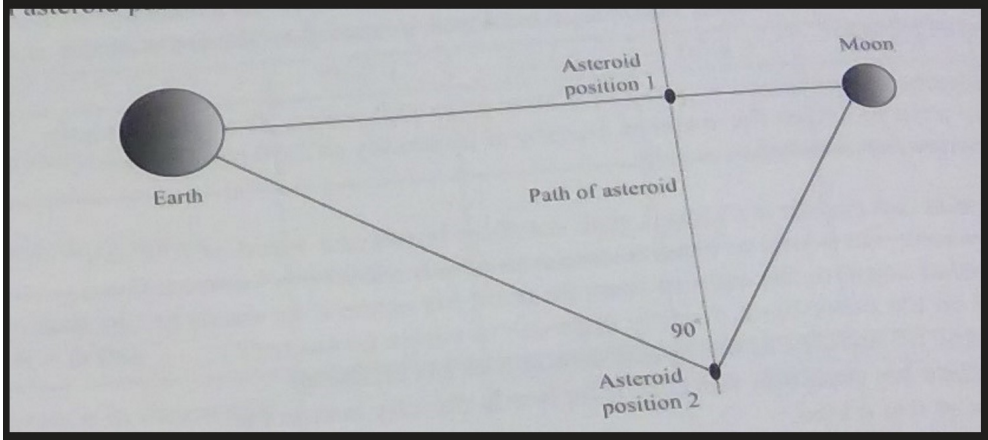
A small asteroid passes between the Earth and the Moon.



The Earth attracts it with a force of 480 N and the moon attracts it with a force of 53.2 N when the asteroid is in position 1. When the asteroid reaches position 2 the forces are 359 N and 13.1 N respectively. Determine the net force on the asteroid in position 1 and 2.

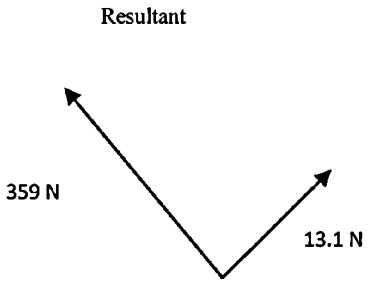
$\Sigma F = (-480) + (+53.2)$
$\Sigma F = -426.8$ N
$\Sigma F = 426.8$ N towards Earth

Position 2

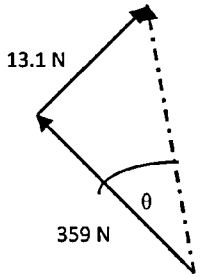
$\Sigma F = \sqrt{(359^2 + 13.1^2)}$
$\Sigma F = 359.2$ N

$\tan \theta = 13.1 / 359.$
$\theta = 2.09^0$

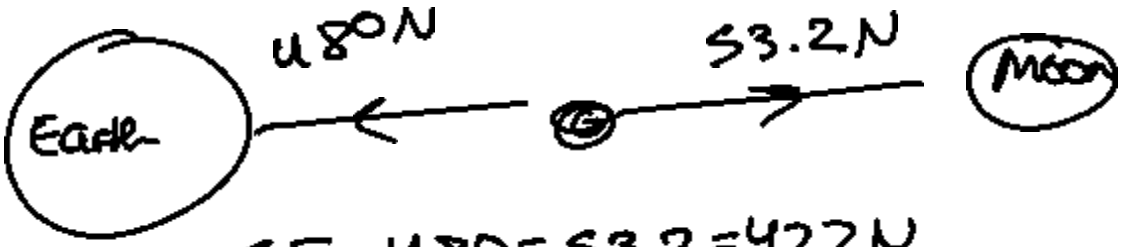
Actual Situation



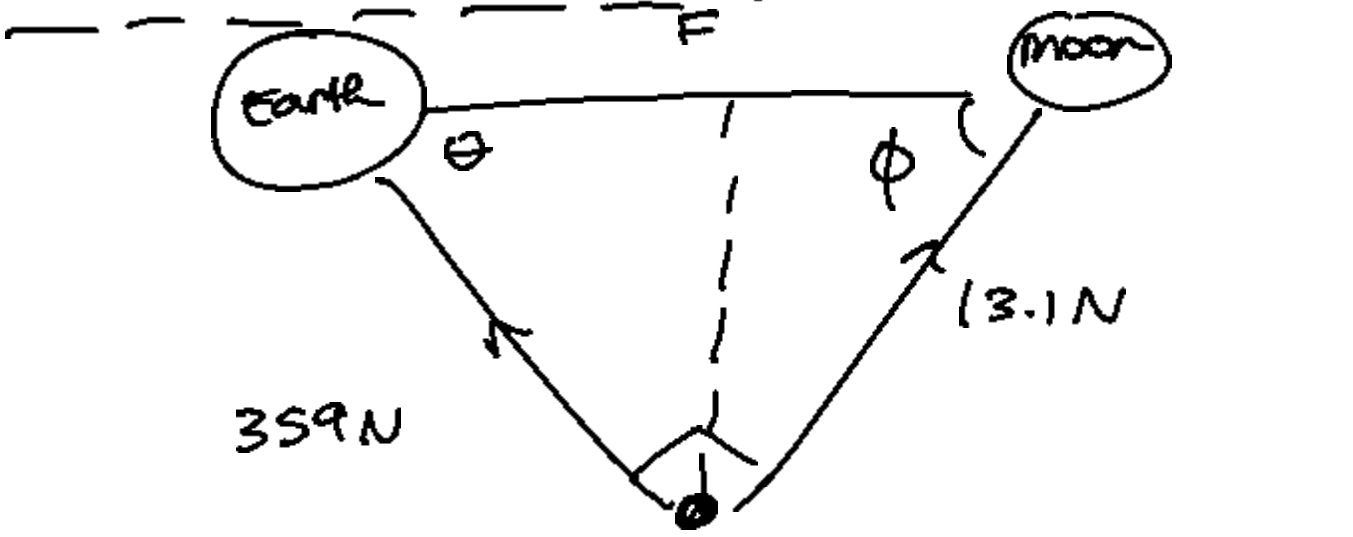
Situation according to Σ F



$\Sigma F = 359$ N at 2.09^0 away from the line joining the asteroid to the earth. Angle bends towards the moon.



$\Sigma F = 480 - 53.2 = 427\,N$ towards the Earth



$F = \sqrt{359^2 + 13.1^2} = 359\,N$

$F_{(Earth)} = 359\cos 2.09 = 358.9\,N$ to Earth

$\frac{359}{\sin 90} = \frac{13.1}{\sin \theta} \rightarrow \theta = 2.09$

$\phi = 180 - 90 - 2.09 = 88°$

$F_{(moon)} = 13.1 \cos 88 = 0.478\,N$ to moon

$\Sigma F = 359 - 0.478 = 358\,N$ to Earth