

Write your name here

Surname

Other Names

Mathematics

**June 2017 Paper 1 (Non Calculator)
Part 2 (Second half of the paper)
Edexcel Higher Tier**

Time: 45 minutes

Q	Topic	Max Mark	My Marks
14	Ratio Problems	4	
15	Cones	4	
16	Algebraic Proof	4	
17	Conditional probability	4	
18	Perpendicular Lines	4	
19	Vectors Proof	4	
20	Quadratic Simultaneous Equations	5	
21	Congruent Triangles	4	
22	The Cosine Rule	5	
	Total	38	

For worked solutions and video solutions visit mathsgenie.co.uk

- 14** White shapes and black shapes are used in a game.
Some of the shapes are circles.
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3:7

The ratio of the number of white circles to the number of white squares is 4:5

The ratio of the number of black circles to the number of black squares is 2:5

Work out what fraction of all the shapes are circles.

.....
(Total for Question 14 is 4 marks)



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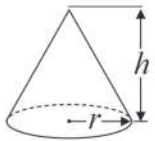
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15 A cone has a volume of 98 cm^3 .
The radius of the cone is 5.13 cm .

(a) Work out an estimate for the height of the cone.

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



.....cm
(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?
Give reasons for your answer.

.....
.....
.....
(1)

(Total for Question 15 is 4 marks)

16 n is an integer greater than 1

Prove algebraically that $n^2 - 2 - (n - 2)^2$ is always an even number.

(Total for Question 16 is 4 marks)



17 There are 9 counters in a bag.

7 of the counters are green.

2 of the counters are blue.

Ria takes at random two counters from the bag.

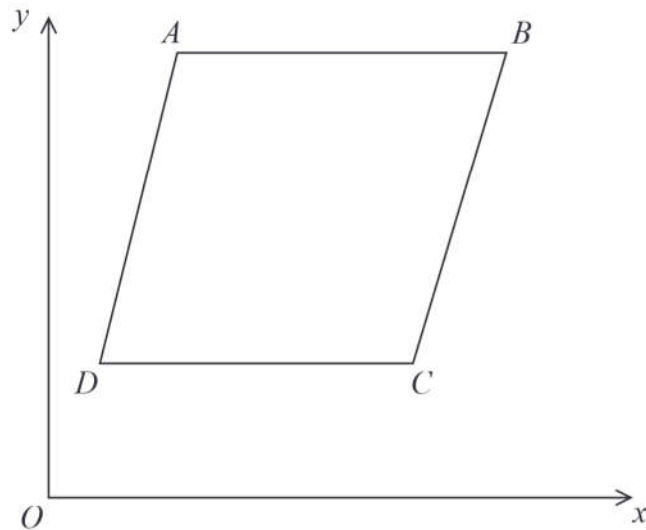
Work out the probability that Ria takes one counter of each colour.

You must show your working.

.....
(Total for Question 17 is 4 marks)



18



$ABCD$ is a rhombus.

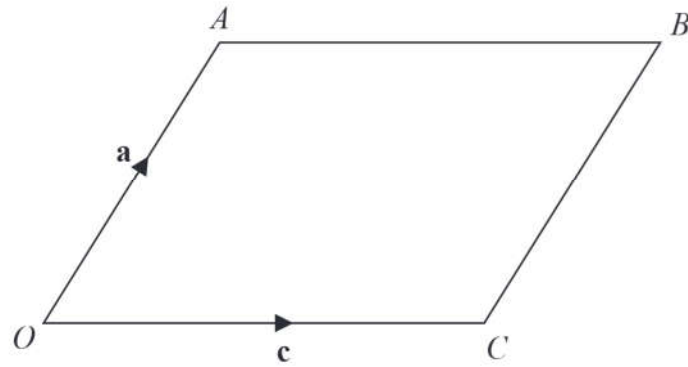
The coordinates of A are $(5, 11)$

The equation of the diagonal DB is $y = \frac{1}{2}x + 6$

Find an equation of the diagonal AC .

(Total for Question 18 is 4 marks)





$OABC$ is a parallelogram.

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OC} = \mathbf{c}$$

X is the midpoint of the line AC .

OCD is a straight line so that $OC : CD = k : 1$

$$\text{Given that } \vec{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a}$$

find the value of k .

$$k = \dots\dots\dots$$

(Total for Question 19 is 4 marks)



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20 Solve algebraically the simultaneous equations

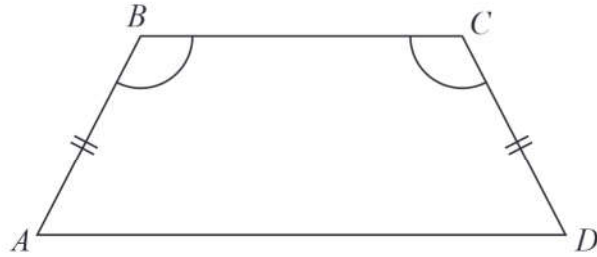
$$x^2 + y^2 = 25$$

$$y - 3x = 13$$

(Total for Question 20 is 5 marks)



21 $ABCD$ is a quadrilateral.



$$AB = CD.$$

$$\text{Angle } ABC = \text{angle } BCD.$$

Prove that $AC = BD$.

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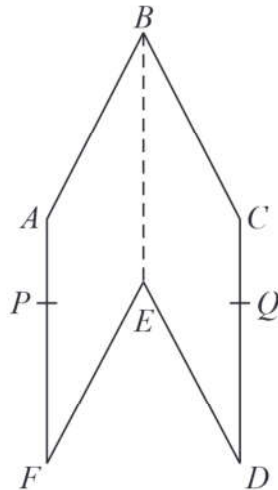
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(Total for Question 21 is 4 marks)



22 The diagram shows a hexagon $ABCDEF$.



$ABEF$ and $CBED$ are congruent parallelograms where $AB = BC = x$ cm.
 P is the point on AF and Q is the point on CD such that $BP = BQ = 10$ cm.

Given that angle $ABC = 30^\circ$,

prove that $\cos PBQ = 1 - \frac{(2 - \sqrt{3})x^2}{200}$

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

