

Centre No.						Paper Reference						Surname	Initial(s)	
Candidate No.						5	5	2	5	/	0	5	Signature	

Paper Reference(s)

**5525/05**

**Edexcel GCSE**

**Mathematics A – 1387**

**Paper 5 (Non-Calculator)**

**Higher Tier**

**Monday 4 June 2007 – Afternoon**

**Time: 2 hours**

Examiner's use only

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Team Leader's use only

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**Materials required for examination**

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

**Items included with question papers**

Nil

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initials and signature. Check that you have the correct question paper.

Answer ALL the questions. Write your answers in the spaces provided in this question paper.

**You must NOT write on the formulae page. Anything you write on the formulae page will gain NO credit.**

If you need more space to complete your answer to any question, use additional answer sheets.

**Information for Candidates**

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 27 questions in this question paper. The total mark for this paper is 100.

There are 24 pages in this question paper. Any blank pages are indicated.

**Calculators must not be used.**

**Advice to Candidates**

Show all stages in any calculations.

Work steadily through the paper. Do not spend too long on one question.

If you cannot answer a question, leave it and attempt the next one.

Return at the end to those you have left out.

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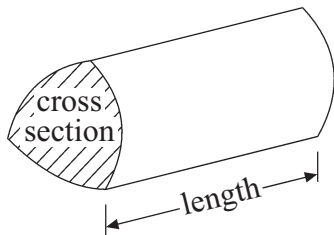
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## GCSE Mathematics 1387/8

Formulae: Higher Tier

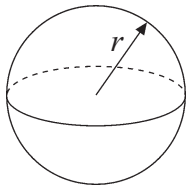
**You must not write on this formulae page.  
Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section  $\times$  length



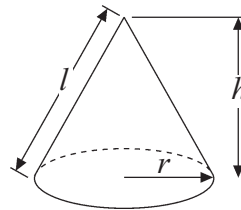
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**Surface area of sphere** =  $4\pi r^2$

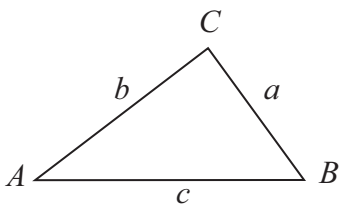


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2}ab \sin C$



**Answer ALL TWENTY SEVEN questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

1. A bag contains counters which are red or green or yellow or blue.

The table shows each of the probabilities that a counter taken at random from the bag will be red or green or blue.

Colour	Red	Green	Yellow	Blue
Probability	0.2	0.3		0.1

A counter is to be taken at random from the bag.

- (a) Work out the probability that the counter will be yellow.

.....  
(2)

The bag contains 200 counters.

- (b) Work out the number of red counters in the bag.

.....  
(2)

(Total 4 marks)

Q1



Leave  
blank

2. Kate buys 2 lollies and 5 choc ices for £6.50  
Pete buys 2 lollies and 3 choc ices for £4.30

Work out the cost of one lolly.  
Give your answer in pence.

..... pence  
**(Total 3 marks)**

**Q2**

3. Matthew wants to collect information about the time students take to travel to school.

Design a suitable question he could use on a questionnaire.

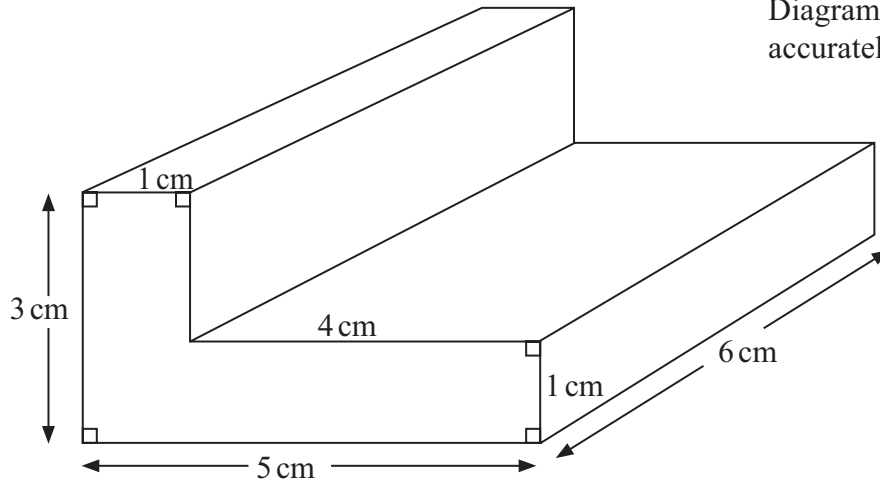
**(Total 2 marks)**

**Q3**



4.

Diagram **NOT** accurately drawn



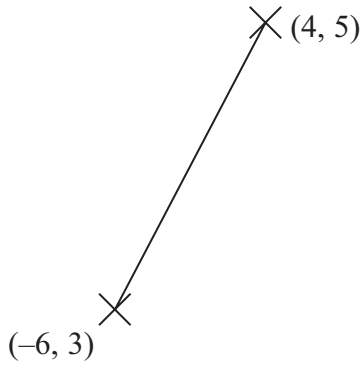
Work out the total surface area of the L-shaped prism.  
State the units with your answer.

Q4

.....  
(Total 4 marks)



5. Work out the coordinates of the midpoint of the line joining the points (4, 5) and (-6, 3).



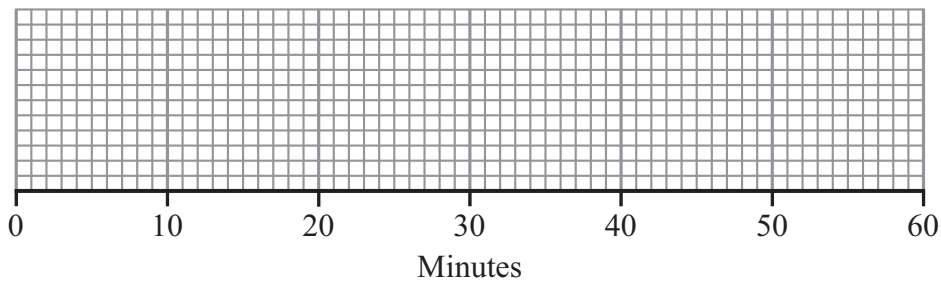
(....., .....)  
(Total 2 marks)

Q5

6. Mrs Raja set work for the students in her class. She recorded the time taken, in minutes, for each student to do the work. She used her results to work out the information in the table.

	Minutes
Shortest time	4
Lower quartile	14
Median	26
Upper quartile	30
Longest time	57

On the grid, draw a box plot to show the information in the table.

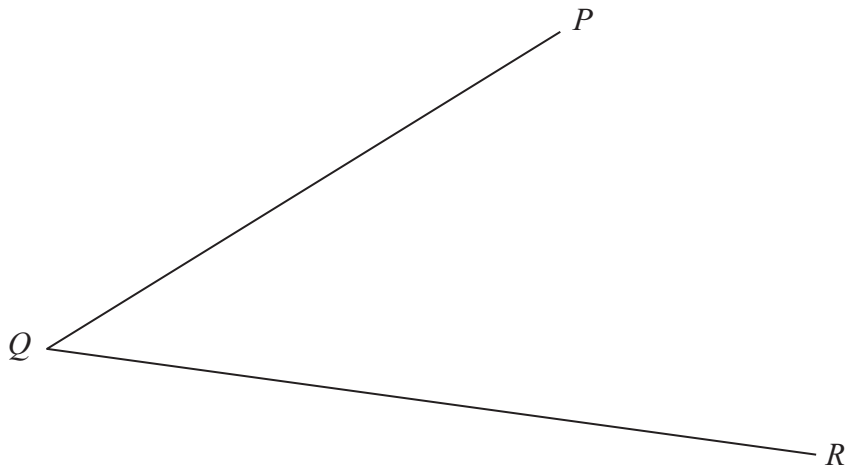


(Total 2 marks)

Q6



7.



Use ruler and compasses to **construct** the bisector of angle  $PQR$ .  
You must show all your construction lines.

(Total 2 marks)

Q7



8. (a) Write 126 as a product of its prime factors.

.....  
(2)

(b) Find the Highest Common Factor (HCF) of 84 and 126

.....  
(2)

**(Total 4 marks)**

Q8





9. (a)  $m$  is an integer such that  $-1 \leq m < 4$   
List all the possible values of  $m$ .

.....  
(2)

- (b) (i) Solve the inequality  $3x \geq x + 7$

.....

- (ii)  $x$  is a whole number.

Write down the smallest value of  $x$  that satisfies  $3x \geq x + 7$

.....  
(3)

(Total 5 marks)

Q9



10. (a) Write as a power of 7

(i)  $7^8 \div 7^3$

.....

(ii)  $\frac{7^2 \times 7^3}{7}$

.....

(3)

(b) Write down the reciprocal of 2

.....

(1)

(Total 4 marks)

Q10

11. (a) Make  $n$  the subject of the formula  $m = 5n - 21$

$n =$  .....

(2)

(b) Make  $p$  the subject of the formula  $4(p - 2q) = 3p + 2$

$p =$  .....

(3)

(Total 5 marks)

Q11



12.

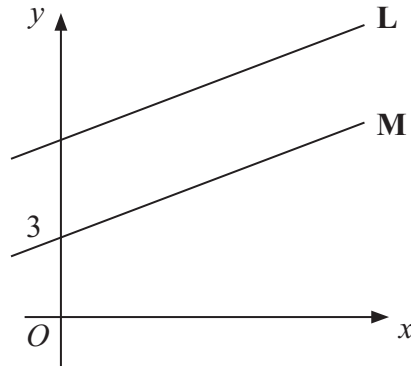


Diagram **NOT** accurately drawn

The straight line **L** has equation  $y = \frac{1}{2}x + 7$

The straight line **M** is parallel to **L** and passes through the point (0, 3).

Write down an equation for the line **M**.

.....  
(Total 2 marks)

Q12

13. Work out  $2\frac{2}{3} \times 1\frac{1}{4}$

Give your answer in its simplest form.

.....  
(Total 3 marks)

Q13



14. Solve the simultaneous equations

$$4x + 2y = 8$$

$$2x - 5y = 10$$

$x = \dots\dots\dots$  ,  $y = \dots\dots\dots$   
**(Total 3 marks)**

Q14



15.

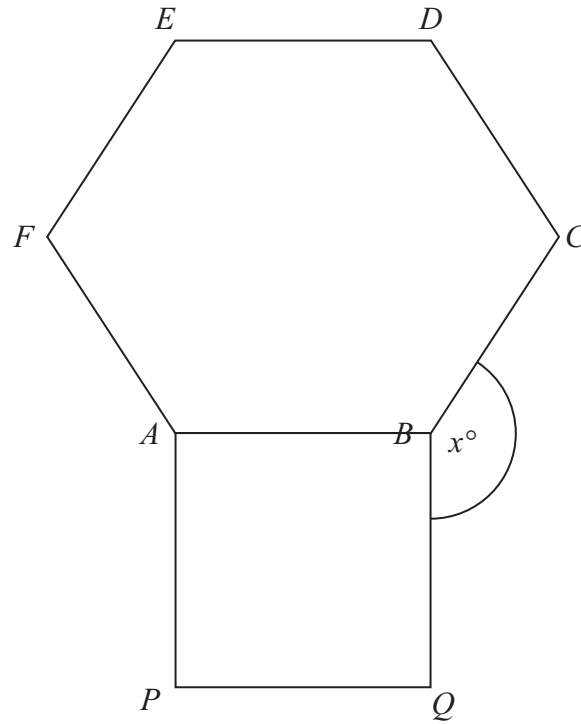


Diagram **NOT** accurately drawn

$ABCDEF$  is a regular hexagon and  $ABQP$  is a square.  
 Angle  $CBQ = x^\circ$ .

Work out the value of  $x$ .

$x = \dots\dots\dots$

(Total 4 marks)

Q15



16. An operator took 100 calls at a call centre.  
The table gives information about the time ( $t$  seconds) it took the operator to answer each call.

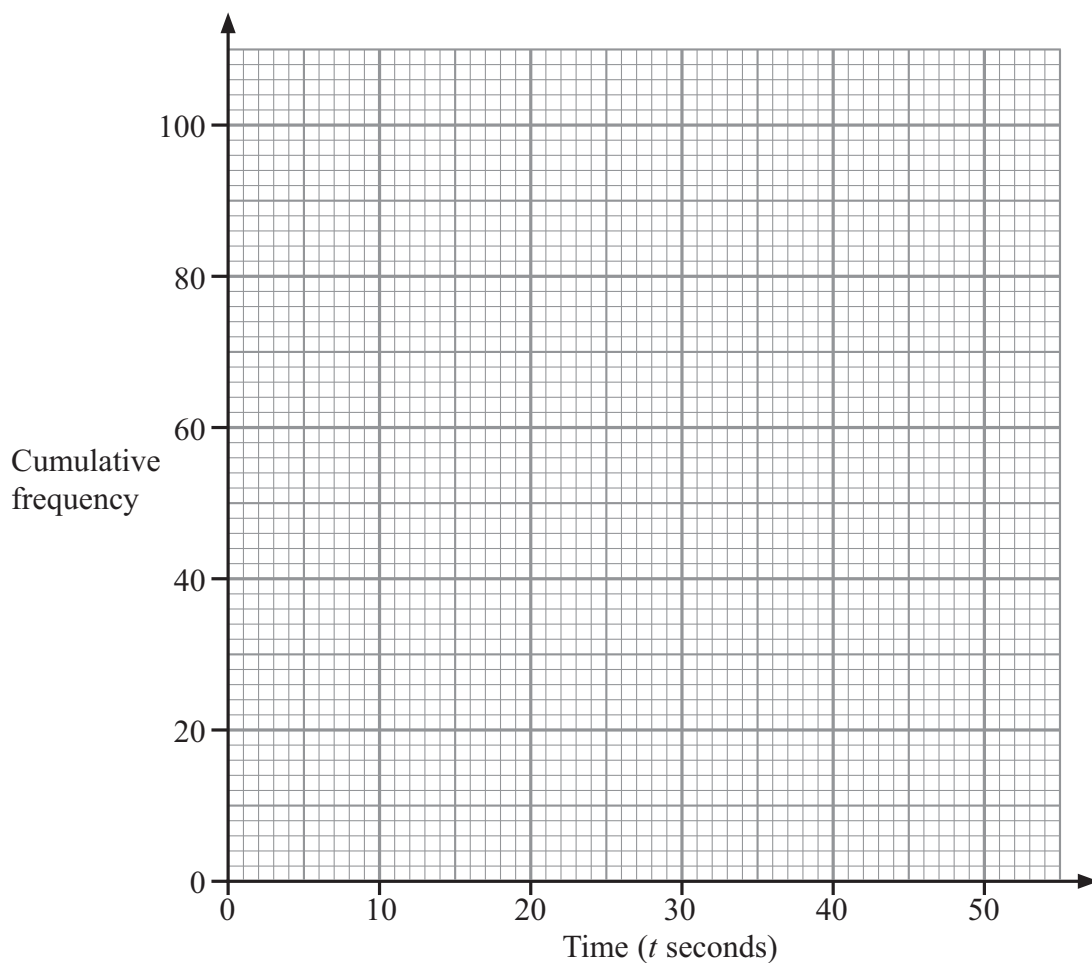
Time ( $t$ seconds)	Frequency
$0 < t \leq 10$	16
$10 < t \leq 20$	34
$20 < t \leq 30$	32
$30 < t \leq 40$	14
$40 < t \leq 50$	4

- (a) Complete the cumulative frequency table.

Time ( $t$ seconds)	Cumulative frequency
$0 < t \leq 10$	16
$0 < t \leq 20$	
$0 < t \leq 30$	
$0 < t \leq 40$	
$0 < t \leq 50$	

(1)





- (b) On the grid, draw a cumulative frequency graph for your table. (2)
- (c) Use your graph to find an estimate for the number of calls the operator took **more than** 18 seconds to answer.

.....  
(2)

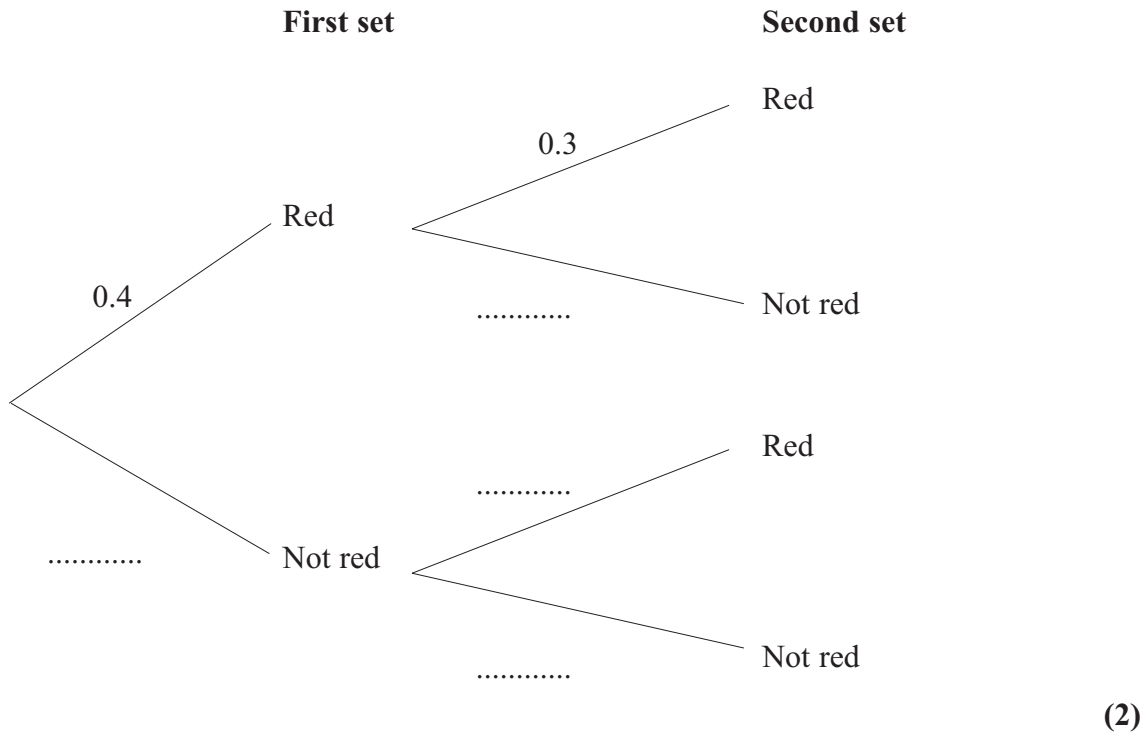
**(Total 5 marks)**

**Q16**



17. There are two sets of traffic lights on Georgina’s route to school.  
 The probability that the first set of traffic lights will be red is 0.4  
 The probability that the second set of traffic lights will be red is 0.3

(a) Complete the probability tree diagram.



(b) Work out the probability that both sets of traffic lights will be red.

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

(c) Work out the probability that exactly one set of traffic lights will be red.

.....  
**(3)**

**(Total 7 marks)**

**Q17**





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blank

18. Prove that the recurring decimal  $0.\dot{4}\dot{5} = \frac{15}{33}$

Q18

(Total 3 marks)

19. Expand and simplify  $(\sqrt{3} - \sqrt{2})(\sqrt{3} + \sqrt{2})$

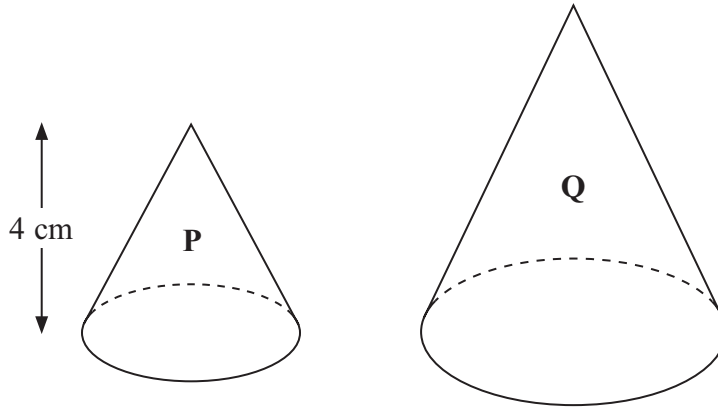
Q19

.....  
(Total 2 marks)



20.

Diagrams NOT accurately drawn



Two cones, **P** and **Q**, are mathematically similar.  
 The total surface area of cone **P** is  $24 \text{ cm}^2$ .  
 The total surface area of cone **Q** is  $96 \text{ cm}^2$ .  
 The height of cone **P** is 4 cm.

(a) Work out the height of cone **Q**.

..... cm  
**(3)**

The volume of cone **P** is  $12 \text{ cm}^3$ .

(b) Work out the volume of cone **Q**.

.....  $\text{cm}^3$   
**(2)**

**(Total 5 marks)**

**Q20**



21. (a) Expand  $x(3 - 2x^2)$

.....  
(2)

(b) Factorise completely  $12xy + 4x^2$

.....  
(2)

(c) Simplify  $\frac{20a^2}{4ab^2}$

.....  
(2)

(d) Simplify  $\frac{x-3}{x^2-9}$

.....  
(2)

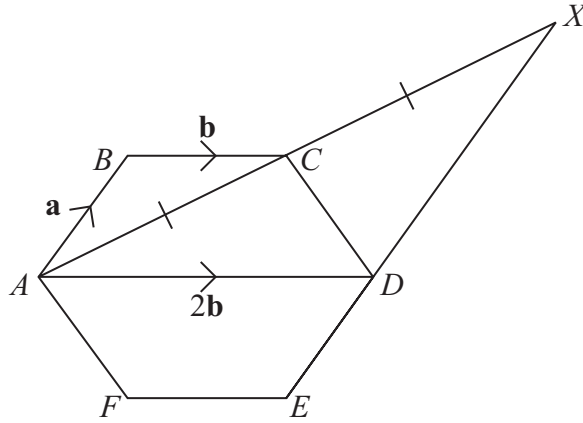
(Total 8 marks)

Q21



22.

Diagram **NOT** accurately drawn



$ABCDEF$  is a regular hexagon.

$$\vec{AB} = \mathbf{a} \quad \vec{BC} = \mathbf{b} \quad \vec{AD} = 2\mathbf{b}$$

(a) Find the vector  $\vec{AC}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

$$\vec{AC} = \dots\dots\dots \quad (1)$$

$$\vec{AC} = \vec{CX}$$

(b) Prove that  $AB$  is parallel to  $DX$ .

(3)

(Total 4 marks)

Q22



23. The diagram shows a cylinder and a sphere.

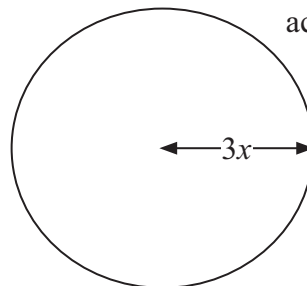
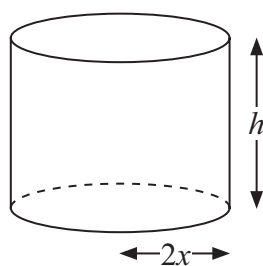


Diagram **NOT** accurately drawn

The radius of the base of the cylinder is  $2x$  cm and the height of the cylinder is  $h$  cm.  
 The radius of the sphere is  $3x$  cm.  
 The volume of the cylinder is equal to the volume of the sphere.

Express  $h$  in terms of  $x$ .  
 Give your answer in its simplest form.

$h = \dots\dots\dots$   
 (Total 3 marks)

Q23



24. (i) Expand and simplify

$$n^2 + (n + 1)^2$$

.....

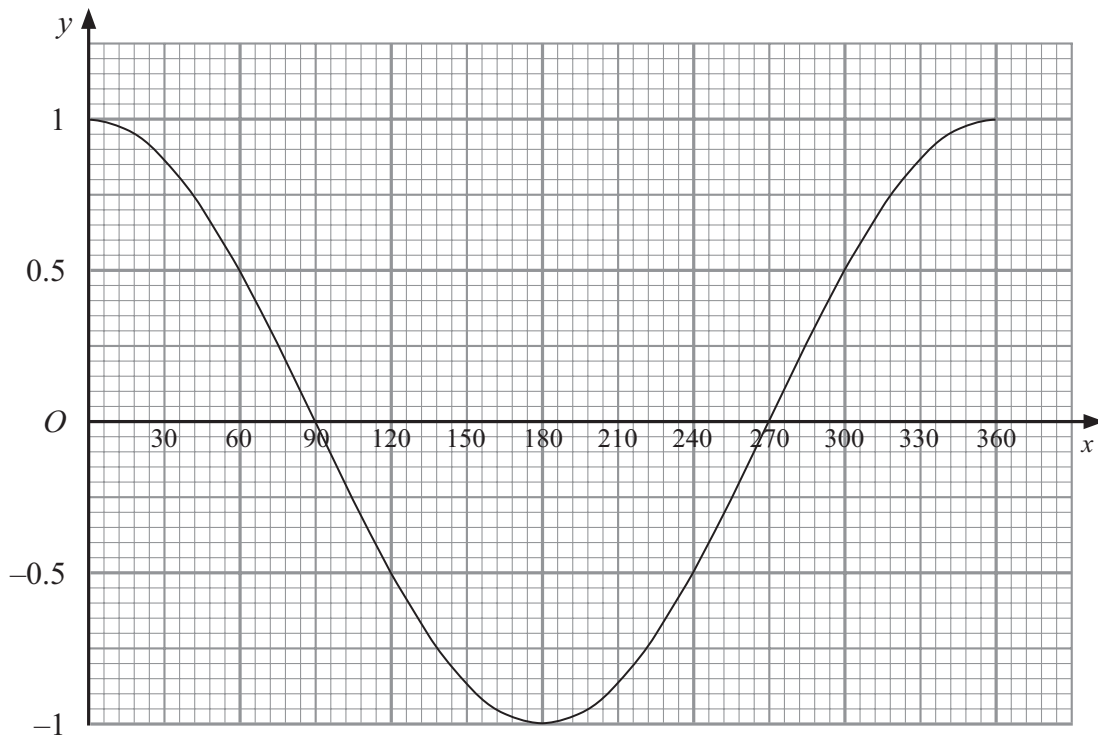
$n$  is a whole number.

(ii) Prove that  $n^2 + (n + 1)^2$  is always an odd number.

Q24

(Total 4 marks)

25. Here is a graph of the curve  $y = \cos x^\circ$  for  $0 \leq x \leq 360$



Use the graph to solve  $\cos x^\circ = 0.75$  for  $0 \leq x \leq 360$

.....

(Total 2 marks)

Q25



26. For all values of  $x$ ,

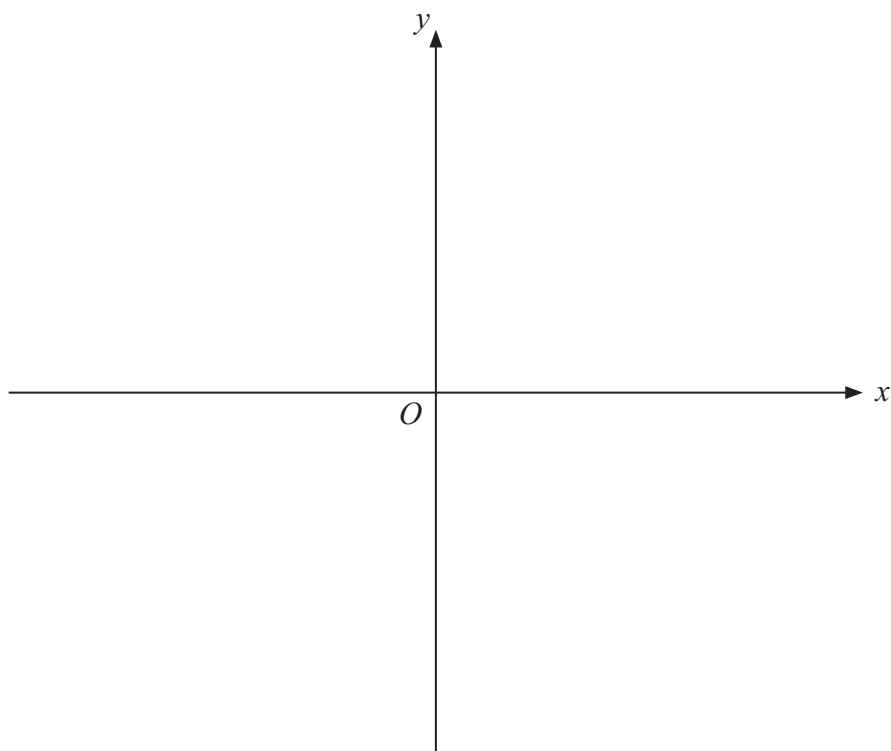
$$x^2 - 6x + 15 = (x - p)^2 + q$$

(a) Find the value of  $p$  and the value of  $q$ .

$$p = \dots\dots\dots, q = \dots\dots\dots$$

(2)

(b) On the axes, draw a sketch of the graph  $y = x^2 - 6x + 15$



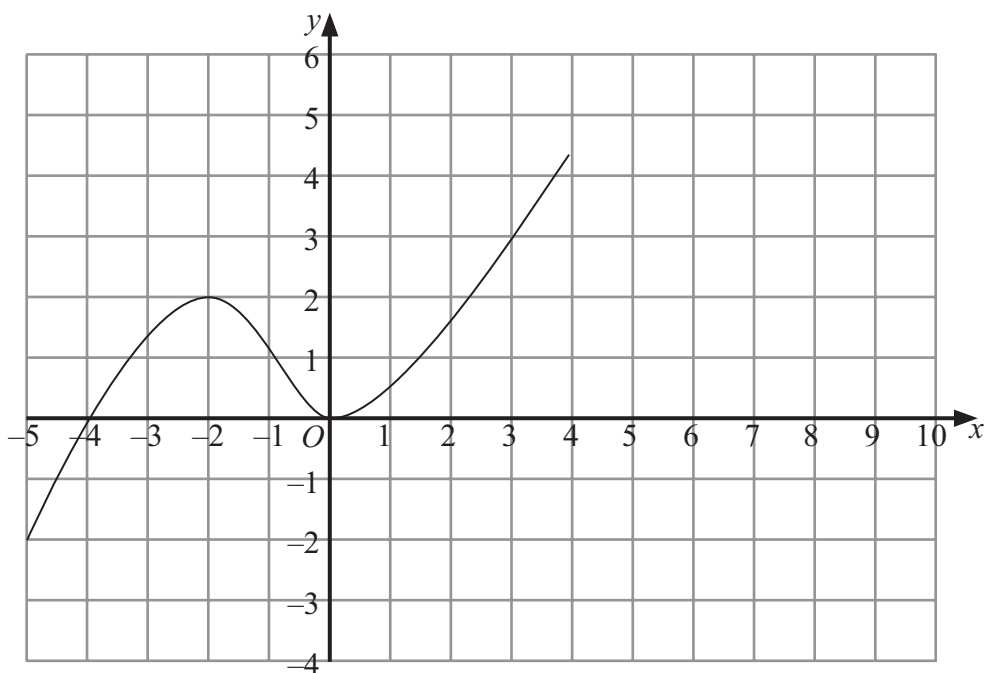
(2)

(Total 4 marks)

Q26

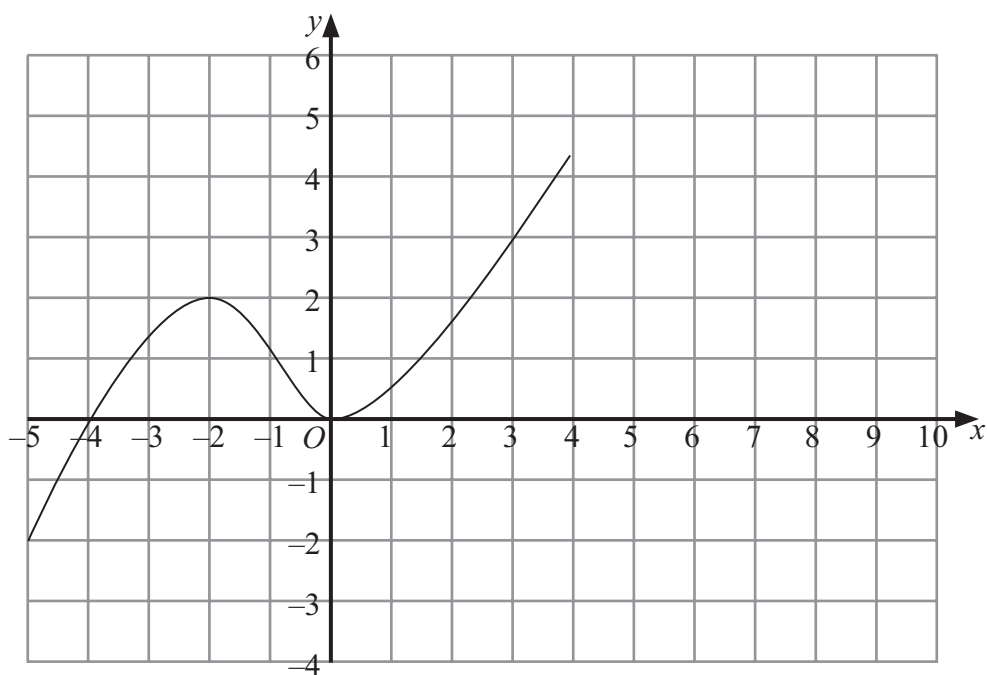


27. The graph of  $y = f(x)$  is shown on the grids.  
 (a) On this grid, sketch the graph of  $y = f(x) + 2$



(2)

- (b) On this grid, sketch the graph of  $y = -f(x)$



(2)

Q27

(Total 4 marks)

TOTAL FOR PAPER: 100 MARKS

END

