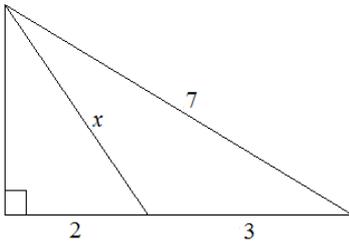


2018 Year 11 math topic test: Geometry © itute 2018

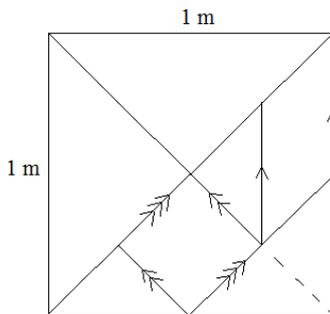
Q1 Find the exact length of the side labelled as x in the following diagram.

2 marks



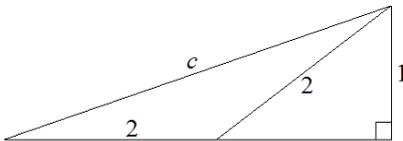
Q2 Find the total length of all the **solid** straight lines in the following square with side length of 1 m.

3 marks



Q3 Find the exact value of c^2 .

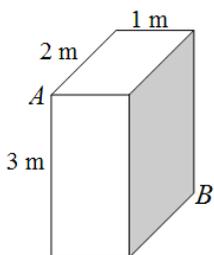
2 marks



Q4 The dimensions of a cuboid are 1 m, 2 m and 3 m as shown below.

a. Find the shortest distance from vertex A to vertex B **through the inside** of the cuboid.

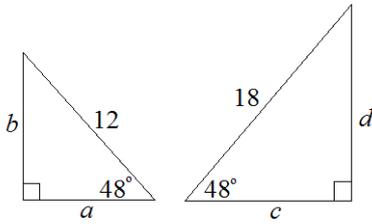
2 marks



b. Find the shortest distance from vertex A to vertex B travelling **on the surface** of the cuboid. 4 marks



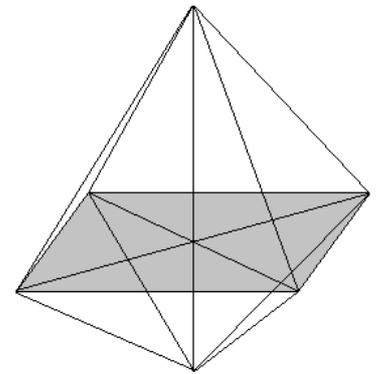
Q5 Find the exact value of each of the ratios $\frac{b}{d}$, $\frac{c}{a}$ and $\frac{a}{12}$. 3 marks



Q6 A solid consists of two regular pyramids sharing the same **square** base (shaded) as shown below. The height of the tall pyramid (top pyramid) is twice the height of the shorter pyramid (bottom pyramid).

a. Find the exact value of the ratio
volume of the top pyramid : volume of the bottom pyramid.

2 marks



The height of the top pyramid is equal to the side length of its base.

b. If the two pyramids share the same base, find the exact value of the ratio
exposed surface area of the top pyramid : exposed surface area of the bottom pyramid.

3 marks

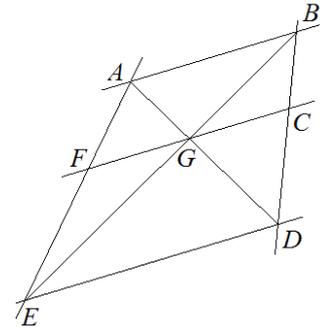
c. If the two pyramids are separated, find the exact value of the ratio
surface area of the top pyramid : surface area of the bottom pyramid.

2 marks

Q7 In the diagram below, AB , FC and ED are parallel lines, and AD , FC and BE intersect at G .

Prove that $AF \times ED = EF \times AB$

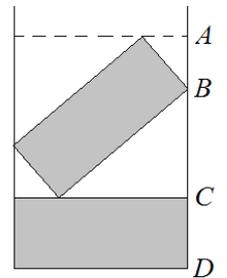
4 marks



Q8 Two identical bricks are placed between two vertical partitions as shown in the diagram below.

Show that $AD = 2 \times BC$.

4 marks

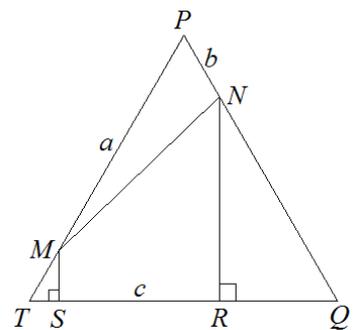


Q9 In the diagram below, $\triangle PQT$ is equilateral. M and N are any points on two sides of the triangle.

$MP = a$, $NP = b$ and $RS = c$.

Show that c is the mean of a and b , i.e. $c = \frac{a+b}{2}$. Do not use trigonometry.

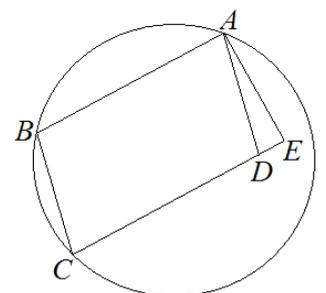
4 marks



Q10 In the following diagram, vertices A , B and C of parallelogram $ABCD$ are on the circumference of the circle, and $\angle AED = 90^\circ$.

If $\triangle AED$ is reflected in the line AE , prove that the resulting figure is a cyclic quadrilateral.

4 marks

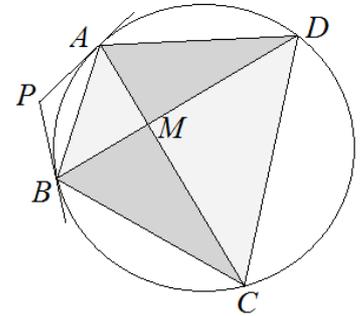




Q11 Diagonals AC and BD of cyclic quadrilateral $ABCD$ in the following diagram are perpendicular and they intersect at M . PA and PB are tangents to the circle.

a. Prove that $MA \times MC = MB \times MD$.

2 marks



b. Hence show that $\text{area of } \triangle MAD \times \text{area of } \triangle MBC = \text{area of } \triangle MAB \times \text{area of } \triangle MDC$.

2 marks

c. Prove that $\triangle PAB$ is isosceles.

3 marks

Q12 In the diagram below, $\triangle ABC$ is equilateral and $\angle CDE = 30^\circ$.

Prove that $AB = AD$.

4 marks

