GCSE Grade 8/9

Maths Booklet 5

Paper 2H
Calculator

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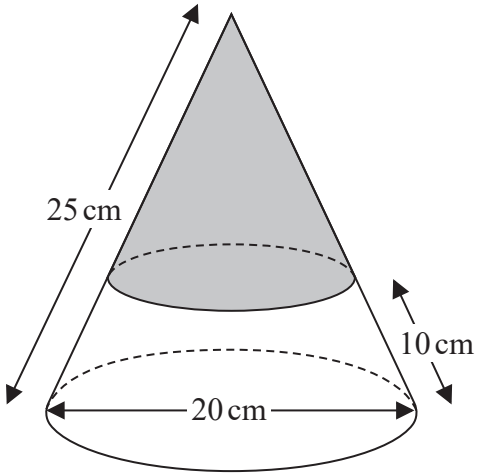
1 Given that

$$2x - 1 \ : \ x - 4 \ = \ 16x + 1 \ : \ 2x - 1$$

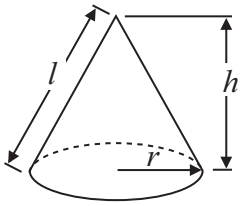
find the possible values of x.

(Total for Question 1 is 5 marks)

2 The diagram represents a solid cone.



Curved surface area of cone = πrl



The cone has a base diameter of 20 cm and a slant height of 25 cm.

A circle is drawn around the surface of the cone at a slant height of 10 cm above the base.
The curved surface of the cone above the circle is painted grey.

Work out the area of the curved surface of the cone that is **not** painted grey.
Give your answer as a multiple of π
You must show all your working.

..... cm^2

(Total for Question 2 is 4 marks)

3 A hot air balloon is descending.
The height of the balloon n minutes after it starts to descend is h_n metres.

The height of the balloon $(n+1)$ minutes after it starts to descend, h_{n+1} metres, is given by

$$h_{n+1} = K \times h_n + 20 \quad \text{where } K \text{ is a constant.}$$

The balloon starts to descend from a height of 1200 metres at 09 15
At 09 16 the height of the balloon is 1040 metres.

Work out the height of the balloon at 09 18

..... m

(Total for Question 3 is 4 marks)

4 There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.
There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$

(3)

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

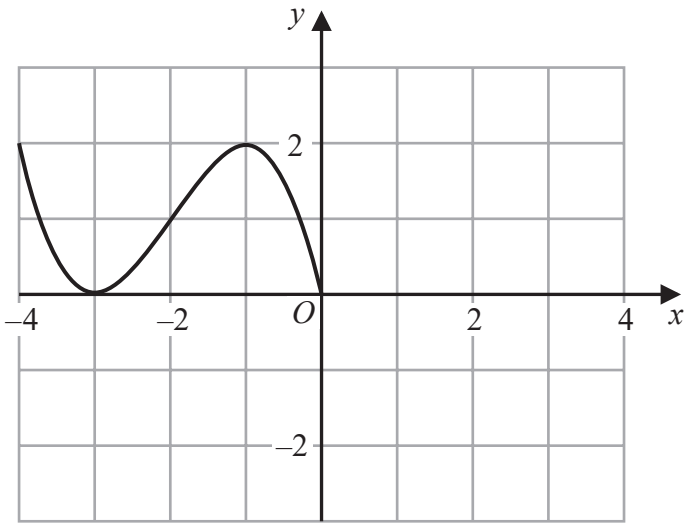
Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

(b) work out the number of red sweets in the bag.
You must show all your working.

(5)

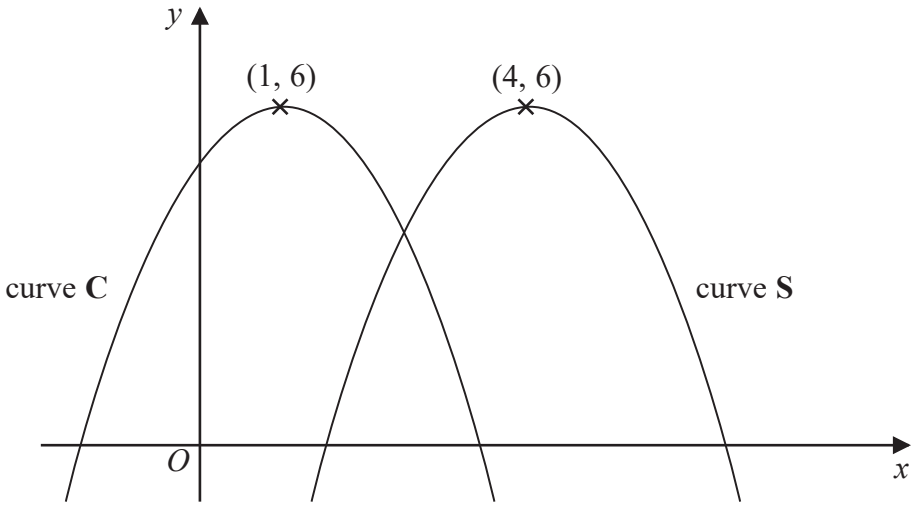
(Total for Question 4 is 8 marks)

5 The graph of the curve with equation $y = f(x)$ is shown on the grid below.



(a) On the grid above, sketch the graph of the curve with equation $y = f(-x)$

(2)



The curve **C** with equation $y = 5 + 2x - x^2$ is transformed by a translation to give the curve **S** such that the point (1, 6) on **C** is mapped to the point (4, 6) on **S**.

(b) Find an equation for **S**.

.....

(2)

(Total for Question 5 is 4 marks)

6 **C** is a circle with centre the origin.

A tangent to **C** passes through the points (–20, 0) and (0, 10)

Work out an equation of **C**.
You must show all your working.

.....

(Total for Question 6 is 5 marks)

7 Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

Find an expression, in terms of n, for the nth term of this quadratic sequence.

.....

(Total for Question 7 is 3 marks)

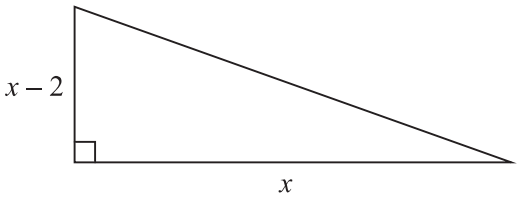
8 $f(x) = 3x^2 - 2x - 8$

Express $f(x + 2)$ in the form $ax^2 + bx$

.....

(Total for Question 8 is 3 marks)

9 Here is a right-angled triangle.



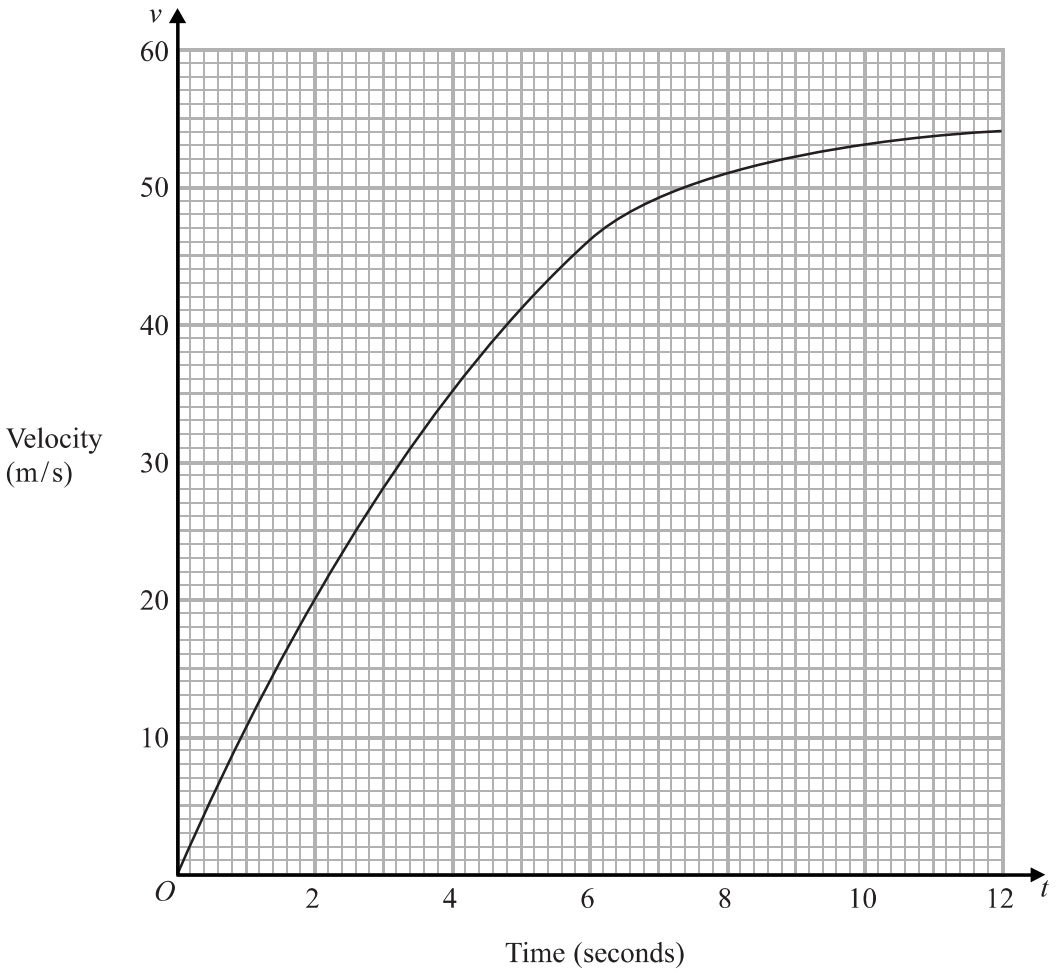
All measurements are in centimetres.
The area of the triangle is 2.5 cm^2.

Find the perimeter of the triangle.
Give your answer correct to 3 significant figures.
You must show all of your working.

..... cm

(Total for Question 9 is 6 marks)

10 The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s^2

(2)

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane.
Use 3 strips of equal width.

..... m

(3)

(Total for Question 10 is 5 marks)