DULWICH COLLEGE
FOUNDED 1619

YEAR 7 ENTRANCE AND SCHOLARSHIP EXAMINATION
Mathematics
Specimen Paper E

Your Last Name	
Your First Name	
Your Current School	
Candidate Number	

Time allowed for this paper: 1 hour

Instructions

- Attempt all the questions.
- Calculators must not be used.
- Show all of your working on this paper.
- There are 100 marks available in total for this test.
- You must not write in the squares on the bottom right of each page.
- The marks available for each part of a question are given in square brackets.

Calculate:

1. $397 + 784 + 86$

Answer: _____ [2]

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2. 89×19

Answer: _____ [2]

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3. $60.2 \div 7$

Answer: _____ [2]

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4. $3.88 - 1.111$

Answer: _____ [2]

Page total:

5. Write down the next two terms in each of the sequences below:

(a) 5 , 9 , 13 , 17 , _____ , _____

[1]

(b) 1000 , 100 , 10 , _____ , _____

[2]

(c) 1 , 3 , 4 , 7 , 11 , _____ , _____

[2]

(d) 2 , 3 , 5 , 7 , 11 , _____ , _____

[2]

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6. Circle the factors of 150:

100	30	7	11
10	3	8	45

[2]

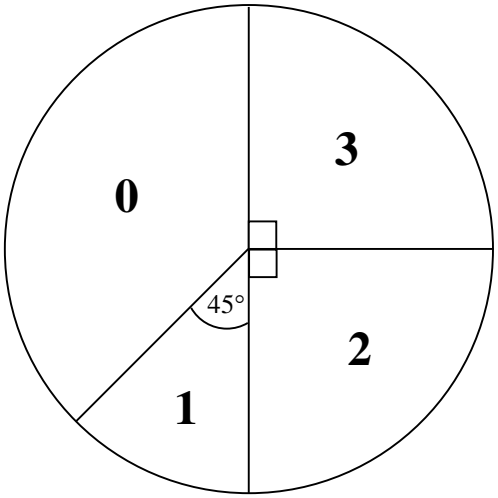
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7. Subtract $4 + (2 \times 13)$ from $(4 + 2) \times 13$.

Answer: _____ [2]

Page total:

8. In a survey a group of children were asked how many siblings (i.e. brothers and sisters) they have. No-one in the group had more than three siblings, and the results are shown in the pie chart below.



(a) Write down the percentage of children who have two siblings.

Answer: _____% [1]

(b) Work out the fraction of children who have no siblings, giving your answer in its lowest terms.

Answer: _____ [2]

8 of the children who were surveyed had one sibling.

(c) Fill in the table below to show the number of children who have 0, 2 and 3 siblings.

Number of siblings	0	1	2	3
Number of children surveyed		8		

[3]

(d) Write down the mode of the number of siblings.

Answer: _____ [1]

Page total:

9. (a) Calculate $0.75 + \frac{2}{5} + \frac{17}{100}$, leaving your answer as a decimal.

Answer: _____ [3]

(b) Write $\frac{12}{75}$ as a decimal.

Answer: _____ [2]

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10. Write down a fraction whose numerator and denominator are both whole numbers and whose value is between $\frac{7}{13}$ and $\frac{8}{13}$.

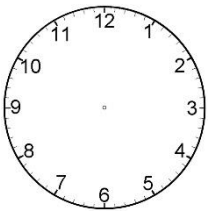
Answer: _____ [3]

Page total:

11. *In this question you may use the clock pictures to help you but you do not have to draw on them and there are no marks for doing so.*

(a) Work out the angle the hour hand of a clock turns through between:

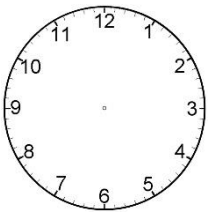
(i) 4pm and 6pm.



°

Answer: _____ [2]

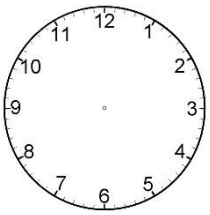
(ii) 2.30pm and 3.50pm.



°

Answer: _____ [3]

(b) Work out the angle between the hour and minute hands when the time is 3.15pm.

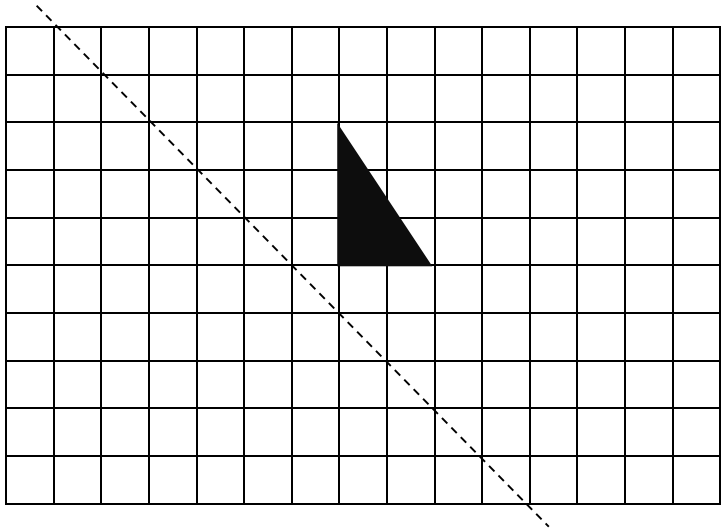


°

Answer: _____ [2]

Page total:

12. (a) Draw the reflection of this triangle in the mirror line shown.



Mirror line

[2]

(b) If the side of each square on the grid represents 1 metre, work out the area of the triangle.

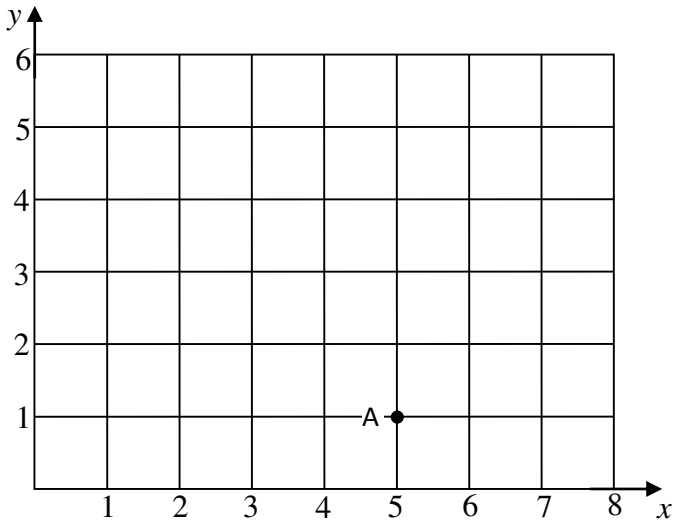
Answer: _____ m^2 [2]

(c) Work out the percentage of the total area of the grid that the original triangle covers.

Answer: _____% [3]

Page total:

13. A, B and C are 3 points on a grid. A is at (5, 1), B is at (1, 1) and C is at (3, 5).



(a) Plot the points B and C and then join A to B, B to C and C to A. [2]

(b) State what type of triangle has been formed.

Answer: _____ [1]

The points A, B, C and a new point D will form a parallelogram when joined in that order.

(c) Write down the co-ordinates of D.

Answer: D is at (____ , ____) [2]

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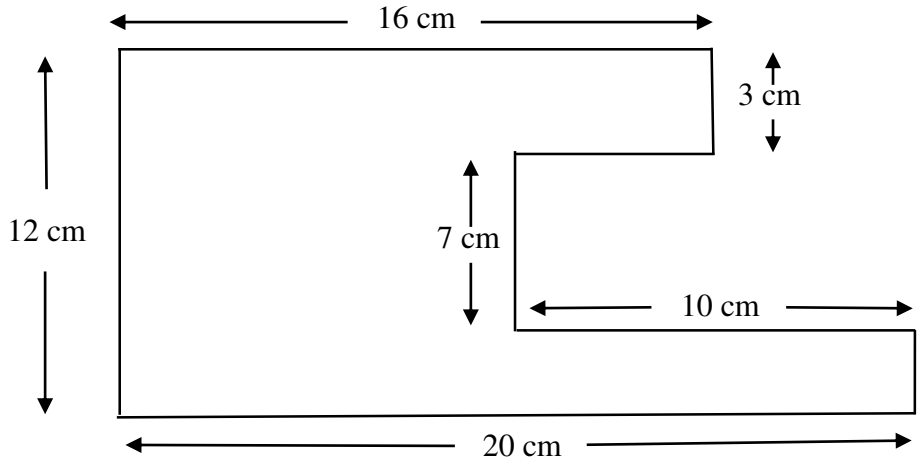
14. A bottle contains 150 ml of juice. Alex drinks 50% more than Jane and these two friends finish the bottle between them. Calculate how much Alex drinks.

Answer: _____ ml [3]

Page total:

15. Work out the area and perimeter of this shape.

Note: all angles are right angles but the diagram has not been drawn to scale.



Answer: Area = _____ cm^2 [3]

Answer: Perimeter = _____ cm [3]

Page total:

16. John takes the train to school from Brixton to West Dulwich every day. Here is part of his train timetable:

London Victoria	0740	0755	0809	0825
Brixton	0747	0802	0816	0832
Herne Hill	0749	0804	0818	0834
West Dulwich	0752	0807	0821	0837
Sydenham Hill	0754	0809	0823	0839
Penge East	0757	0812	0826	0842
Kent House	0759	0814	0828	0844
Beckenham Junction	0801	0816	0830	0846

(a) It is an 8 minute walk from John's house to Brixton station, and a 6 minute walk from West Dulwich to his form room at Dulwich College. Work out what time John will arrive at his form room if he leaves home at 0805.

Answer: _____ [2]

(b) On another day, John leaves home at 0803, but the 0809 train from London Victoria is cancelled. Work out how many minutes late John will be for registration, which starts at 0835.

Answer: _____ minutes [3]

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17. The mean (average) of seven numbers is 9. One number is removed and the mean increases to 10. Find the number which was removed.

Answer: _____ [3]

Page total:

18. Write each of the numbers 31, 32, 33, 34, 35 and 36 in the spaces below, using each number only once, to make all of the statements true.

_____ is a multiple of 8

_____ has exactly four factors

_____ is a square number

_____ is a prime number

_____ is a factor of 105

_____ is a multiple of 3

[6]

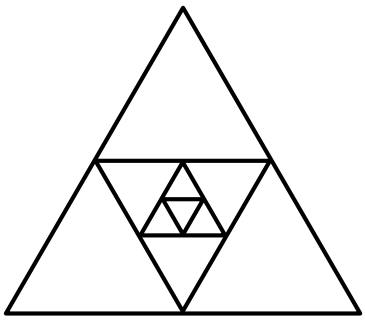
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19. Sachin can clean his flat in 3 hours, and Peter can clean the same flat in 6 hours. Calculate how long it will take to clean the flat if they work together.

Answer: _____ hours [4]

Page total:

20. Four equilateral triangles have been drawn, one inside the other, as shown in the diagram below.



The area of the smallest triangle is 1 cm^2.

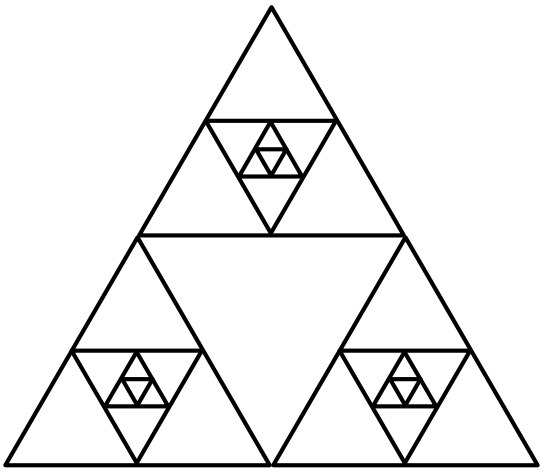
(a) Work out the area of the largest triangle.

Answer: _____ cm^2 [2]

(b) Work out how many triangles there are in total in the diagram above.

Answer: _____ [2]

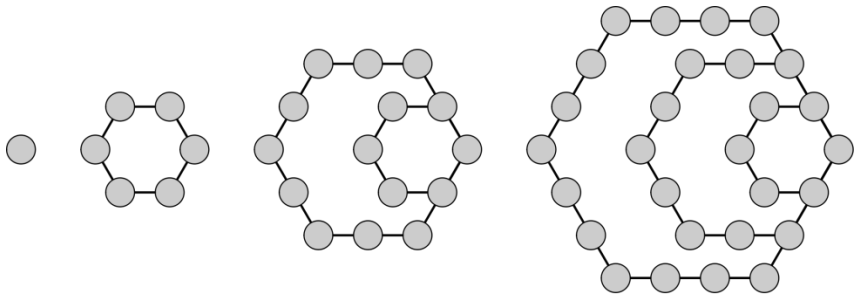
Three copies of the triangle above are put together to form the diagram below. Work out how many triangles there are in total in this diagram.



Answer: _____ [2]

Page total:

21. The number of dots in each of the four diagrams below give the first four hexagonal numbers.



Complete the table below to show the first four hexagonal numbers.

First Hexagonal Number	1
Second Hexagonal Number	
Third Hexagonal Number	15
Fourth Hexagonal Number	

[2]

The hexagonal numbers also follow a numerical pattern.

First Hexagonal Number	$(2 \times 1) \div 2$	1
Second Hexagonal Number	$(4 \times 3) \div 2$	
Third Hexagonal Number	$(6 \times 5) \div 2$	15
Fourth Hexagonal Number	$(8 \times 7) \div 2$	

Complete the table below to work out the Fifth and Twentieth Hexagonal Numbers**, showing your working in exactly the same way as in the table above**.

Fifth Hexagonal Number		
Twentieth Hexagonal Number		

[4]

Page total:

22. The instruction x ♣ y means square x and then add y.

For example: $2 \clubsuit 3 = 2^2 + 3 = 4 + 3 = 7$

(a) Work out the value of $4 \clubsuit 5$

Answer: _____ [2]

(b) What is the value of a if $6 \clubsuit a = 25$

Answer: _____ [2]

The instruction $(x \clubsuit y) \clubsuit z$ means work out $x \clubsuit y$ first, and then apply ♣ again to your answer and z.

For example: $(2 \clubsuit 3) \clubsuit 4 = (2^2 + 3) \clubsuit 4$
$= 7 \clubsuit 4$
$= 7^2 + 4$
$= 49 + 4$
$= 53$

(c) Work out the value of $(3 \clubsuit 2) \clubsuit 8$

Answer: _____ [2]

(d) Work out the value of b if $(b \clubsuit 1) \clubsuit 7 = 107$

Answer: _____ [2]

Page total:

End of the Examination

If you have time, go back and check your answers and make sure that you have shown all of your working.