Centripetal Force

Since centripetal acceleration is directed toward the centre of the circle, the net force must also be directed toward the centre of the circle!

Starting from Newton's Second Law, $\Sigma F = ma$, replace the linear acceleration, a, with the centripetal acceleration, a_c . Thus, we get:

$$\Sigma F = \frac{mv^2}{r}$$

This equation can be combined with the other forms of the equation for centripetal acceleration to yield:

$$\Sigma F = \frac{mv^2}{r} = \frac{4\pi^2 mr}{T^2} = 4\pi^2 mrf^2$$