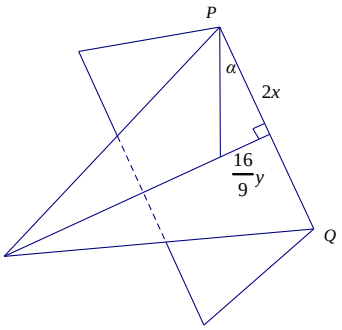
<table>
<tr><th>Question</th><th>Scheme</th><th>Marks</th><th>Notes</th></tr>
<tr><td colspan="4">They must have a dissection for which they should know or find the position of the centre of mass (e.g. triangles and rectangles). A false assumption about the position of the centre of mass of a trapezium results in 0/5.</td></tr>
<tr><td rowspan="4">3a</td><td><table><tr><td></td><td>Large tri</td><td>Small tri</td><td>Small tri</td><td>Whole</td></tr><tr><td>Dist PQ</td><td>0</td><td>-2y</td><td>2y</td><td>d</td></tr><tr><td>Mass ratio</td><td>27xy</td><td>12xy</td><td>12xy</td><td>27xy</td></tr></table></td><td>B1

B1</td><td>Correct distances from PQ or a parallel axis for their complete dissection
Correct mass ratios for a complete dissection</td></tr>
<tr><td>Moments about PQ:</td><td>M1</td><td>Or a parallel axis. Dimensionally correct. Need all non-zero terms and no extras. Condone sign error(s). Allow for $\pm d$
Check the logic carefully.</td></tr>
<tr><td>$(27xy\times 0)-12xy\times(-2y)+12xy\times 2y=27xyd$</td><td>A1</td><td>Correct unsimplified equation. Allow for $\pm d$
Allow for correct distance from a parallel axis</td></tr>
<tr><td>$d=\frac{48}{27}y=\frac{16}{9}y$ *</td><td>A1*</td><td>Obtain given result from fully correct working.</td></tr>
<tr><td colspan="4">There are many different approaches to this.
NB If they are using a trapezium they must show method for the distance. For PQBC the correct value for distance centre of mass from PQ is $\frac{8y}{5}$
Possible alternative moments equations include:
$15xy\times\frac{8y}{5}+9xy\times\frac{4y}{3}+3xy\times 4y=27xyd$ using PQBC, PQDE and DEA
$12xy\times 2y+15xy\times\frac{8y}{5}=27xyd$ using PQA and PQBC
$2\times 3xy\times y-3xy\times y+2\times 6xy\times 1.5y+2\times 3xy\times 2y=27xyd$ working from BC for the folded figure.
$2\times 3xy\times 2y+4\times\frac{1}{2}3xy\times y+2\times 6xy\times 1.5y+3xy\times 4y=27xyd$ working down from PQ</td></tr>
<tr><td></td><td></td><td>(5)</td><td></td></tr>
</table>

Question	Scheme	Marks	Notes
3b			
	Use of trigonometry	M1	Trig ratio for a relevant angle In their working they need a valid attempt to find α or $90°-\alpha$.
	$\tan\alpha=\frac{\frac{16}{9}y}{2x}=\frac{64}{81}$	A1	Correct unsimplified equation in x and y
	$\Rightarrow x=\frac{9}{8}y$	A1	Correct only. $\left(x=1.125y\right)$ (Accept $x=1.1y$ or better)
		(3)	