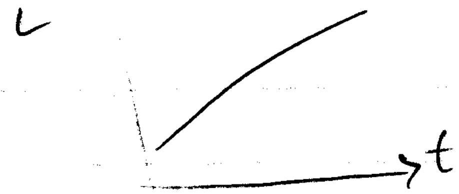
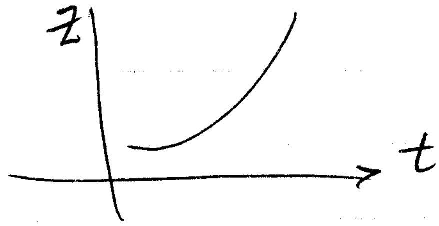
$t=0$ at 1960. Models for $y(t)$ = ppm of $CO_2$




ⓐ $L(t) = \frac{8}{7}t + 315$ $\qquad Z(t) = 315(1.005)^t$ ⓑ

$C(t) = 4\cos 2\pi t + 315$

2. When will $CO_2$ level reach 550 ppm?
1. Predict $CO_2$ level in 2100. $t = \begin{array}{r} 2100 \\ -1960 \\ \hline \end{array} = 140$ yrs

1. ⓐ $L(140) = \frac{8}{7}(140) + 315 =$ ______________ ppm
   This is the amount of $CO_2$ in 2100 if rise is LINEAR

   ⓑ $Z(140) = 315(1.005)^{140} =$ ______________ ppm
   This is the amount of $CO_2$ in 2100 if rise is EXPONENTIAL

2. When will $CO_2$ level reach $y = 550$ ppm? $= L = Z$ Find $t$.

ⓐ $L = \frac{8}{7}t + 315$

$L - 315 = \frac{8}{7}t$

$\frac{7}{8}(L-315) = t$

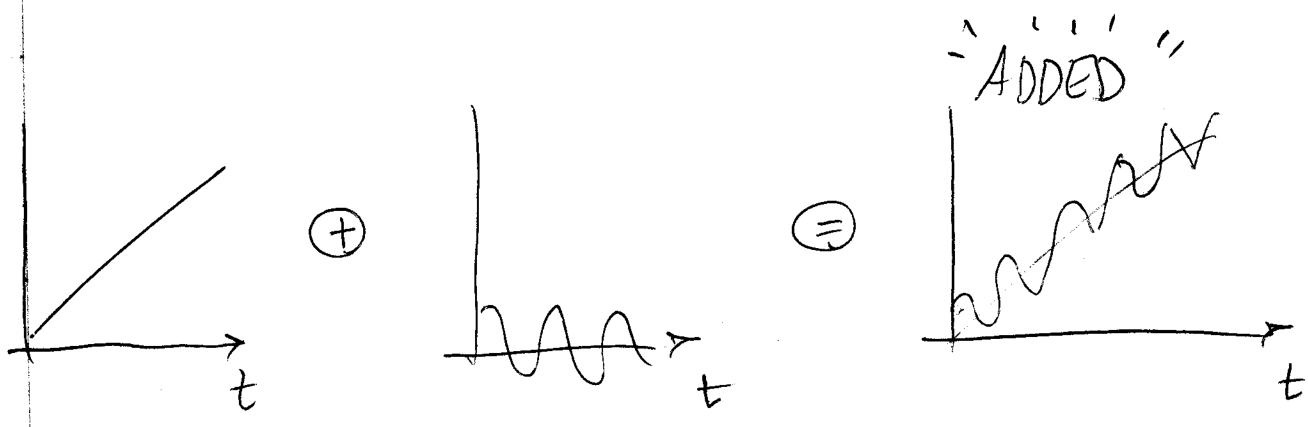
ⓑ $Z = 315(1.005)^t$

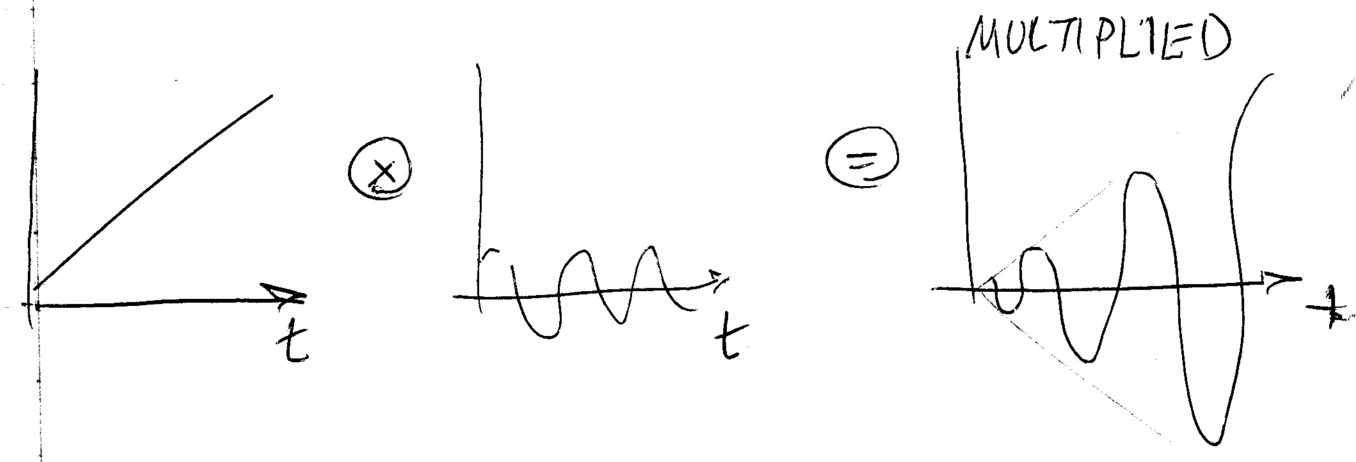
$\ln\left(\frac{Z}{315}\right) = \ln 1.005^t = t\ln 1.005$

$t = \frac{\ln\left(\frac{Z}{315}\right)}{\ln 1.005} =$

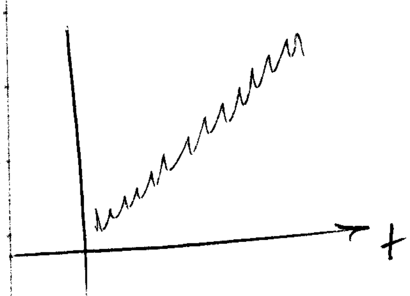
18 Oct 04
EJZ

CORRECTION - How to combine oscillations with smooth functions?

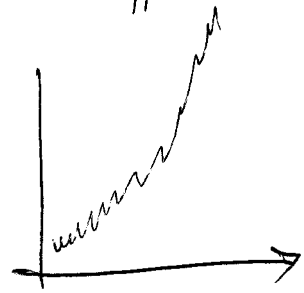



For our $CO_2$ problem, $C(t) = 4\,(\text{ppm}) \cos 2\pi t\,(\text{yr})$




$L + C$ where $L = 315 + \frac{8}{7}t$



$Z + C$ where $Z = 315\,(1.005)^t$