Area and Volume

Past Exam Questions

Maths - Ordinary Level

Q7 2013

Two identical cylindrical tanks, A and B, are being filled with water. At a particular time, the water in tank A is 25 cm deep and the depth of the water is increasing at a steady rate of 5 cm every 10 seconds. At the same time the water in tank B is 10 cm deep and the depth of the water is increasing at a steady rate of 7·5 cm every 10 seconds.

(a) Draw up a table showing the depth of water in each tank at 10 second intervals over two minutes, beginning at the time mentioned above.

(b) Each tank is 1 m in height. Find how long it takes to fill each tank.

Tank A:

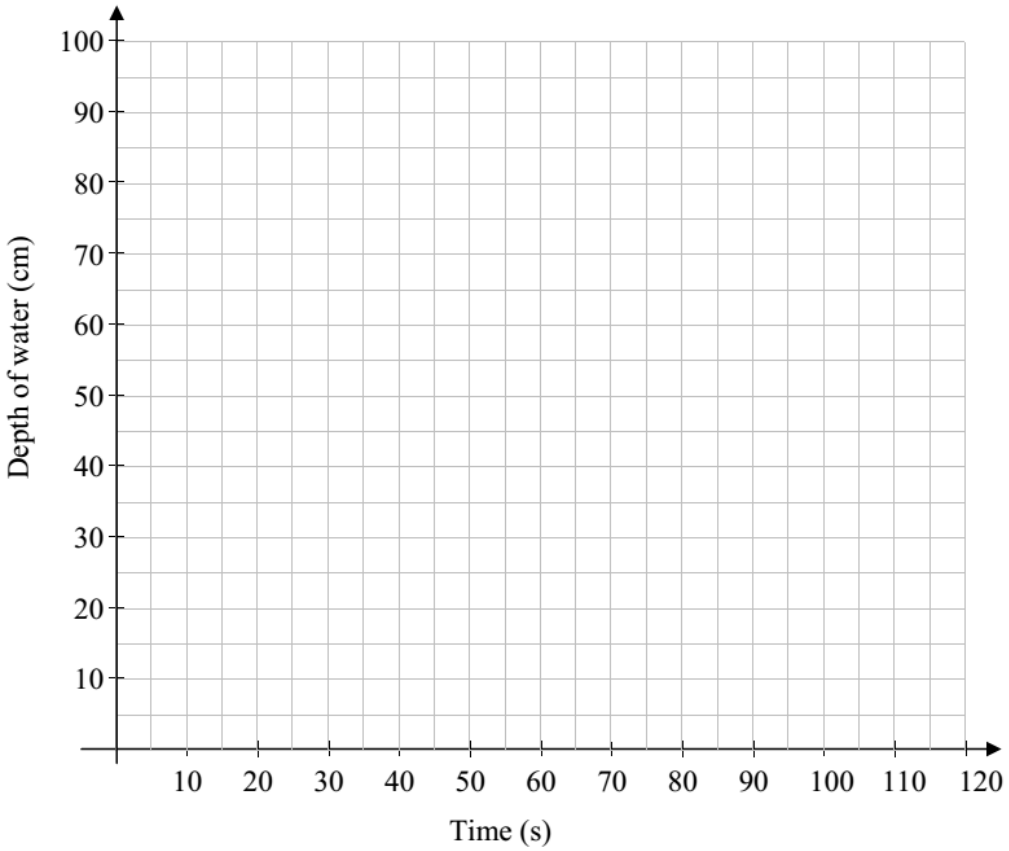
Tank B:

(c) For each tank, write down a formula which gives the depth of water in the tank at any given time. State clearly the meaning of any letters used in your formulas.

Tank A:

Tank B:

(d) For each tank, draw the graph to represent the depth of water in the tank over the 2 minutes.



(e) Find, from your graphs, how much time passes before the depth of water is the same in each tank.

Answer: _____

(f) Verify your answer to part **(e)** using your formulas from part **(c)**.

Q5 2013

Question 5 **(25 marks)**

(a) In a triangle ABC, the lengths of the sides are a, b and c. Using a formula for the area of a triangle, or otherwise, prove that

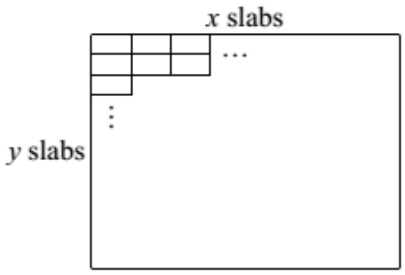
$$\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B} = \frac{c}{\sin \angle C}.$$

(b) In a triangle XYZ, $|XY| = 5$ cm, $|XZ| = 3$ cm and $|\angle XYZ| = 27°$.

(i) Find the two possible values of $|\angle XZY|$. Give your answers correct to the nearest degree.

Q9 (b) 2012

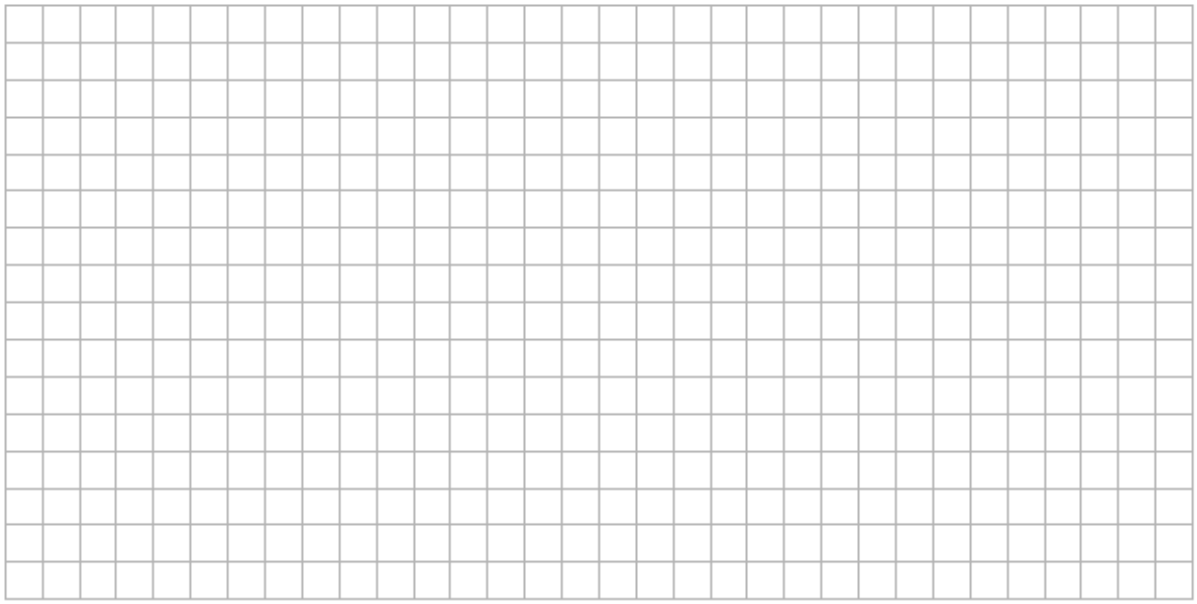
(b) Garden paving slabs measure 40 cm by 20 cm. The slabs are to be arranged to form a rectangular paved area. There are x slabs along one side and y slabs along an adjacent side, as shown.



(i) Write the length of the perimeter, in centimetres, in terms of x and y.

(ii) The material being used for edging means that the perimeter is to be 64 metres. Find y in terms of x.

(iii) Find the value of x for which the paved area is as large as possible.

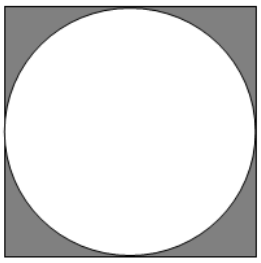


(iv) Find the number of slabs needed to pave this maximum area.

Question 5 2012 Paper 2

Question 5 **(25 marks)**

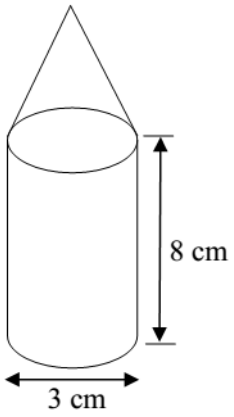
(a) The diagram shows a circle inscribed in a square.
The area of the square is 16 cm^2.



(i) Find the radius length of the circle.

(ii) Find the area of the shaded region, in cm^2, correct to one decimal place.

(b) A solid wax candle is in the shape of a cylinder with a cone on top, as shown in the diagram.



The diameter of the base of the cylinder is 3 cm and the height of the cylinder is 8 cm.

The volume of the wax in the candle is $21\pi \text{ cm}^3$.

(i) Find the height of the candle.

(ii) Nine of these candles fit into a rectangular box. The base of the box is a square. Find the volume of the smallest rectangular box that the candles will fit into.