

Problem:

The velocity time graphs of two objects make angles of 30 and 60 degree's with the time axis find the ratio of their acceleration.

Solution:

Acceleration is defined by the formula:

$$a = \frac{dv}{dt} = \frac{\Delta v}{\Delta t}$$

This value can be calculated as the tangens(tan) function of the velocity time graph angle:

$$a = \tan(\alpha)$$

Thus, the acceleration of this two objects is

$$a_1 = \tan(\alpha_1) = \tan\left(\frac{\pi}{6}\right) = 1/\sqrt{3}$$

$$a_2 = \tan(\alpha_2) = \tan\left(\frac{\pi}{3}\right) = \sqrt{3}$$

If in given graph velocity is defined in m/s units, then acceleration calculated above has units $\frac{m}{s^2}$ accordingly.

Answer: $a_1 = 1/\sqrt{3}$, $a_2 = \sqrt{3}$.