

$$6. f(x, y) = 3x^2 + y$$

$$b) \frac{f(x, y + \Delta y) - f(x, y)}{\Delta y}$$

$$\begin{aligned} \stackrel{\text{1st}}{=} f(\underline{x}, \underline{y} + \Delta y) &= 3(x)^2 + (y + \Delta y) \\ &= 3x^2 + y + \Delta y \end{aligned}$$

$$\begin{aligned} \stackrel{\text{2nd}}{=} \frac{f(x, y + \Delta y) - f(x, y)}{\Delta y} &= \frac{3x^2 + y + \Delta y - (3x^2 + y)}{\Delta y} \\ &= \frac{\overset{\bullet}{3}x^{\overset{\circ}{2}} + \overset{\circ}{y} + \Delta y - \overset{\bullet}{3}x^{\overset{\circ}{2}} - \overset{\circ}{y}}{\Delta y} \\ &= \frac{\Delta y}{\Delta y} \\ &= \textcircled{1} \end{aligned}$$

DOMAIN

1. FRACTIONS (NO ZEROS IN DENOM.)
2. RADICAL WITH EVEN INDEX (NO NEG. INSIDE RADICAL)
3. LOG (NO LOG OF ZERO OR NEG. #)

$$7. f(x, y) = 4x^2 - y$$

$$\text{DOMAIN: } \left\{ (x, y) \mid \begin{array}{l} x \text{ IS ANY REAL \#} \\ y \text{ IS ANY REAL \#} \end{array} \right\}$$

$$\text{RANGE: } (-\infty, \infty)$$