

**Problem Solving GCSE Questions 6**

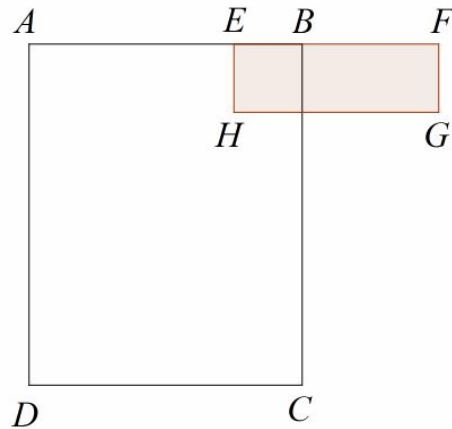
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(1) Jane wakes up on Christmas Eve. She looks at her clock and it reads 05:18.

Given that the clock is 21 minutes fast, how long will it be until it is Christmas Day?

Give your answer in hours and minutes.

(2) The diagram below shows the rectangles  $ABCD$  and  $EFGH$ . The points  $A, E, B$  and  $F$  lie on a straight line.



$$CD = 4cm$$

$$AD = 5cm$$

$$AB = 4EB$$

$$BC = 5EH$$

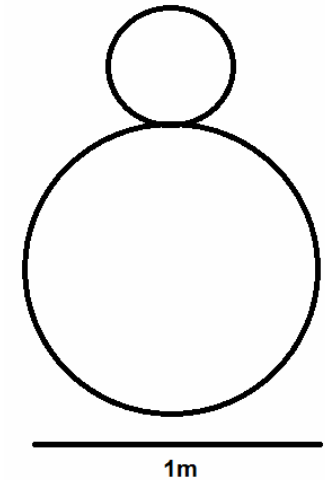
$$BF = 2EB$$

Find the area of rectangle  $EFGH$ .

You must show clearly your working.

(3) Kate is making a Christmas cake. The ratio of flour to sugar to treacle to almonds to butter is 4:3:2:1:1. The weight of the cake is reduced by 10% after it's baked. Given that Kate uses 150g of treacle in the mix, find the weight of the cake after it is baked.

(4) A snow man is made of two perfectly spherical balls of snow. The sphere used for the head is half the size of the sphere used for the body.

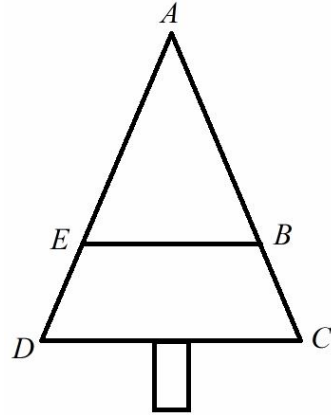


Find the volume of the head of the snowman as a percentage of the volume of body of the snowman.

The volume of a sphere is  $V = \frac{4}{3}\pi r^3$

(5) Santa is riding on his sleigh. He has 500 miles to travel to deliver all the presents he needs to. He can average 30mph on his sleigh when he is delivering the presents. Santa leaves his grotto at midnight. Given that the number of miles travelled is correct to the nearest 10 miles and his speed correct to the nearest 1mph, show that he can't guarantee that he will arrive back at his grotto by 5pm.

(6) Below is a picture of a large Christmas tree. (7) A 1m cube of gold is melted down in 100 equal sized cubes. Find the dimensions of one of the 100 cubes. You must give your answer in cm correct to 3 significant figures.



$EB$  and  $DC$  are parallel.

$$AB = 6m$$

$$BC = 3m$$

$$EB = 4.5m$$

Find:

- (a) The length  $DC$
- (b) The height of the tree given that the trunk is 2m long.

(8) Below is a circle with centre  $O$ . The line  $AB = 9cm$  and is a tangent to the circle. Given that angle  $OAB = 20^\circ$ , find the area of the shaded sector.

