Surname	Centre Number	Candidate Number
Other Names		0

GCSE

4352/02

S15-4352-02

MATHEMATICS (UNITISED SCHEME)
UNIT 2: Non-calculator Mathematics
HIGHER TIER

A.M. THURSDAY, 4 June 2015

1 hour 15 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **2**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**2**	
2.	**8**	
3.	**4**	
4.	**5**	
5.	**5**	
6.	**2**	
7.	**2**	
8.	**6**	
9.	**4**	
10.	**4**	
11.	**3**	
12.	**6**	
13.	**4**	
14.	**6**	
15.	**4**	
Total	**65**	

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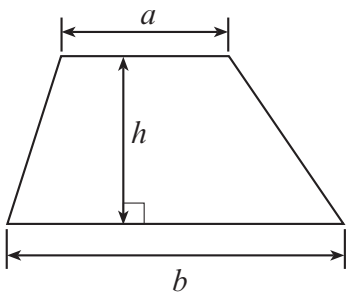
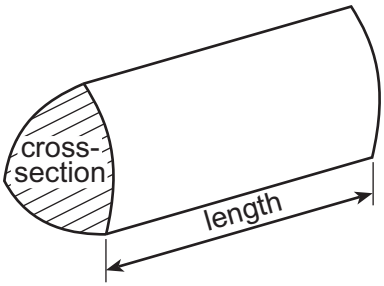
Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$

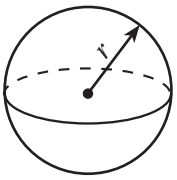


Volume of prism = area of cross-section × length



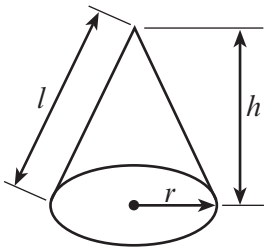
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

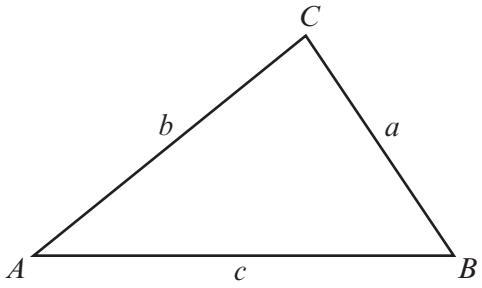


In any triangle ABC

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 = $\frac{1}{2}ab\sin C$



The Quadratic Equation

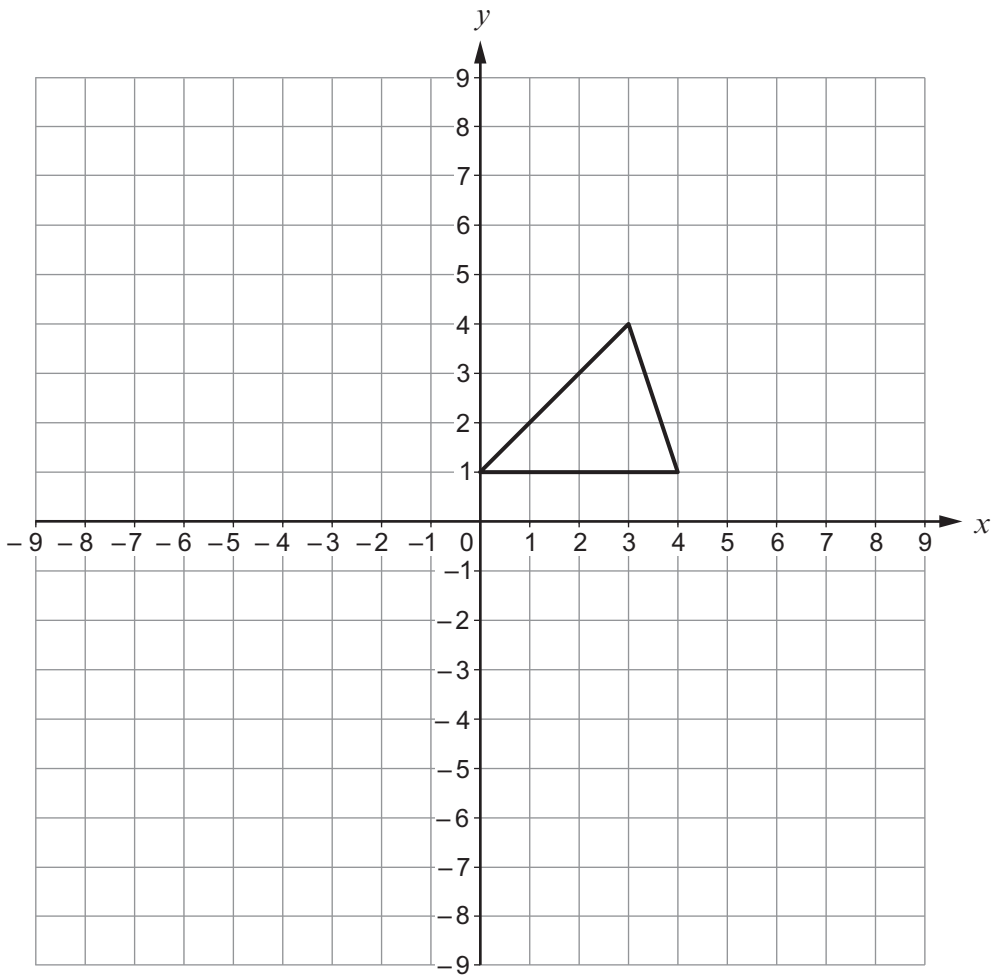
The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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

Examiner only

1. Reflect the given triangle in the line $y = -2$. [2]



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Turn over.

Examiner only

2. *You will be assessed on the quality of your written communication in this question.*

Miriam wants to book a holiday in Portugal. She sees the following advertisement in a travel agent's shop window.

Miriam has already saved £280 for her holiday.
Her weekly wage is £300.
Each week she saves 35% of her wage to go towards her holiday.

Will Miriam be able to pay for the holiday in time to get the 20% reduction? [8]

Examiner only

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Turn over.

Examiner only

3. Sumston School has a total of 600 pupils.
They each travel to school in only one of four ways: by bus, by car, cycle or walk.

On a given day, when all pupils attended school, the probability that a randomly chosen pupil travelled by bus was 0·6 and the probability that the pupil travelled by car was 0·1.

How many pupils cycled or walked to Sumston School on that day? [4]

Examiner only

4. The diagram shows an isosceles triangle ABC where $AB = AC$.

All angles are measured in degrees.

Calculate the size of $B\hat{A}C$. [5]

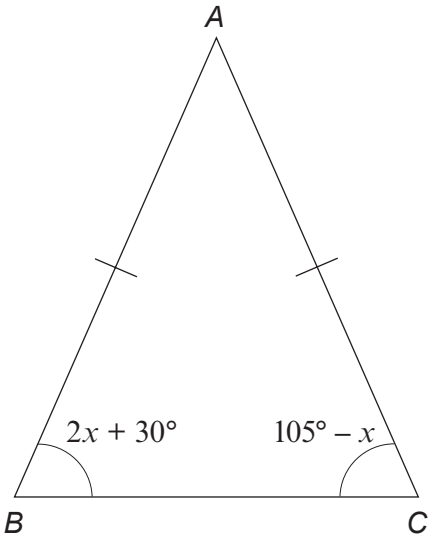

Diagram not drawn to scale

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Examiner only

5. *(a)* Express 80 as a product of prime factors. [2]

(b) Find the lowest common multiple of 80 and 24. [2]

(c) Find the highest common factor of 80 and 24. [1]

Examiner only

6. Write down an expression for the nth term of the following sequence. [2]

10, 21, 32, 43, 54, ...

.....

.....

nth term .....

7. Find the coordinates of the mid-point of the straight line joining the points (–3, –6) and (5, 6). [2]

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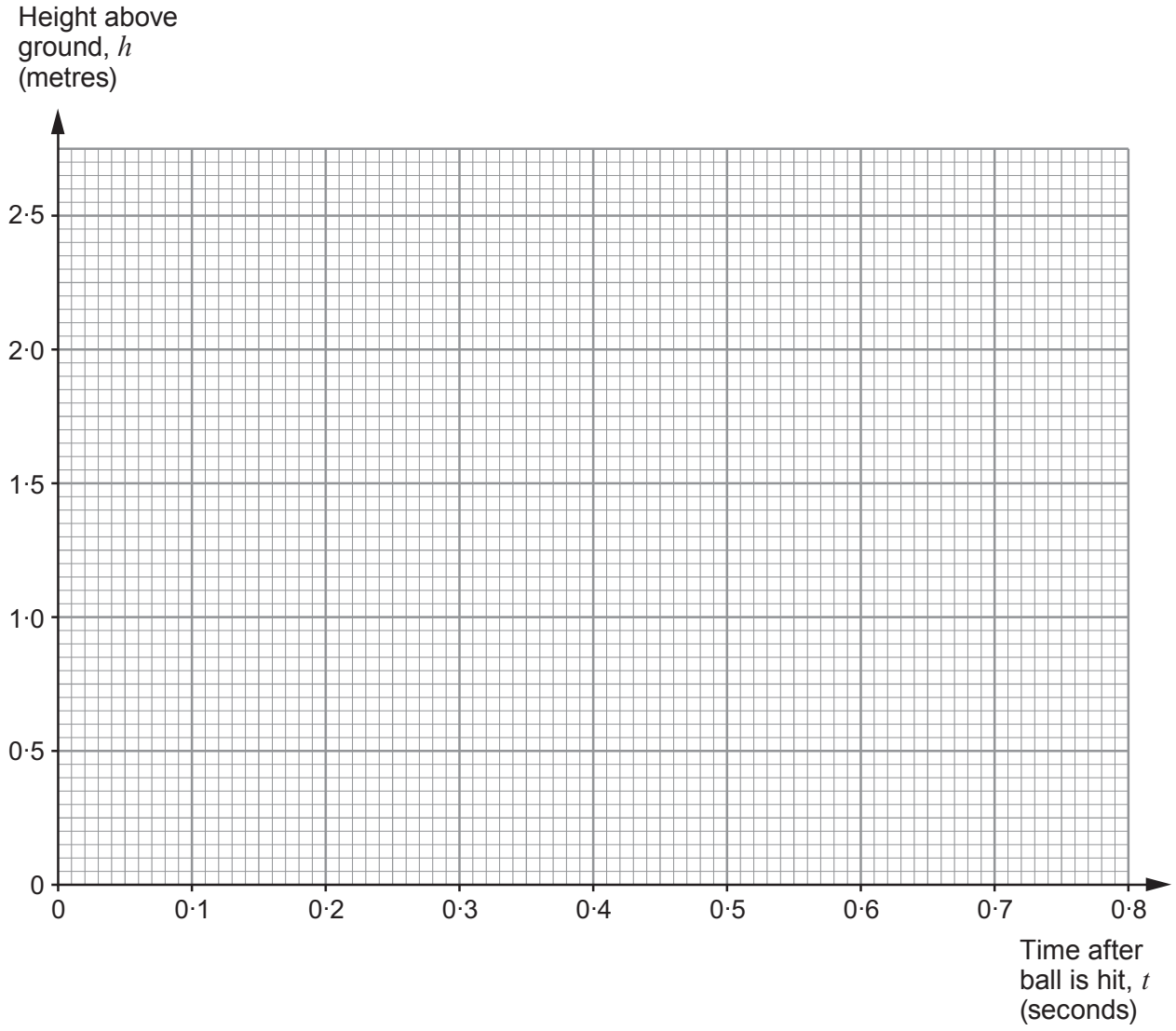
Examiner only

8. Stefan is practising tennis.

After a ball is hit, a camera records its height at different times.
The results are given in the following table.

Time after ball is hit, t (seconds)	0	0·1	0·2	0·3	0·4	0·5	0·6	0·7
Height above ground, h (metres)	2·2	2·25	2·2	2·05	1·8	1·45	1·0	0·45

(a) On the axes below, draw a graph to show the heights of the ball for values of t between 0 and 0·7 seconds. [3]



Examiner only

(b) What is the ball's height above the ground when it is hit? [1]

.....

(c) Use your graph to estimate for how much time the ball is more than 1·3 m above the ground after being hit. [1]

.....

(d) Which of the following equations is a possible formula to give the height of the ball in terms of time? [1]

$h = 2{\cdot}2 + t + 5t^3$ $\quad$ $h = 2{\cdot}2 - 5t$ $\quad$ $h = 2{\cdot}2t - 5t^2$

$h = 2{\cdot}2 + t - 5t^2$ $\quad$ $h = 2{\cdot}2 + 5t^2$

The possible formula is .....

Examiner only

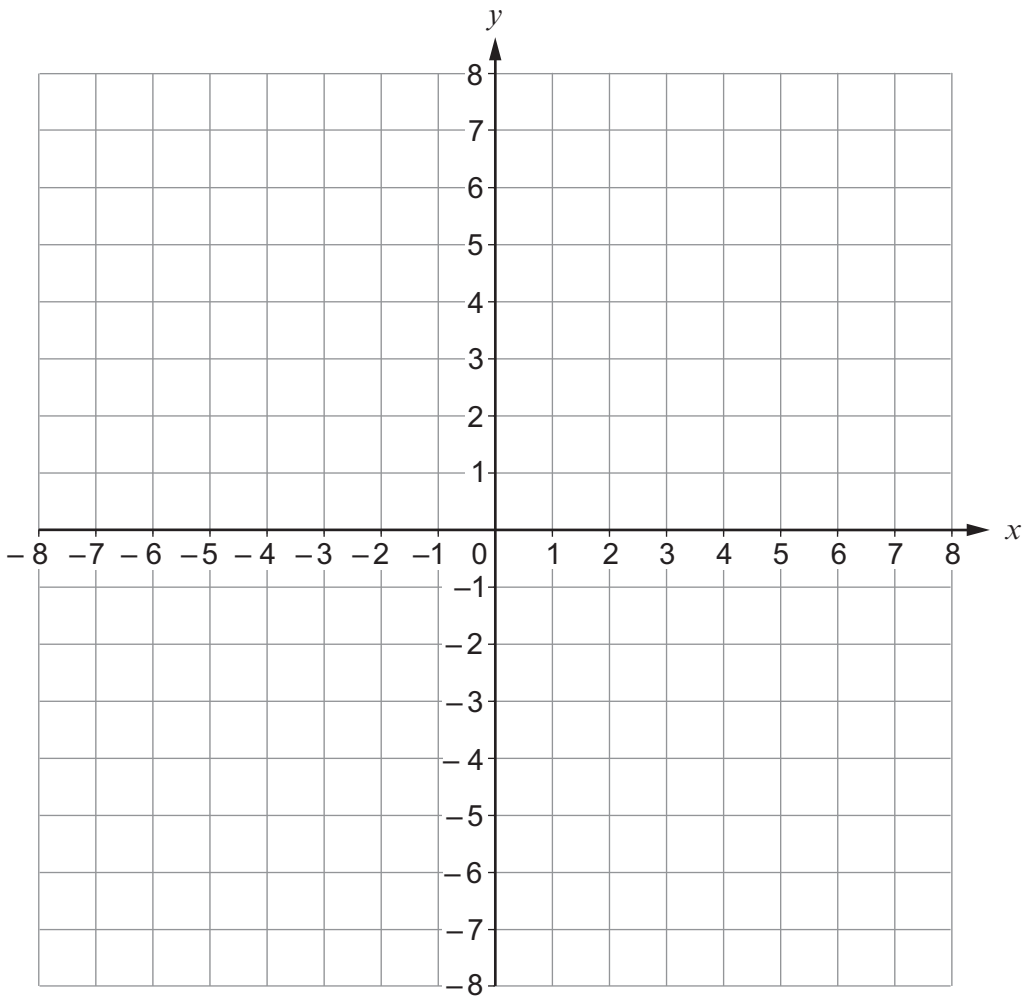
9. On the grid below, draw the region which satisfies all of the following inequalities.

$$x \geqslant -5$$

$$y \leqslant 3$$

$$y - x + 2 \geqslant 0$$

You must clearly indicate the region that represents your answer. [4]



Examiner only

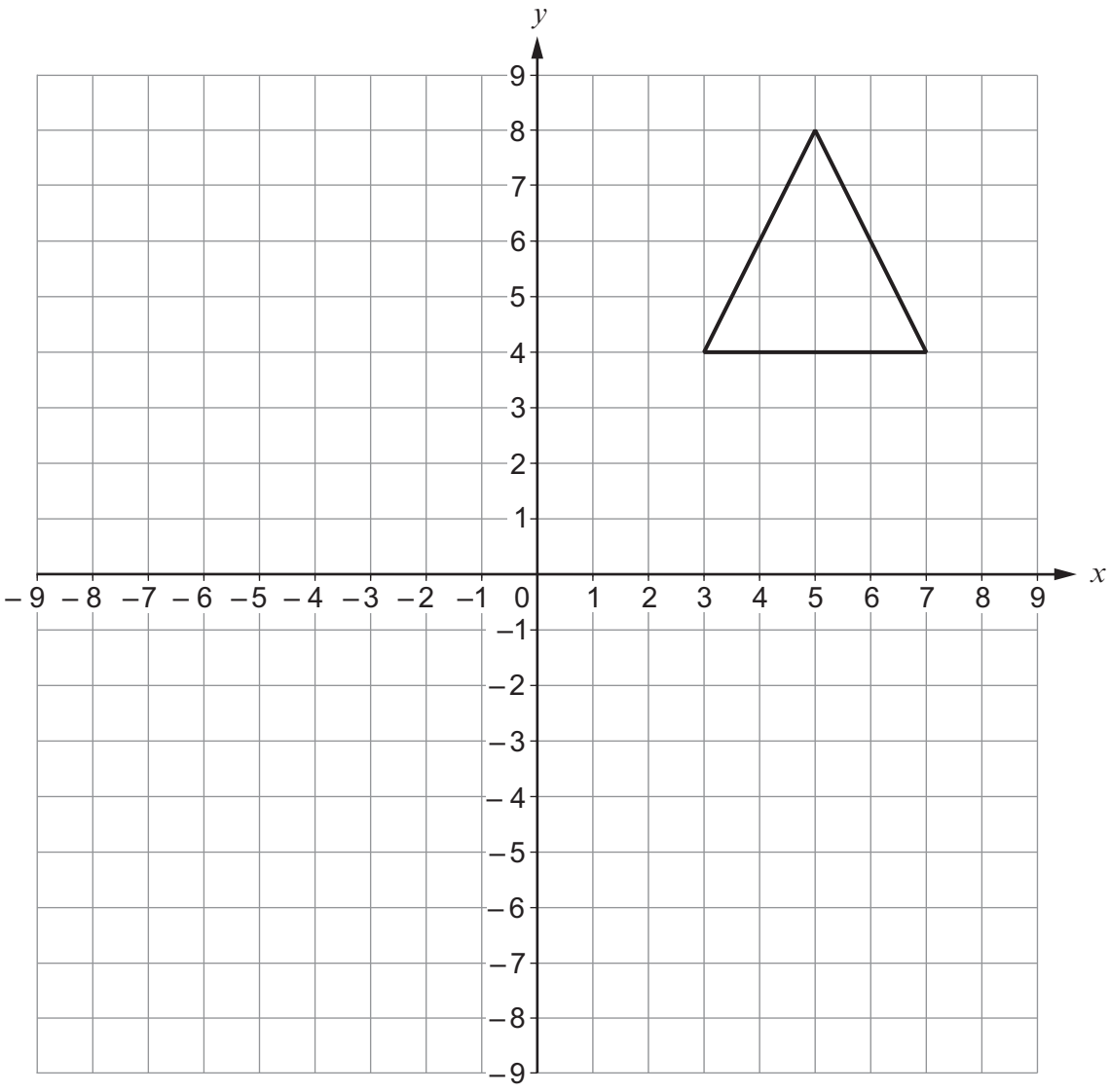
10. Solve the following simultaneous equations using an algebraic method.
You must show all your working. [4]

$$3x + 5y = 6{\cdot}5$$

$$2x - 2y = -9$$

Examiner only

11. Enlarge the given triangle, using scale factor $-\frac{1}{2}$ and centre (3, −2). [3]



Examiner only

12. *(a)* Express $0\dot{7}\dot{4}$ as a fraction. [2]

(b) Simplify $\left(\sqrt{18} + \sqrt{2}\right)^2$. [2]

(c) Evaluate $25^{-\frac{3}{2}}$. [2]

Examiner only

13. The points *A*, *B*, *C* and *D* lie on the circumference of a circle with centre *O*.
All the angles are measured in degrees.

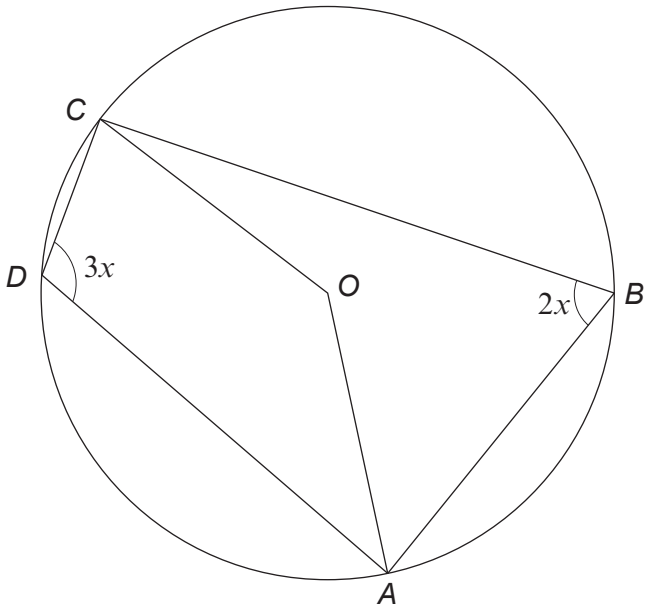


Diagram not drawn to scale

Find the size of the **obtuse** angle $A\hat{O}C$. [4]

Examiner only

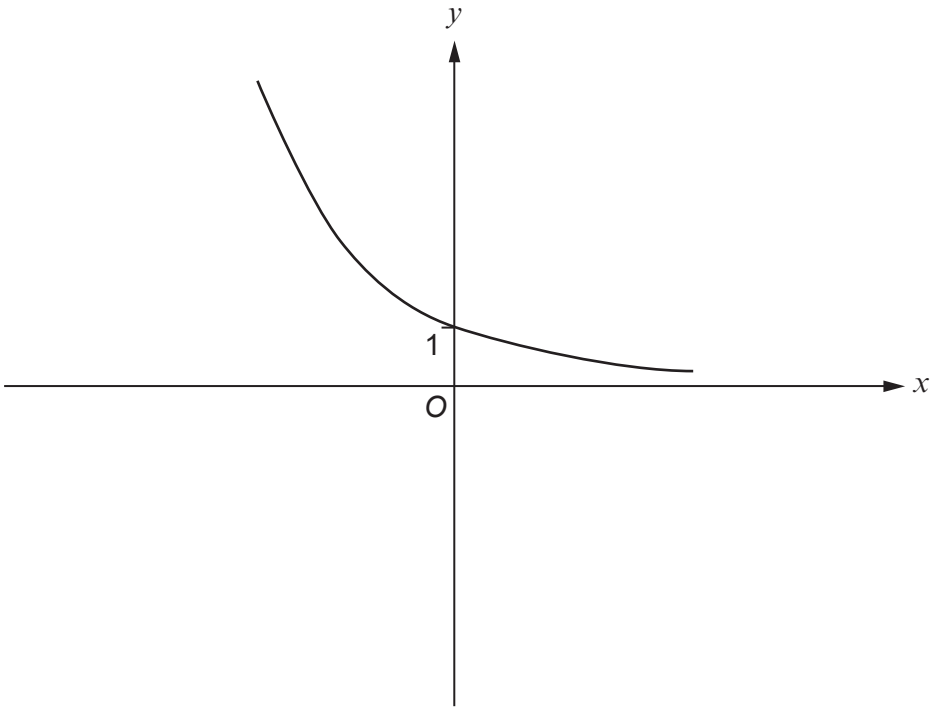
14. A bag contains 5 yellow cards, 9 red cards and 1 black card.
Two cards are to be picked at random, without replacement.

(a) Find the probability of picking 2 yellow cards. [2]

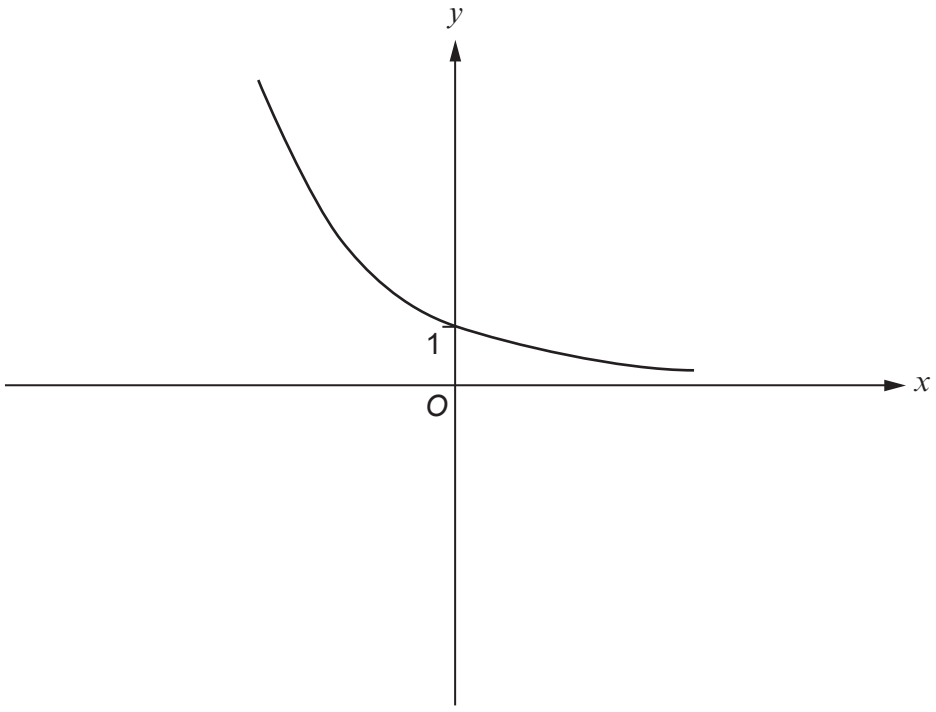
(b) Find the probability that the two cards picked will not be the same colour. [4]

Examiner only

15. *(a)* The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 5$.
Mark clearly the value of y at the point where your curve crosses the y-axis. [2]



(b) This diagram again shows a sketch of $y = f(x)$.
On this diagram, sketch the curve $y = -f(x)$.
Mark clearly the value of y at the point where your curve crosses the y-axis. [2]



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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only