

## CALCULUS REVIEW

In this course, the coordinate,  $x$ , is often expressed as a function of time  $t$ :

$$x = x(t)$$

Earlier, we derived an equation for the **x-COMPONENT** of the **instantaneous velocity**

$$v_x = \lim_{\Delta t \rightarrow 0} \frac{\Delta x}{\Delta t} = \frac{dx}{dt}$$

$\frac{dx}{dt}$  is the **derivative** of  $x$  with respect to  $t$

### EXAMPLES

$x = a$ ,  $a$  - constant number

$$\frac{dx}{dt} = \frac{d(a)}{dt} = 0, \quad \frac{d(4.7)}{dt} = 0$$

$x = t^n$ ,  $n$  - integer (1, 2, 3, ..., -1, -2, ...)

$$\frac{dx}{dt} = \frac{d(t^n)}{dt} = n t^{n-1}$$

$$\frac{d(t^3)}{dt} = 3 t^2$$

$$x = 4.2 t^3 - 2 t$$

$$\frac{dx}{dt} = 4.2 \frac{d(t^3)}{dt} - 2 \frac{d(t)}{dt}$$

$$= (4.2) * 3 t^2 - 2 = 12.6 t^2 - 2$$