A child of mass 21 kg sits on a carousel. The child is 4.8 m from the center. The carousel rotates at a constant speed and completes a rotation every 5.9 seconds.

What is the magnitude of the parallel force?

There is no parallel force.

What is the magnitude of the perpendicular force?

$$|\vec{F}_\perp| = \frac{mv^2}{r}$$

$$= \frac{m\left(\frac{d}{t}\right)^2}{r}$$

$$= \frac{m\left(\frac{2\pi r}{t}\right)^2}{r}$$

$$= \frac{\frac{m4\pi^2 r^2}{t^2}}{r}$$

$$= \frac{4\pi^2 m r^2}{t^2} \cdot \frac{1}{r}$$

$$= \frac{4\pi^2 mr}{t^2}$$

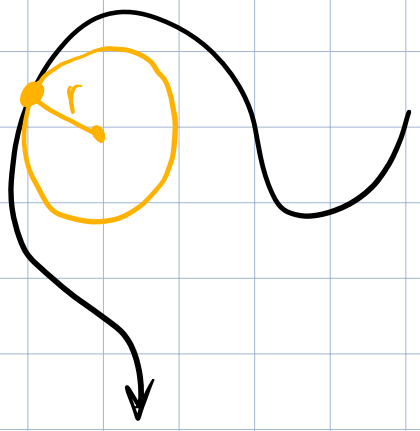
$$= 114.318 \ \frac{kgm}{s^2}$$

What is the magnitude of the net force acting on the child?

$$|\vec{F}_{net}| = |\vec{F}_\perp|$$

$= 114.318\ N$

A proton of mass $1.7e^{-27}$ follows the path. It has a constant speed of 4.0eS and the kissing circle has a radius of 0.08m.



What is the magnitude of the parallel force?

Zero because the speed is constant.

What is the magnitude of the perpendicular force?

$$|\vec{F}_\perp| = \frac{mv^2}{r}$$

$$= 3.4e^{-15}\ \frac{kgm}{s^2}$$