

Credit Mathematics – 2007 – Paper 2

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1. Alistair buys an antique chair for £600.
It is expected to increase in value at the rate of 4.5% each year.
How much is it expected to be worth in 3 years?

2. Solve the equation
$$3x^2 - 2x - 10 = 0$$

Give your answer **correct to 2 significant figures**.

3. (a) During his lunch hour, Luke records the number of birds that visit his bird-table.
The numbers recorded last week were:
$$28 \quad 32 \quad 14 \quad 19 \quad 18 \quad 26 \quad 31$$

Find the mean and standard deviation for this data.

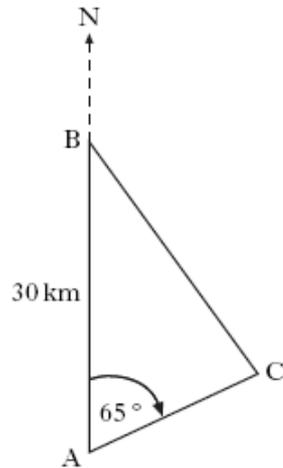
(b) Over the same period, Luke’s friend, Erin also recorded the number of birds visiting her bird-table.
Erin’s recordings have a mean of 25 and a standard deviation of 5.
Make **two** valid comparisons between the friends’ recordings.

4. Solve the inequality
$$\frac{x}{4} - \frac{1}{2} < 5$$

5. Mark takes some friends out for a meal.
The restaurant adds a 10% service charge to the price of the meal.
The **total** bill is £148.50
What was the price of the meal.

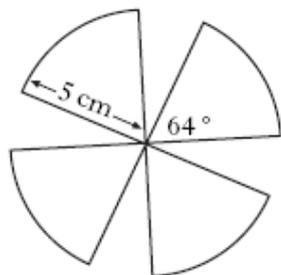
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6. Brunton is 30 kilometres due North of Appleton.
 From Appleton, the bearing of Carlton is 065°
 From Brunton, the bearing of Carlton is 153°



Calculate the distance between Brunton and Carlton.

7. A fan has four identical plastic blades.



Each blade is a sector of a circle of radius 5 centimetres.

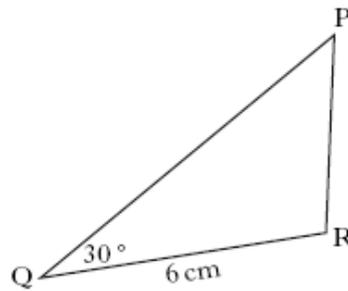
The angle at the centre of each sector is 64°

Calculate the **total** area of plastic required to make the blades.

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8. In triangle PQR

- $QR = 6$ centimetres
- Angle $PQR = 30^\circ$
- Area of triangle PQR = 15 square centimetres.



Calculate the length of PQ.

9. To make “14 carat” gold, copper and pure gold are mixed in the ratio 5:7.

A jeweler has 160 grams of copper and 245 grams of pure gold.

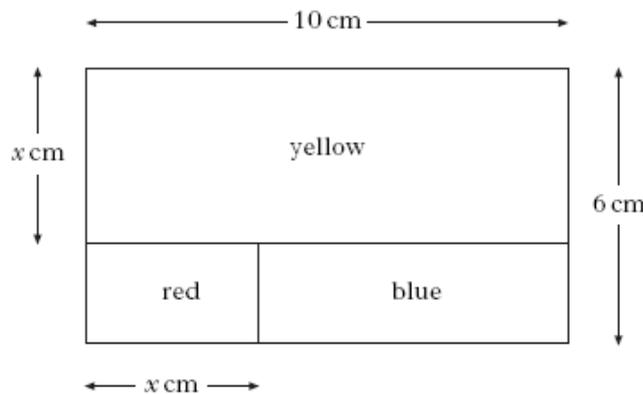
What is the maximum weight of “14 carat” gold that the jeweler can make?

10. Solve **algebraically** the equation

$$5 \cos x^\circ + 4 = 0, \quad 0 \leq x < 360$$

11. (a) A decorator’s logo is rectangular and measures 10 centimetres by 6 centimetres.

It consists of three rectangles: one red, one yellow and one blue.



The yellow rectangle measures 10 centimetres by x centimetres.

The width of the red rectangle is x centimetres.

Show that the area, A , of the blue rectangle is given by the expression

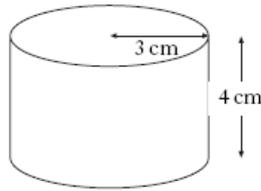
$$A = x^2 - 16x + 60$$

(b) The area of the blue rectangle is equal to $\frac{1}{5}$ of the total area of the logo.

Calculate the value of x .

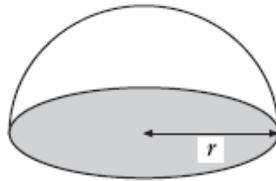
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12. (a) A cylindrical paperweight of radius 3 centimetres and height 4 centimetres is filled with sand.



Calculate the volume of sand in the paperweight.

- (b) Another paperweight, in the shape of a hemisphere, is filled with sand.



It contains the same volume of sand as the first paperweight.

Calculate the radius of the hemisphere.

[The volume of a hemisphere with radius r is given

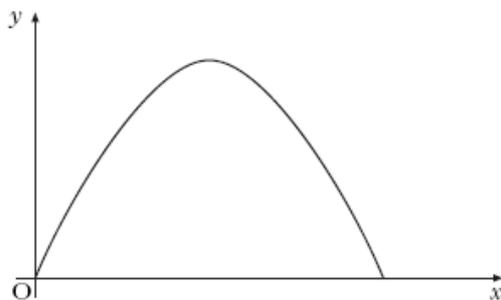
$$\text{by the formula, } V = \frac{2}{3}\pi r^3]$$

13. The profit made by a publishing company of a magazine is calculated by the formula

$$y = 4x(140 - x),$$

where y is the profit (in pounds) and x is the selling price (in pence) of the magazine.

The graph below represents the profit y against the selling price x .



Find the maximum profit the company can make from the sale of the magazine.

[END OF QUESTION PAPER]

TOTALS

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25