ELTHAM COLLEGE

13+ ENTRANCE TEST

2019

MATHEMATICS

Time allowed: **45 minutes**

Name: ……..

Instructions:

The test is 45 minutes long.

You **may not** use a calculator.

There are **12 questions** in this test.

Work steadily through the test and try to answer **all** the questions

Write all your answers and working on the test paper – marks may be awarded for working.

Check your answers carefully.

Total		**(52 marks)**

Question 1

Show that $3\frac{4}{7} - 1\frac{5}{8} = 1\frac{53}{56}$

(**Total for Question 1 is 3 marks**)

Question 2

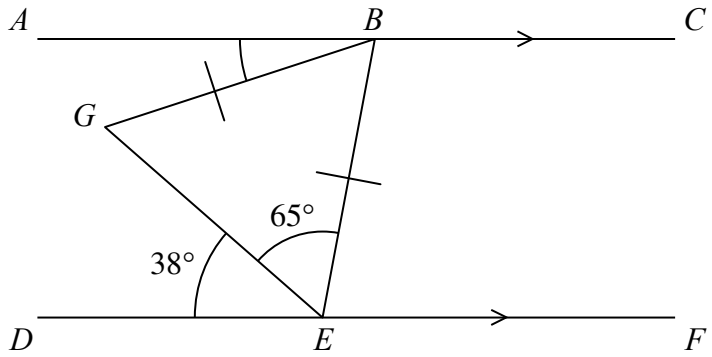


Diagram **NOT** accurately drawn

ABC and *DEF* are parallel lines.

BG = *BE*
Angle *DEG* = 38°
Angle *GEB* = 65°

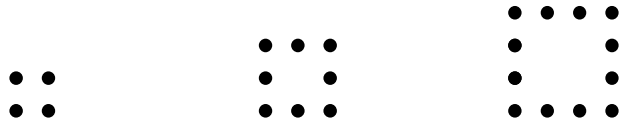
Find the size of angle *ABG*.

..... °

(**Total for Question 2 is 3 marks**)

Question 3

Here is a sequence of patterns made from dots.



Pattern number 1 | Pattern number 2 | Pattern number 3 | Pattern number 4

(*a*) Draw Pattern number 4 in the space above.

(**1**)

(*b*) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	4	8	12		

(**1**)

(*c*) Work out the number of dots in Pattern number 13.

.....

(**2**)

(*d*) Find an expression, in terms of *n*, for the number of dots in Pattern number *n*.

.....

(**1**)

There are fewer than 90 dots in Pattern number *k*.

(*e*) What is the largest possible value of *k*?

.....

(**2**)

(**Total for Question 3 is 7 marks**)

Question 4

(*a*) Find the value of $25 - 4g$ when $g = -3$

.....

(**2**)

(*b*) Expand and simplify $x(2x + 1) + 3(x - 2) + 7$

.....

(**3**)

(**Total for Question 4 is 5 marks**)

Question 5

3 kg of potatoes and 2 kg of apples cost a total of £7.33.
4 kg of potatoes cost £3.80.

Work out the cost of 1 kg of apples.

£.....

(**Total for Question 5 is 4 marks**)

Question 6

There are some people in a cinema.

$\frac{3}{5}$ of the people in the cinema are children.

For the children in the cinema,

number of girls : number of boys = 2 : 7

There are 170 girls in the cinema.

Work out the number of adults in the cinema.

.....

(**Total for Question 6 is 5 marks**)

Question 7

(*a*) Solve $8 - 2p = 15$

p = ...

(**2**)

(*b*) Solve $\frac{7x-2}{4} = 3x + 1$

Show clear algebraic working.

x = ...

(**3**)

(**Total for Question 7 is 5 marks**)

Question 8

$A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$

(*a*) (i) Find the Highest Common Factor (HCF) of *A* and *B*.

.....

(ii) Find the Lowest Common Multiple (LCM) of *A* and *B*.

.....
(**2**)

$A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$
$C = 2^p \times 5^q \times 7^r$

Given that
the HCF of *B* and *C* is $2^3 \times 7$
the LCM of *A* and *C* is $2^4 \times 3^5 \times 5^2 \times 7^3$

(*b*) find the value of *p*, the value of *q* and the value of *r*.

p = ...

q = ...

r = ...
(**2**)

(**Total for Question 8 is 4 marks**)

Question 9

The diagram shows a right-angled triangle.

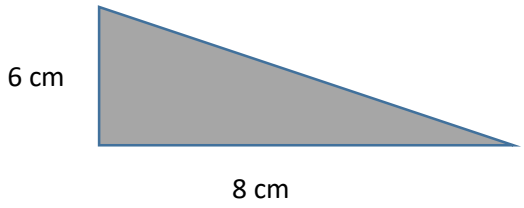


Diagram **NOT** accurately drawn

Five of these triangles are put together to make a shape.

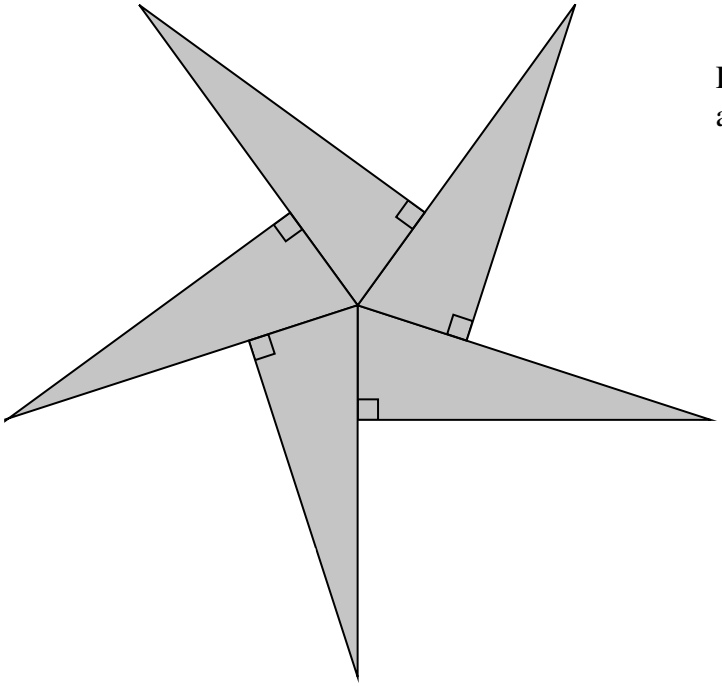


Diagram **NOT** accurately drawn

Calculate the perimeter of the shape.

..... cm

(**Total for Question 9 is 5 marks**)

Question 10

Gopal is paid 20 000 rupees each month.
Jamuna is paid 19 200 rupees each month.

Gopal and Jamuna are both given an increase in their monthly pay.
After the increase, they are both paid the same amount each month.

Gopal was given an increase of 8%

Work out the percentage increase that Jamuna was given.

.....%

(**Total for Question 10 is 4 marks**)

Question 11

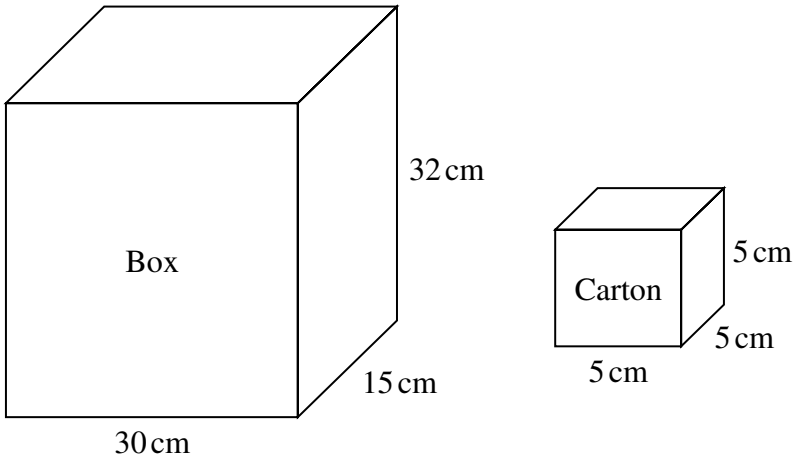


Diagram **NOT** accurately drawn

A wooden box measures 30 cm by 15 cm by 32 cm.
The box has a lid.

A carton measures 5 cm by 5 cm by 5 cm.

James has 110 cartons.
He wants to put all these cartons in the box and be able to shut the lid.

Can James put all 110 cartons in the box and shut the lid?
Show your working clearly.

(**Total for Question 11 is 3 marks**)

Question 12

Here is a hexagon *ABCDEF*.

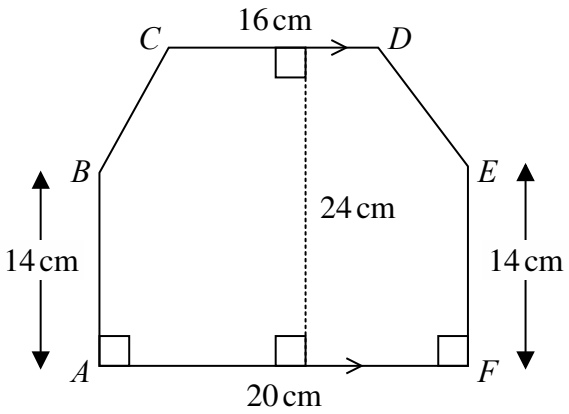


Diagram **NOT** accurately drawn

CD is parallel to *AF*.

Work out the area of hexagon *ABCDEF*.

..... cm^2

(Total for Question 12 is 4 marks)

END OF TEST