



Write your name here

Surname

Other names

# Scholarship Paper

Subject: Mathematics Paper III

Paper:

Time: 1 Hour

**You must have:**

Pen, Calculator, Ruler

Pencil

-

**Total Marks**

75

## Instructions

An answer booklet is provided inside this question paper. You should follow the instructions on the front cover of the answer booklet. If you need additional answer paper ask the invigilator for a continuation booklet.

- Answer **ALL** questions.
- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name.

## Information

- The total mark for this paper is **75**
- The marks for **each** question are shown in brackets
  - *use this as a guide as to how much time to spend on each question.*

## Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly and in good English.

**Questions****Q1.**(a) Expand and simplify  $3x(2x + 3) - x(3x + 5)$ 

.....  
(2)

(b) Make  $t$  the subject of the formula  $p = at - d$ 

.....  
(2)

Given that  $\frac{w^5 \times w^n}{w^3} = w^{10}$ (c) work out the value of  $n$ .

$n =$  .....  
(2)

**(Total for question = 6 marks)**

**Q2.**

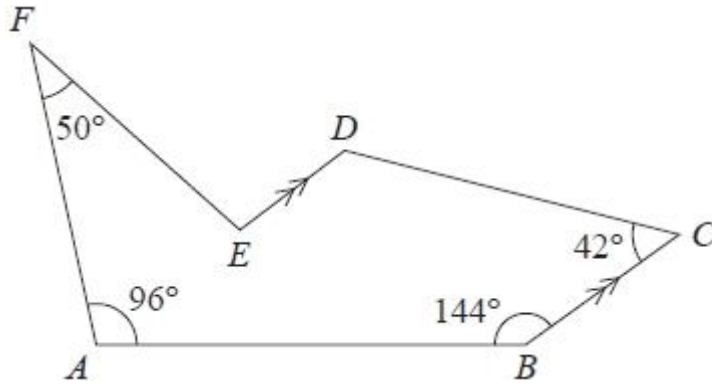


Diagram **NOT**  
accurately drawn

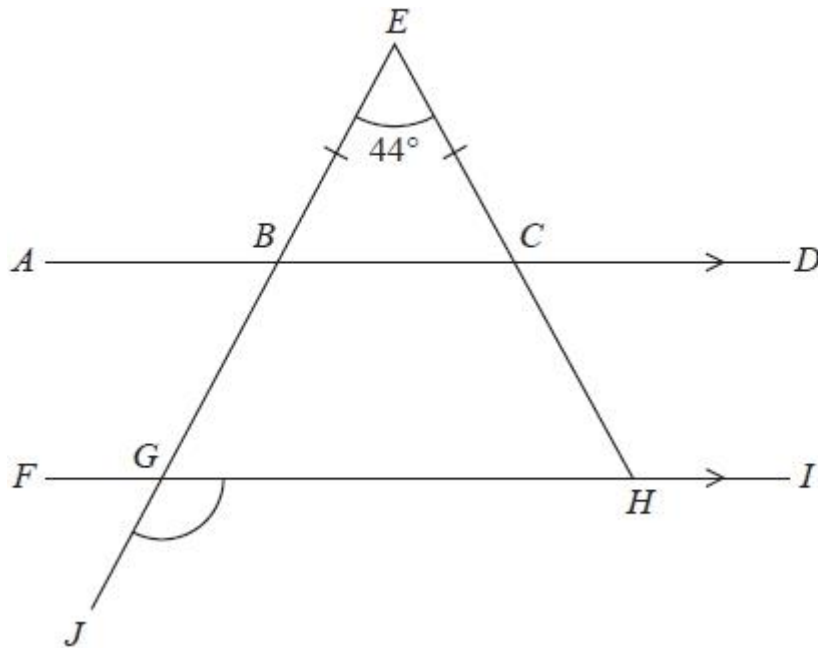
The diagram shows a hexagon  $ABCDEF$ .  
 $BC$  is parallel to  $ED$ .

Work out the size of the obtuse angle  $DEF$ .

..... °

**(Total for question = 5 marks)**

Q3.

Diagram **NOT**  
accurately drawn

$ABCD$  and  $FGHI$  are parallel straight lines.  
 $EBGJ$  and  $ECH$  are straight lines.

$$BE = CE$$

$$\text{Angle } BEC = 44^\circ$$

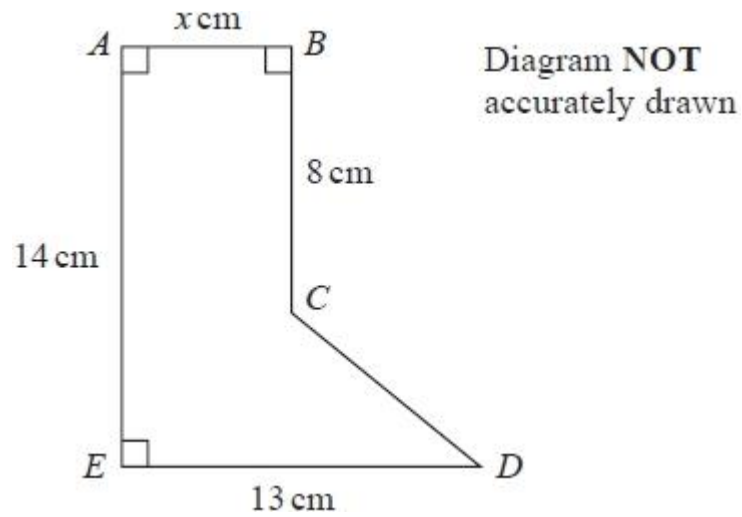
Work out the size of angle  $JGH$ .

Give a reason for each stage of your working.

..... °

**(Total for question = 5 marks)**

Q4.



The diagram shows the shape  $ABCDE$ .

The area of the shape is  $91.8 \text{ cm}^2$

Work out the value of  $x$ .

$x = \dots\dots\dots$

**(Total for question = 4 marks)**

**Q5.**

The diagram shows a sector of a circle with radius 7 cm.

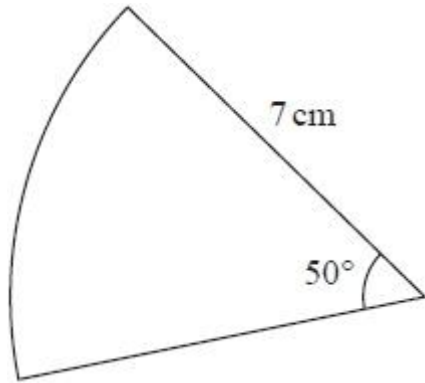


Diagram **NOT**  
accurately drawn

Work out the length of the arc of the sector.  
Give your answer correct to one decimal place.

..... cm

**(Total for question = 2 marks)**

**Q6.**

The diagram shows a shape made from a right-angled triangle and a semicircle.

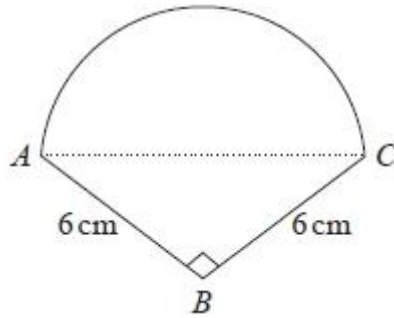


Diagram **NOT**  
accurately drawn

$AC$  is the diameter of the semicircle.

$BA = BC = 6$  cm

Angle  $ABC = 90^\circ$

Work out the area of the shape.

Give your answer correct to 1 decimal place.

..... cm<sup>2</sup>

(Total for question = 5 marks)

**Q7.**

The sum of the first  $N$  terms of an arithmetic series,  $S$ , is 292

The 2nd term of  $S$  is 8.5

The 5th term of  $S$  is 13

Find the value of  $N$ .

Show clear algebraic working.

$N = \dots\dots\dots$

**(Total for question = 5 marks)**



**Q8.**

Mariana sells bags of bird food.

The bags that Mariana sold last week each contained 12 kg of seeds.

The bags that she is going to sell next week will each contain a mixture of nuts and seeds where for each bag

weight of nuts : weight of seeds = 4 : 5

The total weight of the nuts and the seeds in each bag will be 19.35 kg

The weight of seeds in each bag that Mariana sells next week will be less than the weight of seeds in each bag that Mariana sold last week.

Work out this decrease as a percentage of the weight of seeds in each bag that Mariana sold last week.

Give your answer correct to one decimal place.

..... %

**(Total for question = 4 marks)**

**Q9.**

(a) Make  $a$  the subject of the formula  $M = ac - bd$

.....  
(2)

(b) Solve the inequality  $5x - 4 < 39$

.....  
(2)

(c) Factorise fully  $18e^2f^3 - 12e^3f$

.....  
(2)

**(Total for question = 6 marks)**

**Q10.**

Jethro has sat 5 tests.

Each test was marked out of 100 and Jethro's mean mark for the 5 tests is 74

Jethro has to sit one more test that is also to be marked out of 100

Jethro wants his mean mark for all 6 tests to be at least 77

Work out the least mark that Jethro needs to get for the last test.

.....

**(Total for question = 3 marks)**

**Q11.**

Change a speed of  $x$  kilometres per hour into a speed in metres per second.  
Simplify your answer.

..... m/s

**(Total for question = 3 marks)**

**Q12.**

Chao bought a boat for HK\$160 000  
The value of the boat depreciates by 4% each year.

(a) Work out the value of the boat at the end of 3 years.

Give your answer correct to the nearest HK\$.

HK\$ .....

**(3)**

Jalina gets a salary increase of 5%  
Her salary after the increase is HK\$252 000

(b) Work out Jalina's salary before the increase.

HK\$ .....

(3)

**(Total for question = 6 marks)**

**Q13.**

Work out the difference between the largest share and the smallest share when 3450 yen is divided in the ratios 2 : 6 : 7

..... yen

**(Total for question = 3 marks)**

**Q14.**

Show that  $4\frac{2}{3} \div 1\frac{1}{9} = 4\frac{1}{5}$

**(Total for question = 3 marks)**

**Q15.**

$$A = 2n \times 3 \times 5^m$$

Write  $8A$  as a product of powers of its prime factors.

.....  
**(Total for question = 2 marks)**

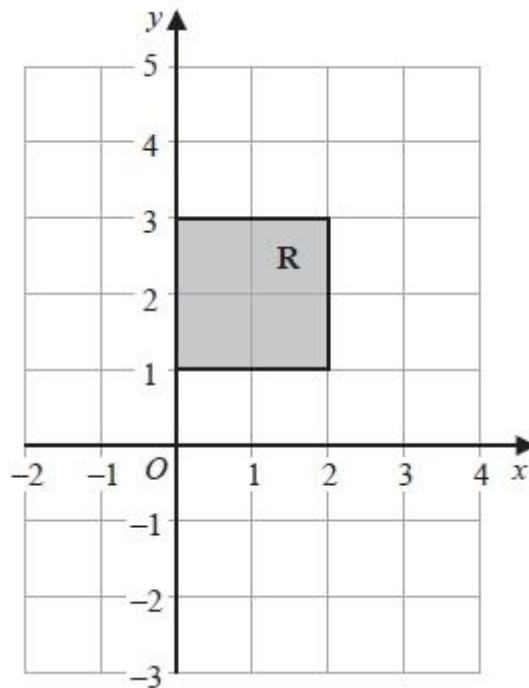
**Q16.**

The straight line **L** has gradient 5 and passes through the point with coordinates  $(0, -3)$

(a) Write down an equation for **L**.

.....  
(2)

(b)



The region **R**, shown shaded in the diagram, is bounded by four straight lines.  
Write down the inequalities that define **R**.

.....  
(2)

**(Total for question = 4 marks)**

**Q17.**

$$A = 3^5 \times 5 \times 7^3$$

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

(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  $23 \times 7$

the LCM of  $A$  and  $C$  is  $24 \times 35 \times 52 \times 73$

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

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots$$

$$r = \dots\dots\dots$$

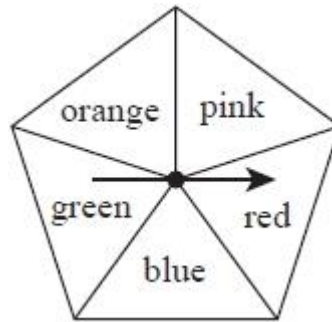
(2)

**(Total for question = 4 marks)**



**Q18.**

Grace has a biased 5-sided spinner.



Grace is going to spin the arrow on the spinner once.

The table below gives the probabilities that the spinner will land on red or on blue or on green.

<b>Colour</b>	Red	Blue	Green	Orange	Pink
<b>Probability</b>	0.20	0.12	0.08		

The probability that the spinner will land on orange is 3 times the probability that the spinner will land on pink.

(a) Work out the probability that the spinner will land on orange.

.....  
(3)

Grace spins the arrow on the spinner 150 times.

(b) Work out an estimate for the number of times the spinner lands on blue.

.....  
(2)

**(Total for question = 5 marks)**