  
HIGHER: INEQUALITIES – This is a selection of the types of question that you need to be able to solve.

**Q1.**

− 3 < *n* ≤ 1

*n* is an integer.

(a) Write down all the possible values of *n*.

      ..............................................................................................................................................

**(2)**

(b) Solve the inequality   3*p*−7 > 11

      ..............................................................................................................................................

**(2)**

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

**Q2.**



(a)  Write down the inequality represented on the number line.

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**(1)**

(b)  Solve 4*y* − 9 ≤ 3

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**(2)**

(c)

               −3 ≤ *n* < 2   
               −2 < *m* < 4   
*n* and *m* are integers.

Given that *n* = *m*, write down all the possible values of *n*.

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**(2)**

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

**Q3.**3*x* + 5 > 16

*x* is an integer.

Find the smallest value of *x*.

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

**Q4.**–2 < n ≤ 3

(a) Represent this inequality on the number line.



**(2)**

(b) Solve the inequality 8x – 3 ≥ 6*x* + 4

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**(2)**

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

**Q5.** Solve the inequality 

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

**Q6.**Solve *x*2 > 3*x* + 4

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

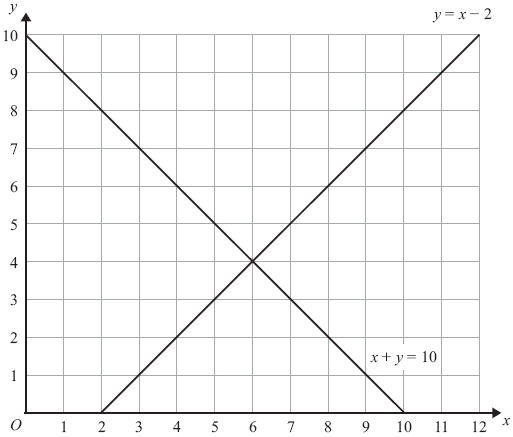
**Q7.** Solve   2*x*2 – 5*x* – 12 > 0

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

**Q8.**

The lines *y* = *x* – 2 and *x* + *y* = 10 are drawn on the grid.



On the grid, mark with a cross (**×**) each of the points with integer coordinates that are in the region defined by

*y* > *x* – 2   
*x* + *y* < 10  
*x* > 3

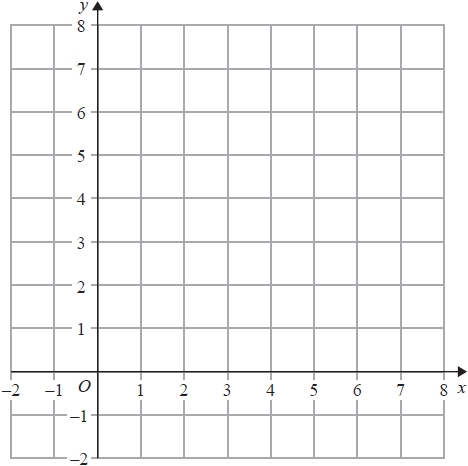
**(Total for Question is 3 marks)**

**Q9.**

On the grid show, by shading, the region defined by the inequalities



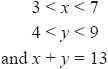
Label the region **R**.



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

**Q10.**

(a)  Given that *x* and *y* are integers such that



find all the possible values of *x*.

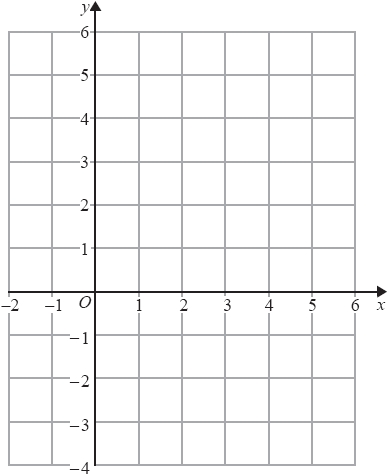
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**(2)**

(b)  On the grid below show, by shading, the region defined by the inequalities



Mark this region with the letter R.



**(4)**

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

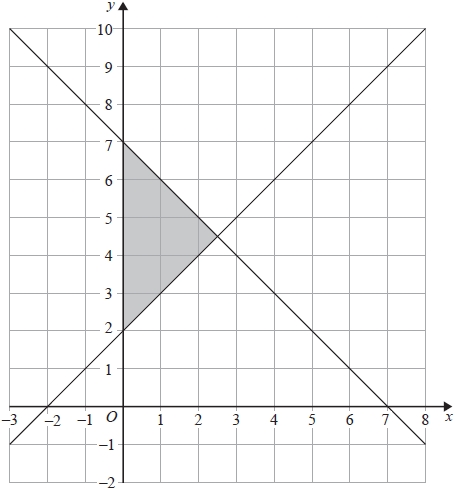
**Q11.**

For her maths homework, Helen answered the following question.

Shade the region that is defined by all these inequalities.

*x* + *y* ≤ 6                  *y* ≥ 0                  *y* ≤ *x* + 2

Here is Helen's answer.

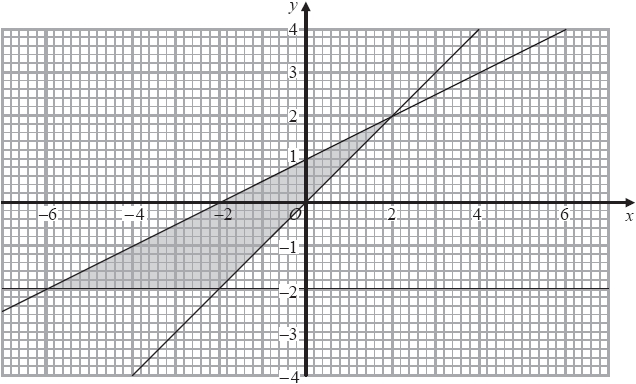


Helen made some mistakes when she answered the question.

Write down two mistakes Helen made.

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

**Q12.**



Write down the three inequalities that define the shaded region.

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

**Q13.**

Here is a cuboid.



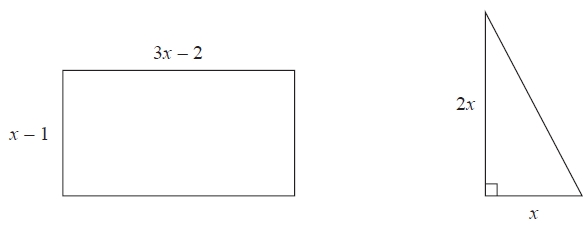
All measurements are in centimetres. *x* is an integer.   
The total volume of the cuboid is less than 900 cm3

Show that 

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

**Q14.**

Here is a rectangle and a right-angled triangle.



All measurements are in centimetres. The area of the rectangle is greater than the area of the triangle.

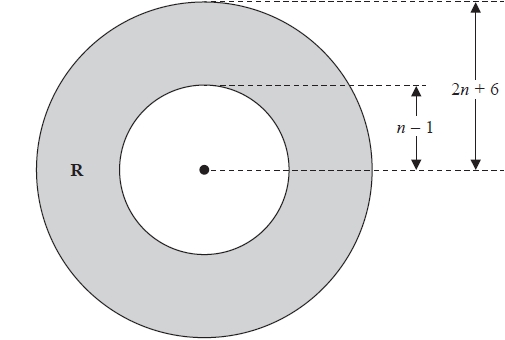
Find the set of possible values of *x*.

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

**Q15.**

The region **R**, shown shaded in the diagram, is the region between two circles with the same centre.



The outer circle has radius (2*n* + 6)   
The inner circle has radius (*n* – 1)   
All measurements are in centimetres.

The area of **R** is greater than the area of a circle of radius (*n* + 13) cm.

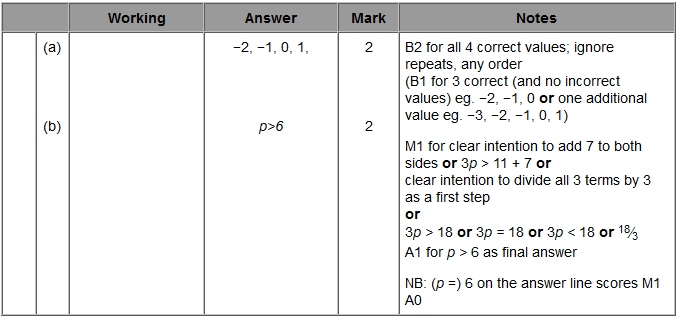
*n* is an integer.

Find the least possible value of *n*.   
You must show all of your working.

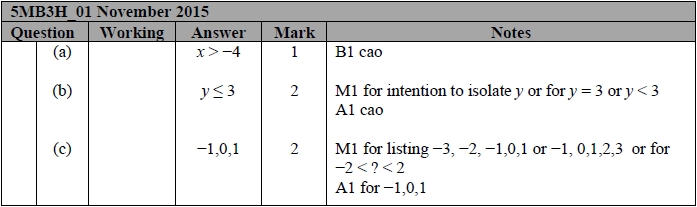
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**(Total for question = 5 marks)**

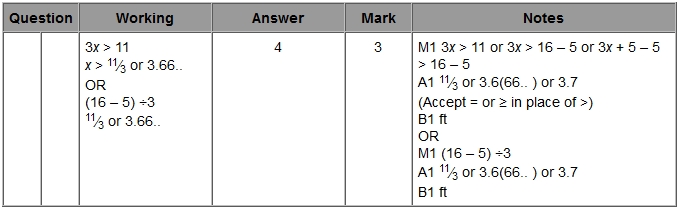
**Mark Scheme**  
Q1.



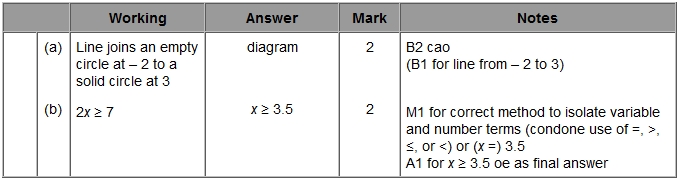
**Q2.**

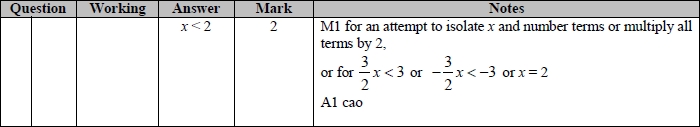


**Q3.**

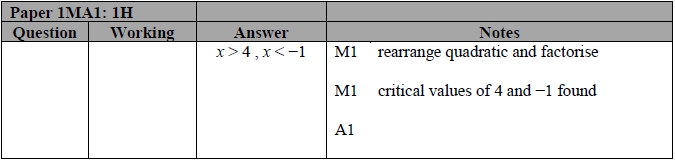


**Q4.**

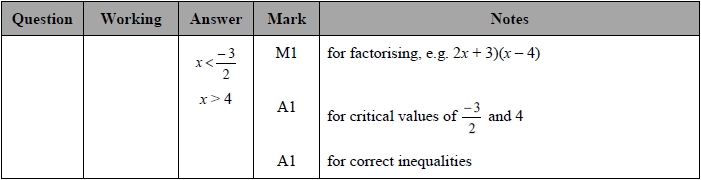


**Q5.**

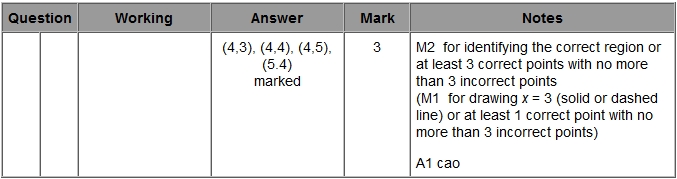
**Q6.**



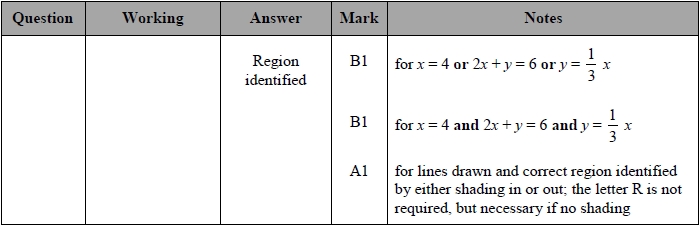
**Q7.**



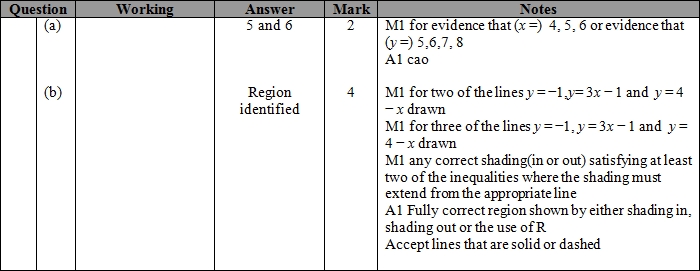
**Q8.**



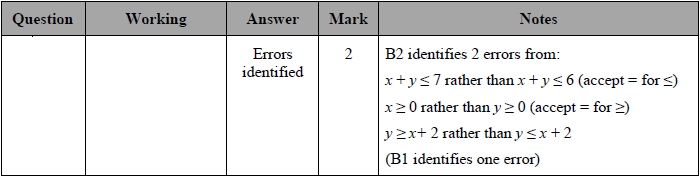
**Q9.**



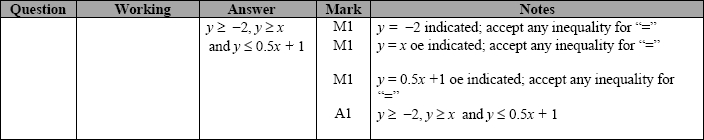
**Q10.**



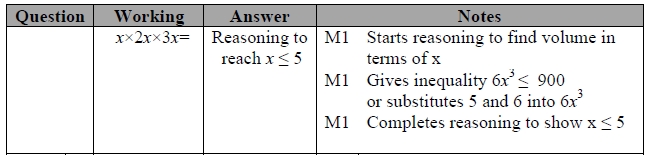
**Q11.**



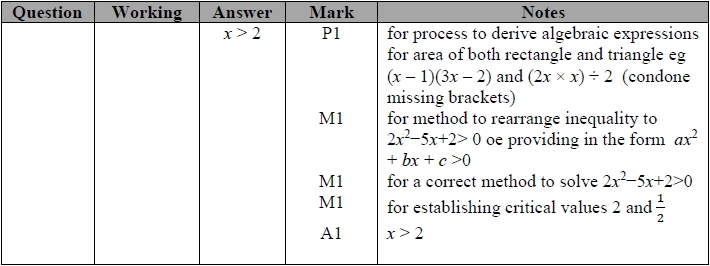
**Q12.**



**Q13.**



**Q14.**



**Q15.**

