1. $f(x) = x^2$

$$\frac{-(x+2h)^2 + 4(x+h)^2 - 3(x)^2}{2h}$$

$$\frac{-\cancel{x^2} - 4hx - \cancel{4h^2} + \cancel{4x^2} + 8xh + \cancel{4h^2} \cancel{-3x^2}}{2h}$$

$$= \frac{4xh}{2h} = 2x = f'(x) = \frac{d(x^2)}{dx}$$

$$f''(x) = \frac{(x+h)^2 - 2x^2 + (x-h)^2}{h^2}$$

$$= \frac{\cancel{x^2} + \cancel{2xh} + h^2 \cancel{-2x^2} + \cancel{x^2} \cancel{-2xh} + h^2}{h^2}$$

$$= \frac{2h^2}{h^2} = 2 = \frac{d^2(x^2)}{dx^2}$$

$f(x) = \operatorname{sen} x$

~~Se~~

$$\lim_{h \to 0} \frac{-\operatorname{sen}(x+2h) + 4\operatorname{sen}(x+h) - 3\operatorname{sen} x}{2h}$$

$$\lim_{h \to 0} \frac{-\cos(x+2h)2 + 4\cos(x+h) - 3\cos x}{2}$$

$$= \frac{-2(\cos x \cos 2h - \operatorname{sen} x \operatorname{sen} 2h) + 4(\cos x \cos h - \operatorname{sen} x \operatorname{sen} h) - 3\cos x}{2}$$

$$\lim_{h \to 0}$$

$$= \frac{-2(\cos x) + 4\cos x - 3\cos x}{2}$$

$$= \frac{2\cos x}{2} = \cos x = f'(x)$$

$$\lim_{h \to 0} \frac{\operatorname{Sen}(x+h) - 2\operatorname{Sen}(x) + \operatorname{Sen}(x-h)}{h^2}$$

$$= \lim_{h \to 0} \frac{-\operatorname{Sen}(x+h) - \operatorname{Sen}(x-h)}{2}$$

$$= \frac{-\operatorname{Sen}x\operatorname{Cos}h - \operatorname{Sen}h\operatorname{Cos}x - \operatorname{Sen}x\operatorname{Cos}h + \operatorname{Sen}h\operatorname{Cos}x}{2}$$

$$= -\frac{2\operatorname{Sen}x}{2} = -\operatorname{Sen}x$$

3.

$$C = 3 \cdot 10^8 \, m/s \cdot \frac{1 \, au}{1{,}496 \cdot 10^{11} \, m} \cdot \frac{3{,}154 \cdot 10^7 \, s}{1 \, año}$$

$$= 63248 \, au/año$$