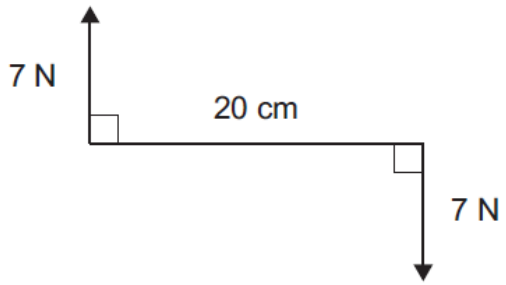
AQA – Centre of mass and moments – A2 Further Mathematics Mechanics

1. June/2021/Paper_7367/3M/No.2

A force of magnitude 7 N acts at each end of a rod of length 20 cm, forming a couple.

The forces act at right angles to the rod, as shown in the diagram below.



Find the magnitude of the resultant moment of the couple.

Circle your answer.

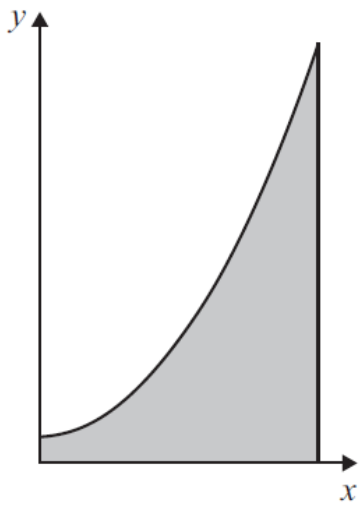
[1 mark]

1.4 N m 2.8 N m 140 N m 280 N m

2. June/2021/Paper_7367/3M/No.5

A uniform lamina has the shape of the region enclosed by the curve $y = x^2 + 1$ and the lines $x = 0$, $x = 4$ and $y = 0$

The diagram below shows the lamina.



(a) Find the coordinates of the centre of mass of the lamina, giving your answer in exact form.

[4 marks]

(b) The lamina is suspended from the point where the curve intersects the line $x = 4$ and hangs in equilibrium.

Find the angle between the vertical and the longest straight edge of the lamina, giving your answer correct to the nearest degree.

[3 marks]