

## General Paper 2 Exam Solutions 2007

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1. Given the train travels at an average speed of 144 km/hr.  
The train takes 1 hour 15 minutes to travel from Dingwall to Aberdeen.

The distance between Dingwall and Aberdeen is:

First convert time to hours only

$$1 \text{ hour } 15 \text{ minutes} = 1\frac{15}{60} = 1.25 \text{ hours}$$

$$D = S \times T = 144 \times 1.25 = 180 \text{ km}$$

2. Given the bricklayer uses 7500 bricks to build a wall, each brick costs 23pence and a charge of £200 is made for every 500 bricks laid.

In total the wall costs:

$$7500 \div 500 = 15$$

$$\text{Total} = 7500 \times 0.23 + 15 \times 200 = \text{£}4725$$

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3. Given the check-up prices and that the family have 2 dogs and a cat. The 2 dogs had 2 check-ups each and the total cost for check-ups for the 2 dogs and the cat was £105.25.

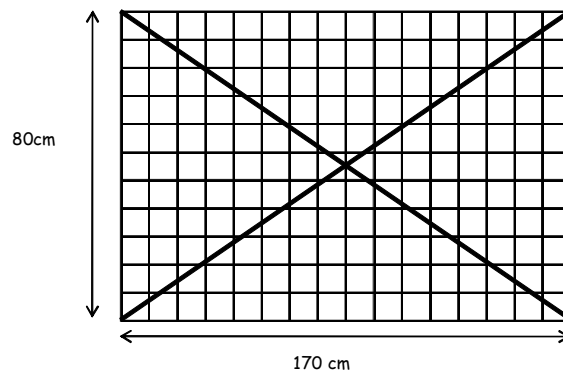
Number of check-ups for the cat was:

$$\text{Dogs cost} = 2 \times 2 \times \text{£}17.50 = \text{£}70$$

$$\text{Cat cost} = \text{£}105.25 - \text{£}70 = \text{£}35.25$$

$$\text{Cat check-ups} = \text{£}35.25 \div \text{£}11.75 = 3$$

4. Given the rectangular metal grid. The length of one diagonal metal bar is:



Using Pythagoras Theorem

$$c^2 = a^2 + b^2$$

$$c^2 = (170)^2 + (80)^2$$

$$c^2 = 35300$$

$$c = \sqrt{35300} = 187.88 = 188\text{cm (to the nearest cm)}$$

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5. (a) Simplifying  $2(3x+7)+4(3-x)$  we get:

$$2(3x+7)+4(3-x) = 6x+14+12-4x = 10x+26$$

- (b) Solving the inequality  $4a-3 \geq 21$  we get:

$$4a-3 \geq 21$$

$$4a \geq 21+3$$

$$4a \geq 24$$

$$a \geq \frac{24}{4}$$

$$a \geq 6$$

6. Give the diagram of the kite. The length of DF is:

Using the symmetry of the kite.  $DE = 14\text{cm}$

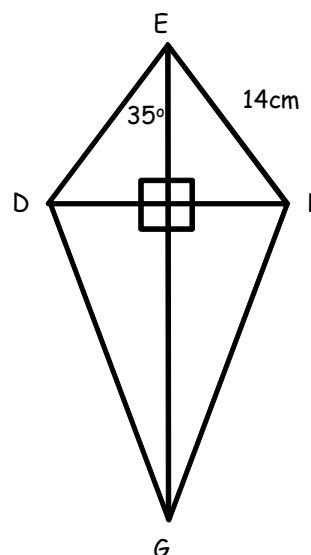
$\frac{1}{2}$  of DF will be

Using  $S^{\circ}HC^{\wedge}HT^{\circ}A$

$$\sin 35^{\circ} = \frac{x}{14}$$

$$x = 14 \times \sin 35^{\circ} = 8\text{cm}$$

Hence DF is  $2 \times 8 = 16\text{cm}$

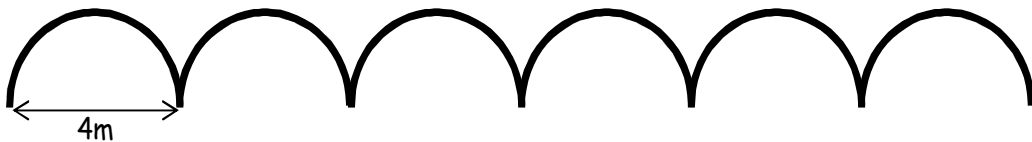


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7. Given the diagram and each semi-circle has diameter 4cm.

- (a) The length of the curved section of one of the semi-circles is:



$$\begin{aligned} \text{Curve length} &= \frac{1}{2} \times \pi \times D \\ &= \frac{1}{2} \times \pi \times 4 \\ &= 6.28\text{m} \end{aligned}$$

- (b) Given Tony has 40m of fairy lights. To find out whether this will cover the edge of the canopy we have:

$$\text{Total Curve length} = 6 \times 6.28 = 37.68\text{m}$$

So Tony will have enough to cover the edge of the canopy.

8. Given Sally invests £4200 in the bank at a rate of 6.3% interest per annum.

The amount of simple interest after 10 months will be:

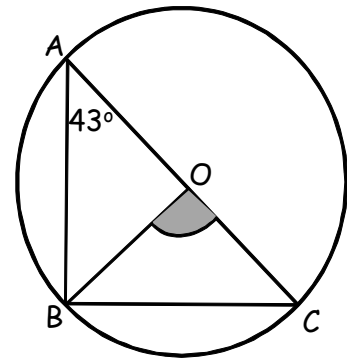
$$\begin{aligned} \text{Interest for 1 month} &= £4200 \times 6.3 \div 100 \div 12 = £22.05 \\ \text{Interest for 10 months} &= 22.05 \times 10 = £220.50 \end{aligned}$$

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9. Given the diagram,  $AC$  is a diameter of the circle,  $B$  is point on the circle and  $BAC$  is  $43^\circ$ . The size of shaded angle  $BOC$  is:

Triangle  $AOB$  is isosceles  
 Hence  $\angle ABO$  is  $43^\circ$   
 Angles in a triangle add to  $180^\circ$   
 $\angle AOB$  is  $180^\circ - 86^\circ = 94^\circ$   
 By straight line property  
 $\angle BOC$  is  $180^\circ - 94^\circ = 86^\circ$



10. (a) Given the diagram of the grain hopper.  
 The area of the end face is:

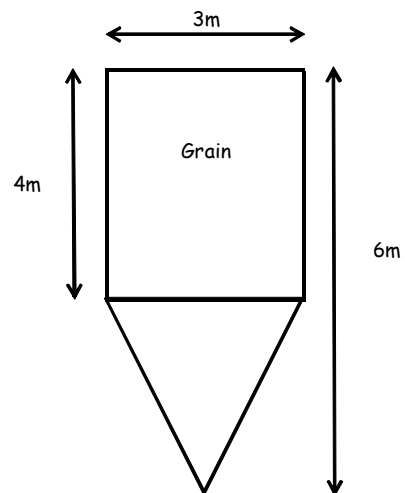
The area will be:  

$$\text{Area} = l \times b + \frac{1}{2} \times \text{base} \times \text{height}$$

$$= 4 \times 3 + \frac{1}{2} \times 3 \times (6-4)$$

$$= 12 + 3$$

$$= 15\text{m}$$



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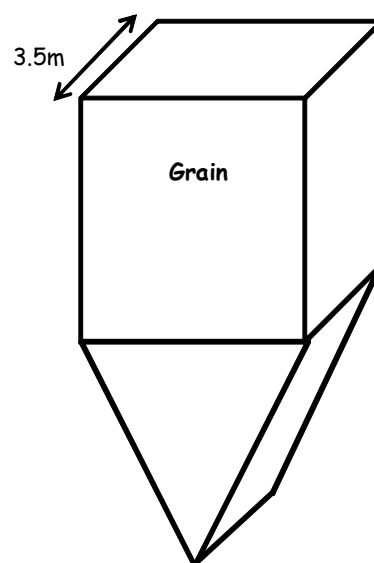
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- (b) Given the grain hopper is in the shape of a prism.  
The length is 3.5m.

$$\text{Volume} = A \times L$$

$$\text{Volume} = 3.5 \times 15 = 52.5\text{m}^3$$



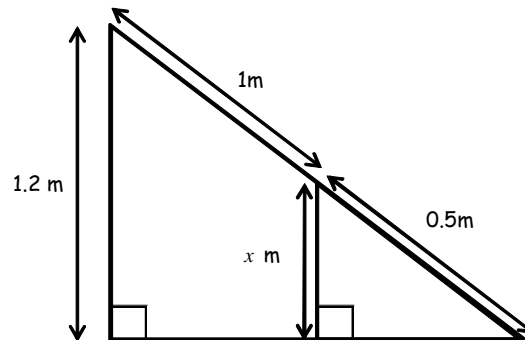
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11. Given the diagram of the mathematically similar triangles below.  
To find  $x$  we have:

$$\text{RSF} = \frac{1.2}{1.5} = \frac{x}{0.5}$$

$$x = 0.5 \times \frac{1.2}{1.5} = 0.4\text{m}$$



12. Given the burning time,  $t$  minutes, of a candle varies directly as its height,  $h$  millimetres. A candle of 75 millimetres burns for 180 minutes.
- (a) To find the burning time of a 40 millimetres candle is:

$$t \propto h$$

$$t = kh$$

$$180 = k75$$

$$k = \frac{180}{75} = 2.4$$

$$t = 2.4h$$

- (b) Given a candle burns for  $2\frac{1}{2}$  hours.

- (c) The height of the candle would be:

$$2\frac{1}{2}\text{ hours} \rightarrow 2 \times 60 + 30 = 210 \text{ minutes}$$

$$t = 2.4h$$

$$h = \frac{210}{2.4} = 87.5 \text{ millimetres}$$