = \boxed{-\frac{1}{6}}$$