Mock Grade 8/9

Maths Booklet 5

Paper 2H
Calculator

www.ggmaths.co.uk

1 Given that

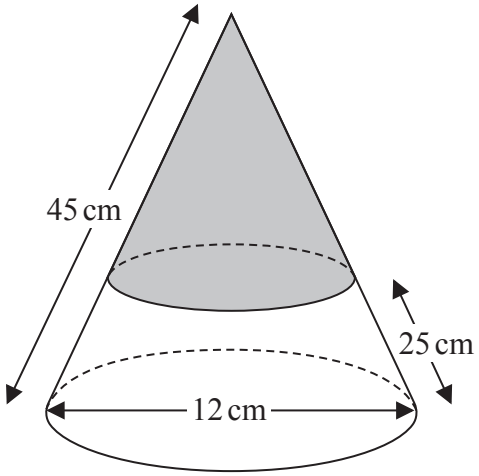
$$5 - 3x \ : \ 9 - x \ = \ 3x + 7 \ : \ 4 - x$$

Find the possible values of x.

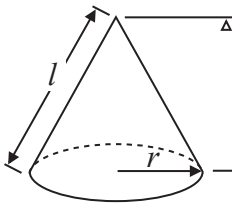
.....

(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 12 cm and a slant height of 45 cm.

A circle is drawn around the surface of the cone at a slant height of 25 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

$$h_{n+1} = K \times h_n + 30 \quad \text{where } K \text{ is a constant.}$$

The balloon starts to descend from a height of 1200 metres at 09 22
At 09 23 the height of the balloon is 1038 metres.

Work out the height of the balloon at 09 25

..... 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 7 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 $\frac{3}{5}$

(a) Show why the probability cannot be $\frac{3}{5}$

(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.

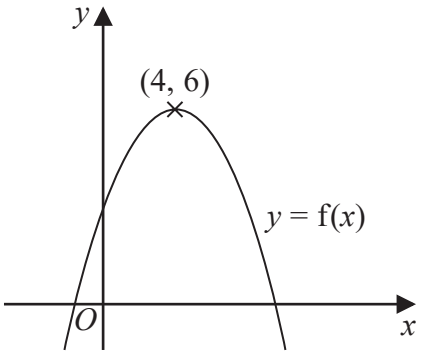
Given that the probability that both the sweets he takes will be red is $\frac{5}{11}$

(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 diagram shows a sketch of part of the curve with equation $y = f(x)$



There is one maximum point on this curve.
The coordinates of this maximum point are (4, 6)

(a) Write down the coordinates of the maximum point on the curve with equation

(i) $y = f(x + 4)$

(..... , ...)

(ii) $y = f(2x)$

(..... , ...)

(2)

The equation of a curve **C** is $y = x^2 + 3x + 4$

The curve **C** is transformed to curve **S** under the translation $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$

(b) Find an equation of curve **S**.

You do not need to simplify the equation.

.....

(2)

(Total for Question 5 is 4 marks)

6 The centre O of a circle has coordinates (4, 7)

The point A, on the circle, has coordinates (6, 11) and AOP is a diameter of the circle.

Find an equation of the tangent to the circle at the point P

.....

(Total for Question 6 is 4 marks)

7 Here are the first five terms of a number sequence S.

10 16 22 28 34

(a) Find an expression, in terms of n, for the nth term of this sequence.

(2)

The nth term of a sequence T is given by $n^2 - 3$

There are numbers that are terms in both the sequence S and the sequence T.

(b) Find one of these numbers.

(2)

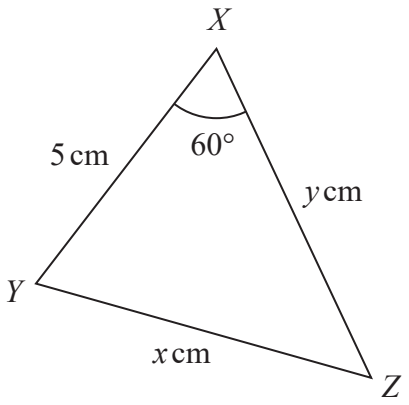
(Total for Question 7 is 4 marks)

---

8 (a) Write $x^2 - 12x + 7$ in the form $a(x + b)^2 + c$

(Total for Question 8 is 3 marks)

9 Here is a triangle XYZ.



The perimeter of the triangle is k cm.

Given that $x = y - 1$
find the value of k.
Show your working clearly.

$k =$

(Total for Question 9 is 5 marks)

10 A car is travelling along a straight horizontal road.
The car takes 120s to travel between two sets of traffic lights which as 2145m apart.
The car starts from rest at the first set of traffic lights and moves with constant acceleration for 30s until its speed is 22 ms-1.

The car maintains this speed for T seconds.
The car then moves with constant deceleration, coming to rest at the second set of traffic lights.

(a) Sketch a speed-time graph for the motion of the var between the two sets of traffic lights.

.....

(3)

(b) find the value of *T*

.....

(2)

(Total for Question 10 is 5 marks)