$$x_1(t) = \cos(2\pi f_0 t) = x_1(t) = \cos(2\pi \phi(t))$$

where $\phi(t) = f_0 t$

$$f_{ins}(t) = \frac{d\phi(t)}{dt} = f_0$$

$$x_4(t) = \cos(\pi a t^2) = \cos(2\pi a \phi(t))$$

where $\phi(t) = \frac{a t^2}{2}$

$$f_{ins}(t) = \frac{d\phi(t)}{dt} = at$$

$t = 0$

$f_{ins}(0) = 0$

$t = t_0$

$f_{ins}(t_0) = a t_0$

$a = 1737$

t changes from 0 to 1 and frequency increases linearly therefore min value for frequency:

$f_{ins_{min}}(0) = 0$

and max value for frequency:

$f_{ins_{max}}(1) = 1737$

$$x_5(t) = \cos\left(2\pi\left(-500t^2 + 1600t\right)\right)$$

$$x_5(t) = \cos\left(2\pi\,\phi(t)\right)$$

$$\phi(t) = -500t^2 + 1600t$$

$$f_{ins}(t) = \frac{d\phi(t)}{dt} = -1000t + 1600$$

$$f_{ins}(0) = 1600\,,\quad f_{ins}(1) = 600\,,\quad f_{ins}(2) = -400$$