x-component

$$\Sigma F_x = F_N \sin\theta + F_s \cos\theta$$

$$F_s = \mu_s \cdot F_N$$

$$\Sigma F_x = F_N \sin\theta + \mu_s \cdot F_N \cos\theta$$

$$ma_c = F_N \sin\theta + \mu_s \cdot F_N \cos\theta$$

$$\frac{mv^2}{r} = F_N(\sin\theta + \mu_s \cdot \cos\theta)$$

$$\frac{\frac{mv^2}{r}}{(\sin\theta + \mu_s \cdot \cos\theta)} = F_N$$

y-component

$$\Sigma F_y = F_N \cos\theta - F_s \cdot \sin\theta - F_g$$

$F_s = \mu_s \cdot F_N$, $F_g = mg$

$\Sigma F_y = 0$ (not slipping up or down the incline)

$\therefore a_y = 0$

$$0 = F_N \cos\theta - \mu_s \cdot F_N \sin\theta - mg$$

$$mg = F_N \cos\theta - \mu_s \cdot F_N \sin\theta$$

$$mg = F_N(\cos\theta - \mu_s \cdot \sin\theta)$$

$$\frac{mg}{(\cos\theta - \mu_s \cdot \sin\theta)} = F_N$$

equate the 2 F_N's together

*this is F_c = 5835.4 N (part B)

$$\frac{\frac{mv^2}{r}}{(\sin\theta + \mu_s \cdot \cos\theta)} = \frac{mg}{(\cos\theta - \mu_s \cdot \sin\theta)}$$

$$\frac{5835.4}{(\sin 10 + \mu_s \cos 10)} = \frac{1000 \times 9.8}{(\cos 10 - \mu_s \cdot \sin 10)}$$

cross multiply

$$5835.4(\cos 10 - \mu_s \cdot \sin 10) = 9800(\sin 10 + \mu_s \cos 10)$$

$$5746.75 - \mu_s(1013.30) = 1701.75 + \mu_s(9651.12)$$

$$5746.75 - 1701.75 = \mu_s(9651.12) + \mu_s(1013.30)$$

$$4045 = \mu_s(10664.42)$$

$$\frac{4045}{10664.42} = \mu_s$$

$$\boxed{0.379 = \mu_s}$$