$\Rightarrow 10 \sin A + 10\mu \cos A = 10 \quad \ldots ②$

Adding equations ① and ② we get

$20 \sin A = 12$

$\Rightarrow \sin A = \frac{3}{5}$

$\Rightarrow A = \sin^{-1}\left(\frac{3}{5}\right) = 36.87°$

(ii) From equation ② we get

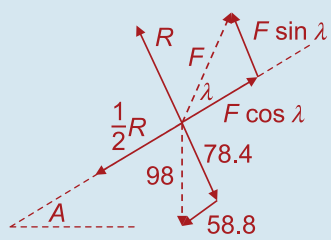
$10\left(\frac{3}{5}\right) + 10\mu\left(\frac{4}{5}\right) = 10$

$\Rightarrow 6 + 8\mu = 10$

$\Rightarrow 8\mu = 4$

$\Rightarrow \mu = \frac{1}{2}$

(iii) The force diagram therefore looks like this:



$R + F \sin \lambda = 78.4$

$\Rightarrow R = 78.4 - F \sin \lambda$

$\frac{1}{2}R + 58.8 = F \cos \lambda$

$\Rightarrow R = 2F \cos \lambda - 117.6$

$\Rightarrow 78.4 - F \sin \lambda = 2F \cos \lambda - 117.6$

$\Rightarrow F(2 \cos \lambda + \sin \lambda) = 196$

$\Rightarrow F = \frac{196}{2 \cos \lambda + \sin \lambda}$

$= 196(2 \cos \lambda + \sin \lambda)^{-1}$

$\Rightarrow \frac{dF}{d\lambda} = -196(2 \cos \lambda + \sin \lambda)^{-2}(-2 \sin \lambda + \cos \lambda)$

$\Rightarrow \frac{dF}{d\lambda} = \frac{196(\cos \lambda - 2 \sin \lambda)}{(2 \cos \lambda + \sin \lambda)^2}$

Putting $\frac{dF}{d\lambda} = 0$ we get

$\cos \lambda - 2 \sin \lambda = 0$

$\Rightarrow 1 - 2 \tan \lambda = 0$

$\Rightarrow \tan \lambda = \frac{1}{2}$

$\Rightarrow \sin \lambda = \frac{1}{\sqrt{5}}$ and $\cos \lambda = \frac{2}{\sqrt{5}}$

$F = \frac{196}{2 \cos \lambda + \sin \lambda}$

$= \frac{196}{\frac{4}{\sqrt{5}} + \frac{1}{\sqrt{5}}}$

$= \frac{196}{\frac{5}{\sqrt{5}}}$

$= \frac{196}{\sqrt{5}}$ N