

## Quiz #10 - The last one ☺

**Directions:** Carefully read each question below and answer to the best of your ability in the space provided. Your answer to problems should be written in a clear and concise manner. You **MUST** show your work to receive full credit!

1. (3 points) Use the properties of limits to calculate the following limits:

**Solution:**

$$(a) \quad \lim_{(x,y) \rightarrow (1,-2)} 3xy + y^2 = 3(1)(-2) + (-2)^2 = -6 + 4 = \boxed{-2}$$

$$(b) \quad \lim_{(x,y) \rightarrow (-1,1)} (4y^2 + 2x)(3xy - 5) = (4(1)^2 + 2(-1))(3(-1)(1) - 5) = (2)(-8) = \boxed{-16}$$

$$(c) \quad \lim_{(x,y) \rightarrow (1,1)} \frac{2x^2 + y}{2xy + 3} = \frac{2(1)^2 + 1}{2(1)(1) + 3} = \boxed{\frac{3}{5}}$$

2. (7 points) Compute the following limit, if it exists:

$$\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y^2}{x^3 + y^6}$$

**Solution:**

$$\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y^2}{x^3 + y^6} = \lim_{\substack{x \rightarrow 0 \\ y=x}} \frac{3x^2x^2}{x^3 + x^6} = \lim_{x \rightarrow 0} \frac{3x^3x}{x^3(1 + x^3)} = \lim_{x \rightarrow 0} \frac{3x}{1 + x^3} = 0$$

but

$$\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y^2}{x^3 + y^6} = \lim_{\substack{x \rightarrow 0 \\ y=\sqrt{x}}} \frac{3x^2(\sqrt{x})^2}{x^3 + (\sqrt{x})^6} = \lim_{x \rightarrow 0} \frac{3x^3}{2x^3} = \frac{3}{2}$$

Thus the limit doesn't exist.

Name: \_\_\_\_\_

Section (circle one):            001            002

Question:	1	2	Total
Points:	3	7	10
Score:			