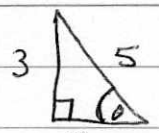
1) $\tan\theta = \frac{3}{4} = \frac{O}{A}$



$\cos\theta = \frac{4}{5}$

$\sin\theta = \frac{3}{5}$

perp to plane: $R = 2g\cos\theta$

$= 2g\left(\frac{4}{5}\right)$

$= \frac{8}{5}g$

$F = ma$

$2g\sin\theta - 0.2\left(\frac{8}{5}g\right) = 2a$

$2g\left(\frac{3}{5}\right) - \frac{8}{25}g = 2a$

$\frac{6}{5}g - \frac{8}{25}g = 2a$

$\frac{22}{25}g = 2a$

$\frac{11}{25}g = a$

$a = \frac{11}{25}g \ ms^{-2}$ [4.3 ms^{-2} 2sf]

2a/ perp to plane: $R = 10 \cos 30$

$R = 5\sqrt{3}$ N

parallel to plane: $12 = 10 \sin 30 + \mu R$

$12 = 5 + 5\sqrt{3}\mu$

$7 = 5\sqrt{3}\mu$

$\mu = \underline{0.81}$ (2 sf)

b/ $R = 5\sqrt{3}$.

Max friction $= \mu R$

$= 0.81 \cdot 5\sqrt{3}$

$= \underline{7}$ N

Forces acting down the plane: $10 \sin 30$

$\underline{5}$ N

The brick does not move. The force acting down the plane is less than the max value of friction.

3a/ perp. to plane: $R = 12 \sin 30 + 10 \cos 30$

$= 6 + 5\sqrt{3}$

parallel to plane: $12 \cos 30 = \mu R + 10 \sin 30$

$6\sqrt{3} = \mu(6 + 5\sqrt{3}) + 5$

$\mu = \dfrac{6\sqrt{3} - 5}{6 + 5\sqrt{3}}$

$\mu = 0.37$ 2sf

b/ perp to plane: $R = 10 \cos 30$

$= 5\sqrt{3}$

Friction max $= \mu R$

$= 0.37 \cdot 5\sqrt{3}$

$= 3.185\ldots$ N

Force acting down the plane $= 10 \sin 30$

$= 5$ N

The brick will accelerate down the plane.

$5 > 3.2$