ST ALBANS SCHOOL

11+ Mathematics Examination

Remember that you must **not** use a calculator to answer any question in this examination, but it is very important to show your working as you may get marks for this.

You do not need any geometry equipment.

The maximum marks for each question are shown in brackets. There are 21 pages of questions. The maximum total for this paper is 100 marks.

You have 60 minutes for this paper.

Name …… Date of Birth ……..

Section A Mathematical Skills	Section B Problem Solving	**Total**
30	70	100

SECTION A: MATHEMATICAL SKILLS

1. Fill in the three missing numbers to make these four fractions equivalent

$$\frac{4}{\quad} = \frac{\quad}{10} = \frac{12}{15} = \frac{20}{\quad}$$

(1)

2. (a) Given that

$$\frac{3}{7} + \frac{1}{6} = \frac{25}{42}$$

write down the answer to

$$\frac{25}{42} - \frac{1}{6} = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

(1)

(b) Given that

$$\frac{4}{5} \times \frac{11}{12} = \frac{11}{15}$$

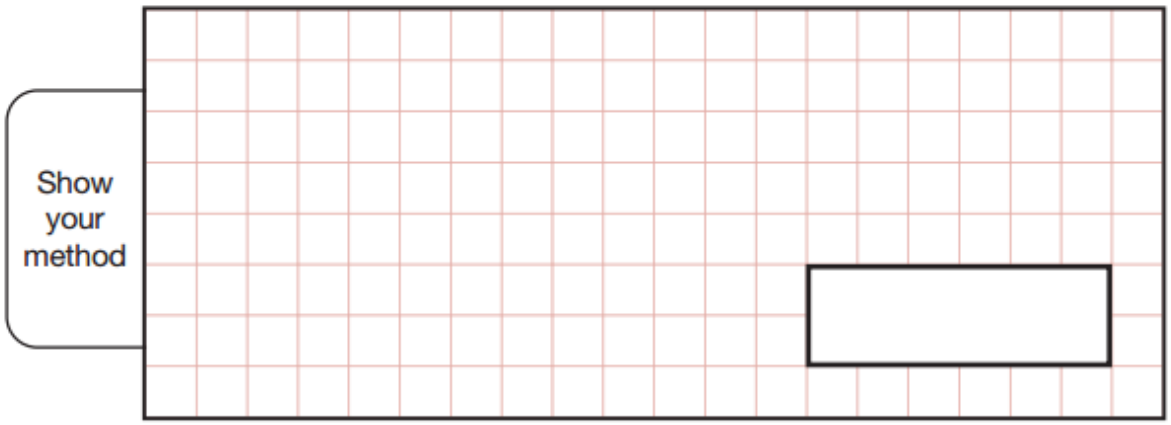
write down the answer to

$$\frac{11}{15} \div \frac{4}{5} = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

(2)

3. (a) Calculate

$$27 \times 36$$



(2)

(b) Use your answer to part (a) to write down the answer to

$$27 \times 18 =$$

…….

(1)

(c) Use your answer to part (a) to write down the answer to

$$2.7 \times 3.6 =$$

…….

(1)

4. Given that

$$352 \times 48 = 16896$$

work out

$$16896 \div 24 =$$

…….

(2)

5. (a) Write

0.427

as a fraction

..... (1)

(b) Write

$\frac{6}{20}$

as a percentage

..... (1)

6. (a) How many centimetres are there in five kilometres?

Show your method

(2)

(b) How many times does two hundred go into one million?

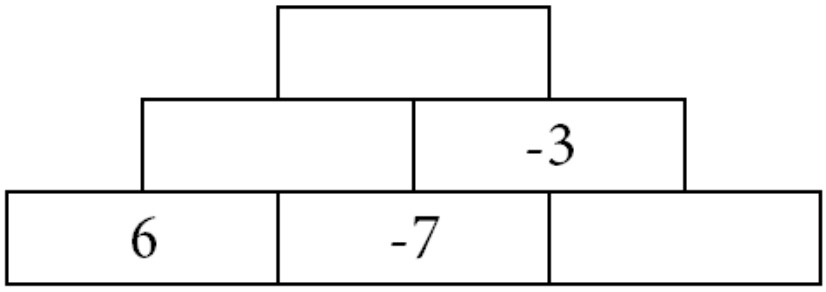
Show your method

(2)

7. Write in words the answer to one hundred thousand subtract one hundred and eleven.

..... (2)

8. In this number pyramid, the number in each block is found by adding together the numbers in the two blocks immediately below. Fill in the missing numbers.



(2)

Page Total

9. Decide whether for each of the following is correct or not. Write Y for 'yes' and N for 'no'.

(a) $15 - 3 \times 7 = -6$

..... (1)

(b) $3 + 5 \times 4 = 32$

..... (1)

(c) $6 \times 3 + 2 = 20$

..... (1)

10. Calculate

$$28.3 - 1.64 + 0.57$$

Show your method

(2)

11. Work out the answer to the following, giving your answer as a **decimal**.

$$8 + \frac{7}{10} + \frac{91}{100}$$

Show your method

(2)

12. What is half of 1.1 ?

…… (1)

13. Look at the following four numbers, each of which represents a digit in a four-digit number.

9, 2, 8, 3

Using each number **once only**:

(a) Write down the **largest** number you can make.

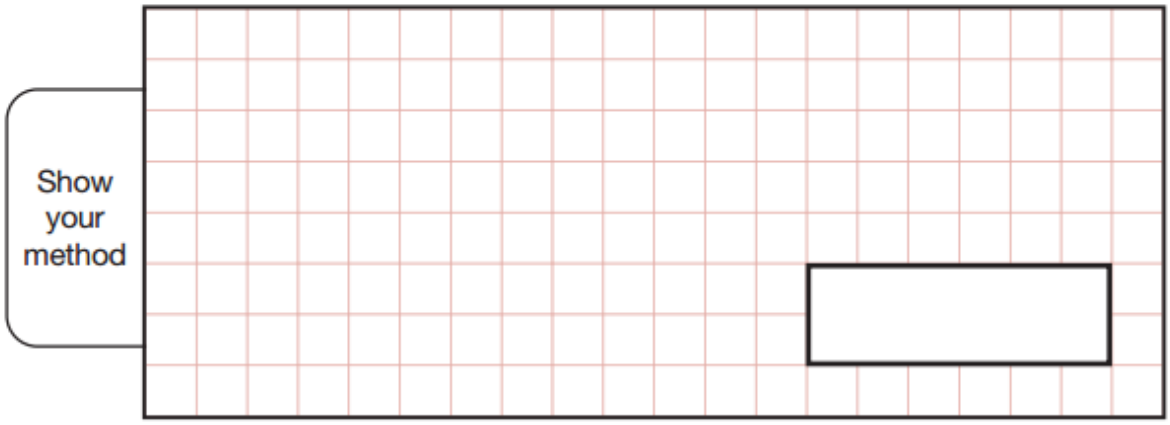
…… (1)

(b) Write down the smallest **even** number you can make.

…… (1)

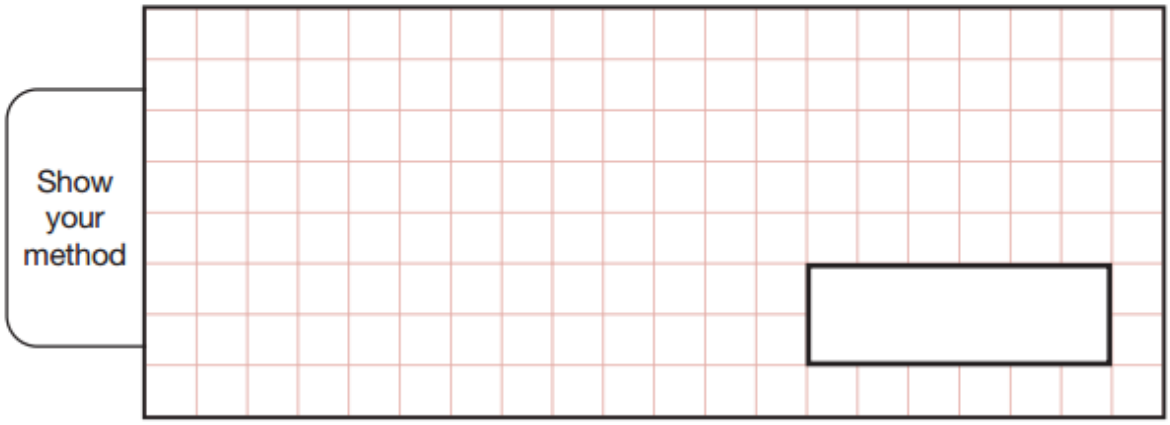
SECTION B: PROBLEM SOLVING

14. (a) An aeroplane leaves Heathrow at 21:26 and arrives at Atlanta at 10:45 on the following day. How long does this journey take, in hours and minutes?



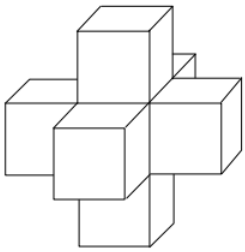
(2)

(b) In fact, the times were given as local times. The time in Atlanta is five hours behind U.K. time. What is the actual length of the journey?



(2)

15. One cube has each of its faces covered by one face of an identical cube, making a solid as shown.



The total volume of the solid is 56 cm^3.

(a) Find the width of one cube, in cm.

Show your method

(2)

(b) Find the total surface of the solid, in cm^2.

Show your method

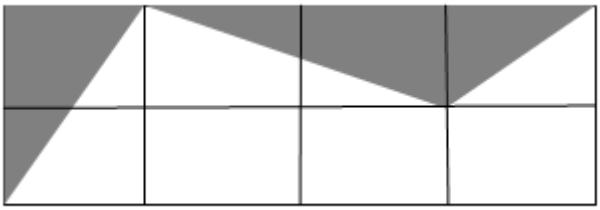
(3)

16. Write + or – in each space to make the calculation correct

$$123 \quad 45 \quad 67 \quad 89 = 100$$

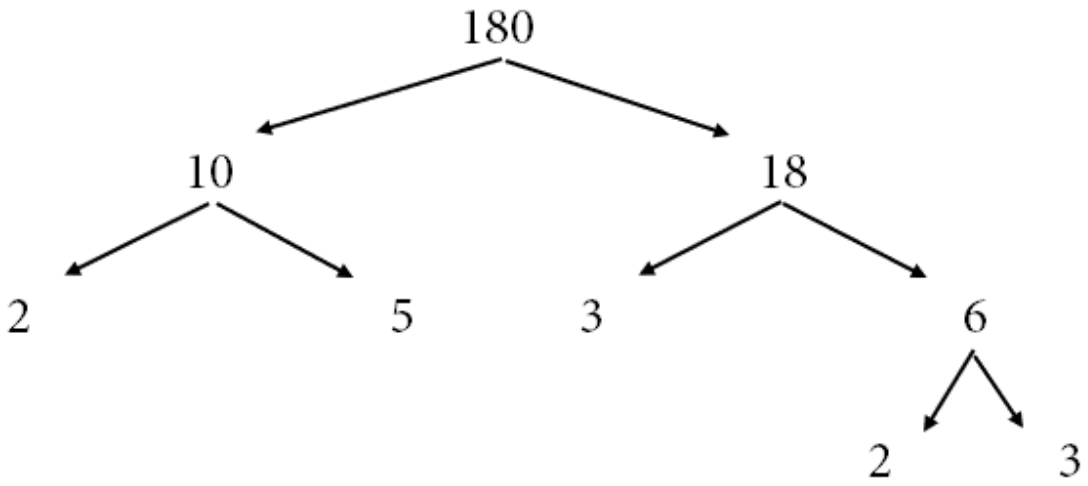
(2)

17. What fraction of this shape is shaded?



..... (3)

18. A factor tree can be used to write any number as a product of prime factors.



We can say that

$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

(The order of the numbers does not matter)

Use a factor tree, or any other method you know, to write **420** as a product of prime factors.

..... (4)

Page Total

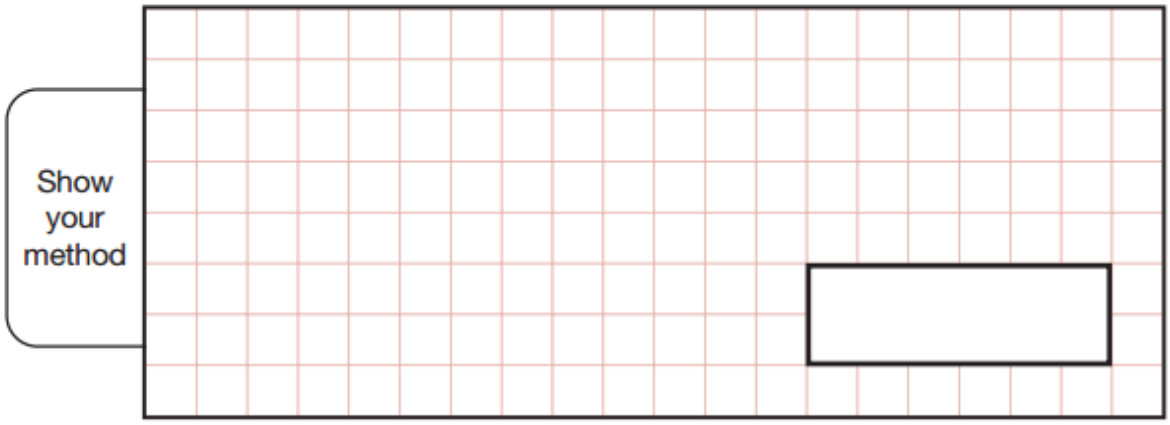
19. Year 6 were playing a number game

Emily said, 'If I multiply my number by 4 and then subtract 5, I get the same answer as multiplying my number by 2 and then adding 1'.

(a) Faye called Emily's number x and formed the following equation:

$$4x - 5 = 2x + 1$$

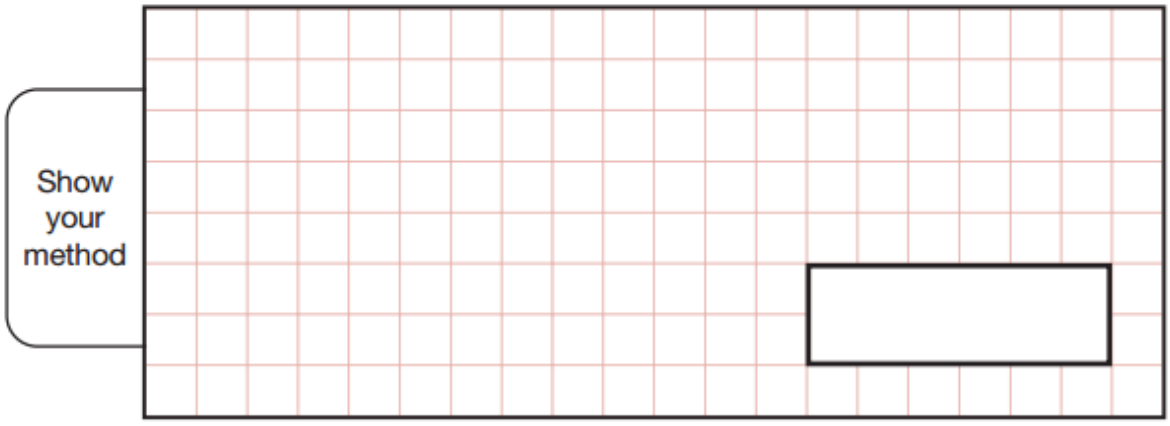
Solve this equation and write down the value of x, showing your working clearly.



(2)

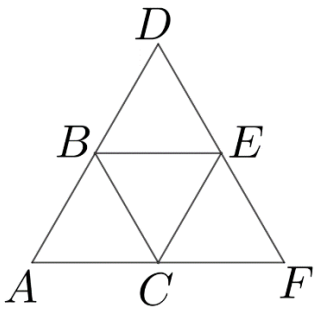
Gemma said, 'Multiplying my number by 2 and then adding 5 gives the same answer as subtracting my number from 23'.

(b) Find Gemma's number, showing your working clearly.

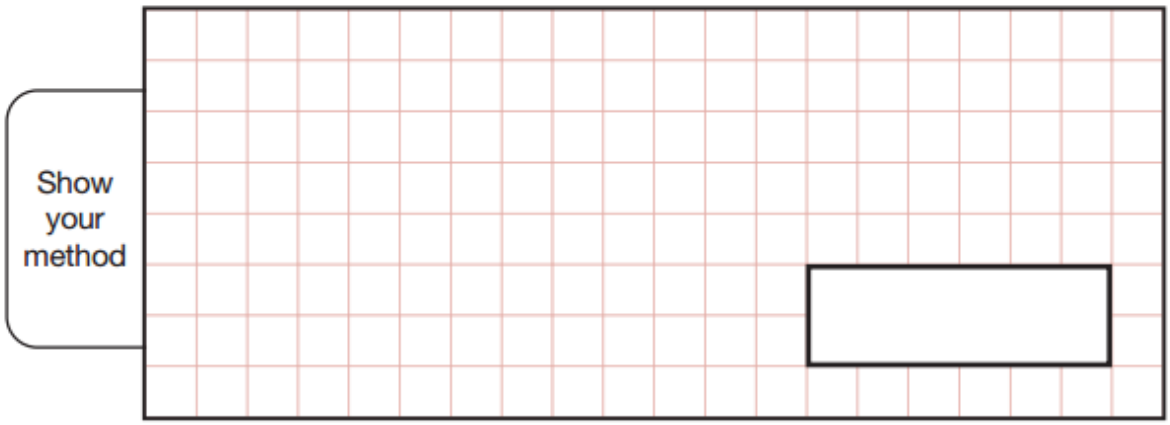


(2)

20. The equilateral triangle ADF is split into four equally sized smaller equilateral triangles.



(a) Two of the four small triangles are to be painted black and the other two are to be painted white. In how many different ways can this be done?



(2)

Ben thinks that he can draw a copy of the of triangles without taking his pencil off the page **and** without going over the same line twice. He begins at A and then travels to B.

(b) Complete the list below showing the order that Ben's pencil visits the corners of the triangles.

A , B, ...

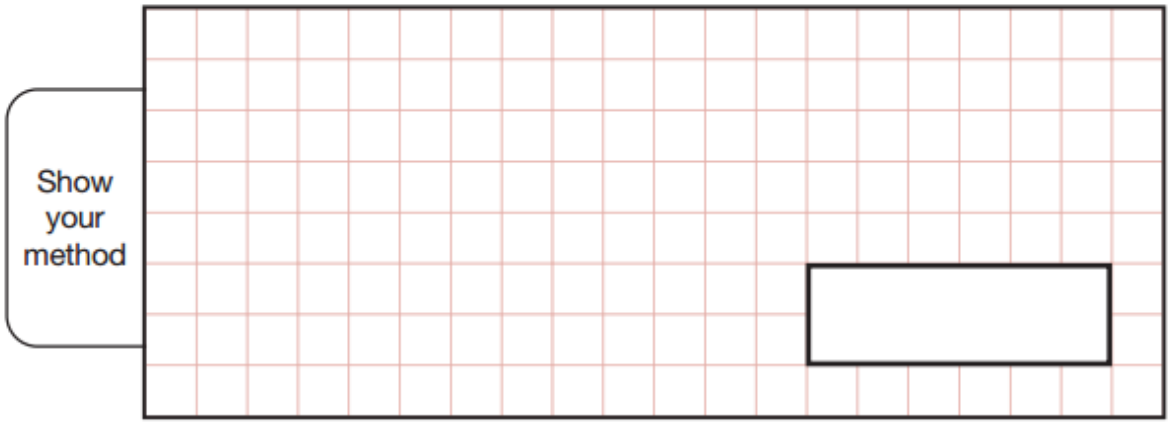
(2)

Page Total

21. Farmer John has 14 horses and farmer Paul has 27.

John buys some horses from Paul and then has 3 more horses than Paul.

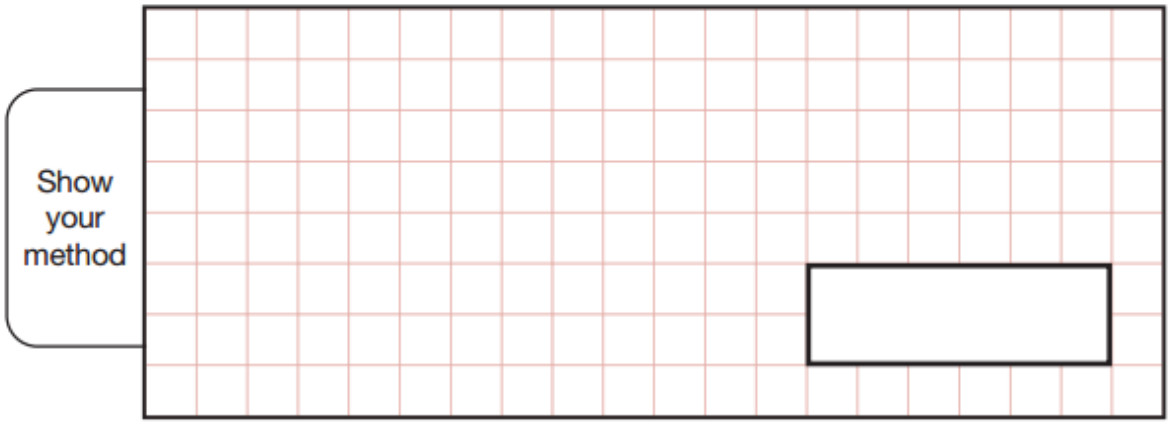
How many did John buy?



(3)

22. What is

$$\frac{1}{3} \text{ of } \frac{1}{4} \text{ of } \frac{1}{5} \text{ of } 360 \text{ ?}$$



(3)

23. Mongle birds can be either pink or green. Some of them eat insects, but the rest prefer seeds. In a particular flock of Mongle birds, there are 17 green birds in total and 12 birds which eat seeds. 9 of the pink birds eat insects and 2 of the green ones eat seeds. How many birds are there in the flock?

(You can use the table to help you)

	Pink	Green	**Total**
Seeds			
Insect			
Total			

…… (3)

24. Each number in this sequence is half of the number before.

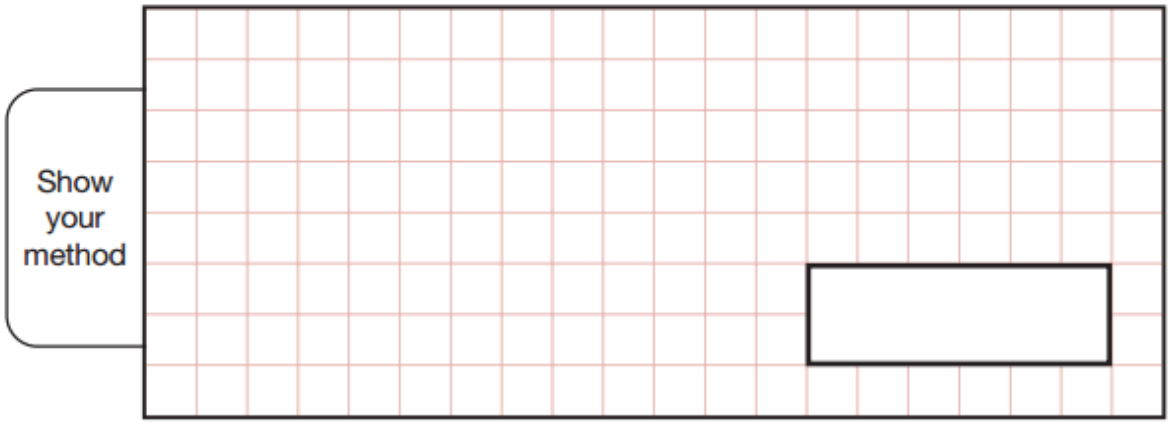
Write in the missing numbers.

……., ……., ……., 12 , 6 , 3 , ……., ……., (2)

Page Total

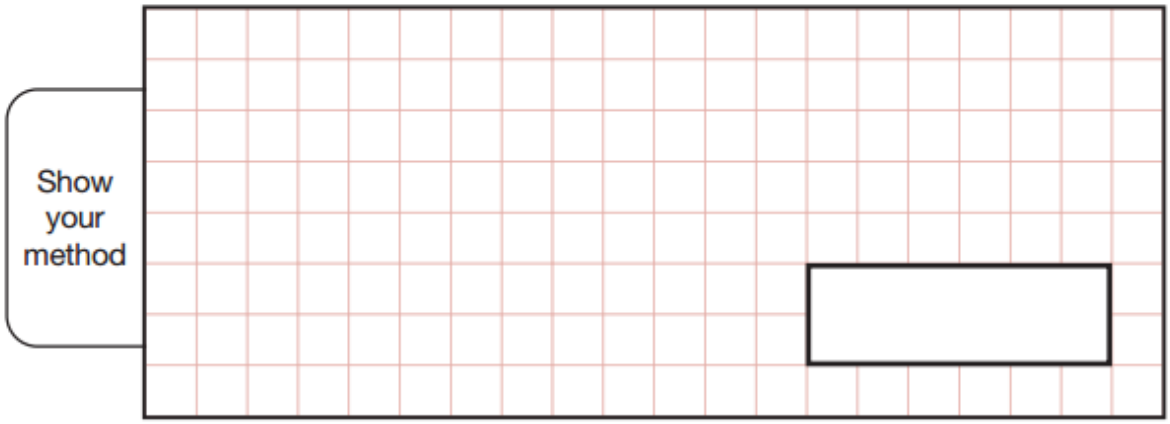
25. I am counting up the money from the tombola at the end of the school fair.

(a) There are twenty four £1 coins, seven £2 coins, six £5 notes, fourteen £10 notes, three £20 notes and one £50 note.
How much money is there in total?



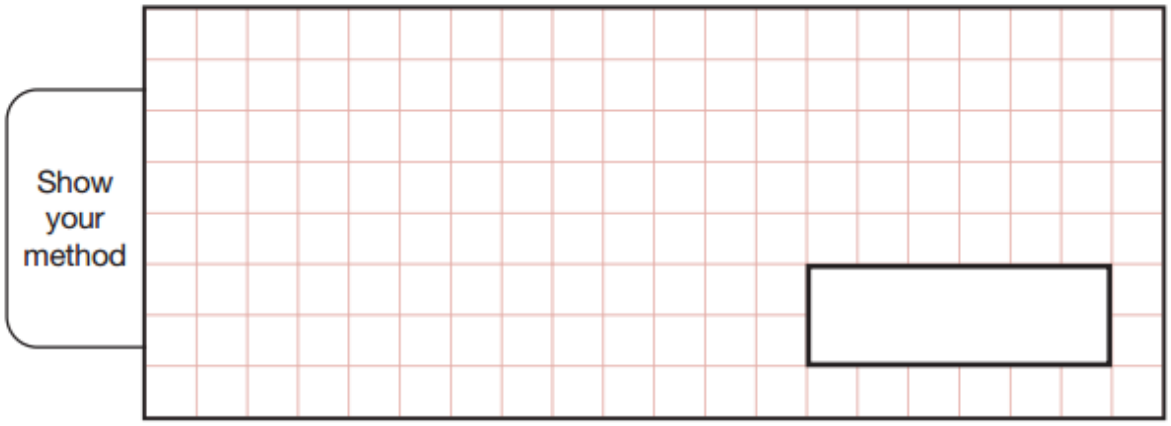
(3)

(b) I exchange all of the money for as many £20 notes as possible.
How many £20 notes do I have now?



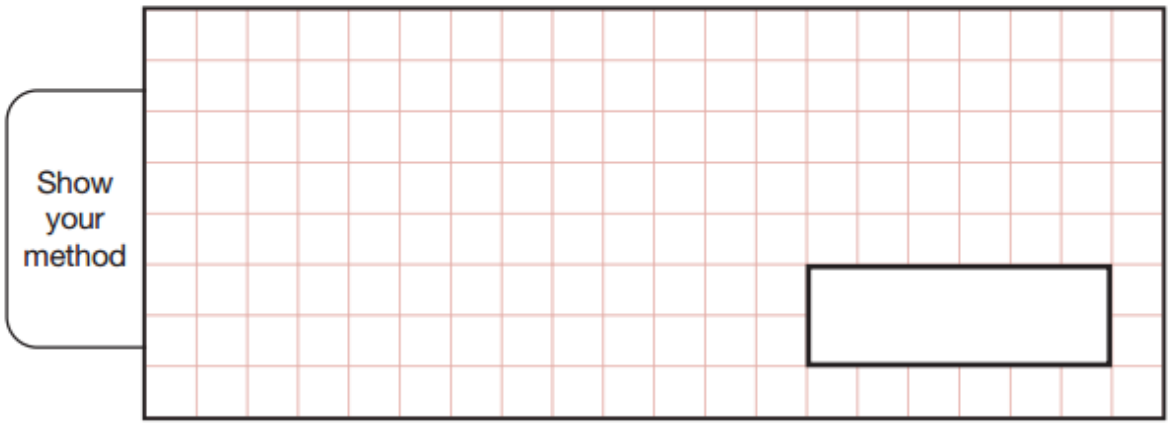
(2)

26. Two of the angles in a quadrilateral are right angles. One of the others is five times larger than the fourth angle.
What is the size of the largest angle?



(3)

27. The front row of a theatre has 48 seats and each other row has four more seats than the row in front. There are 80 seats in the last row. How many seats are there **altogether** in the theatre?



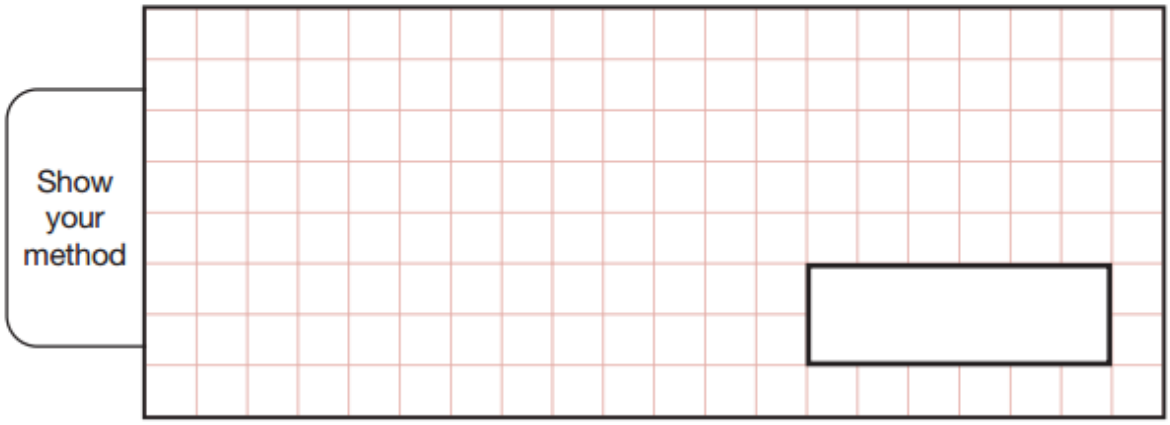
(3)

Page Total

28. Martha and Sally each have the same amount of money.

If Martha spends £10 and Sally spends £20, then Martha has three times as much as Sally.
If Martha spends £15 and Sally spends £20, then Martha has twice as much as Sally.

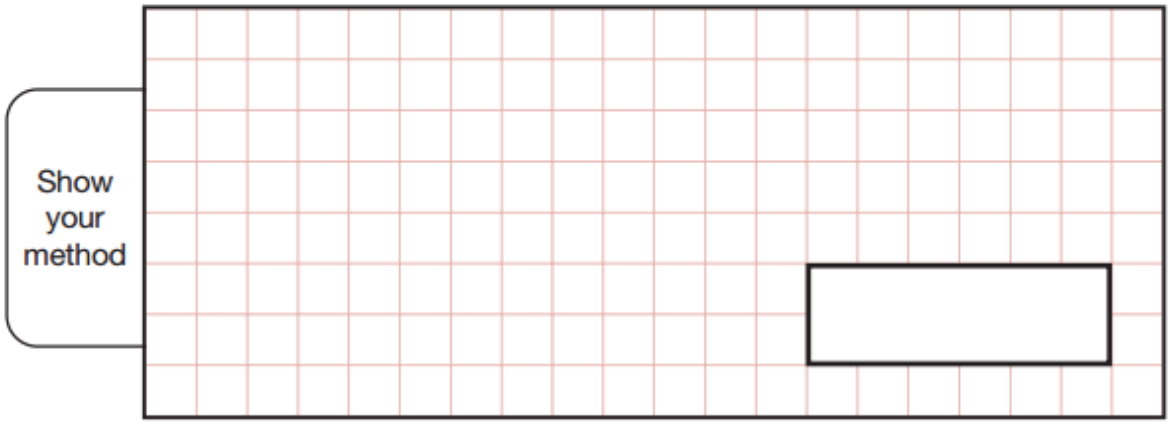
How much money do they have altogether?



(4)

29. The sum of two whole numbers is 30 and their difference is 20.

What are the two numbers?



(3)

30.

$7^0 = 1$	$7^5 = 16\,807$
$7^1 = 7$	$7^6 = 117\,649$
$7^2 = 49$	$7^7 = 823\,543$
$7^3 = 343$	$7^8 = 5\,764\,801$
$7^4 = 2\,401$	

Use the information in the table above to answer the following questions.

(a) Explain how the table shows that $49 \times 343 = 16\,807$

..... (1)

(b) Use the table to help you work out the value of

$$\frac{5\,764\,801}{823\,543}$$

..... (1)

(c) Use the table to help you work out the value of

$$\frac{117\,649}{2\,401}$$

..... (1)

(d) The units digit of $\mathbf{7^6}$ is 9.

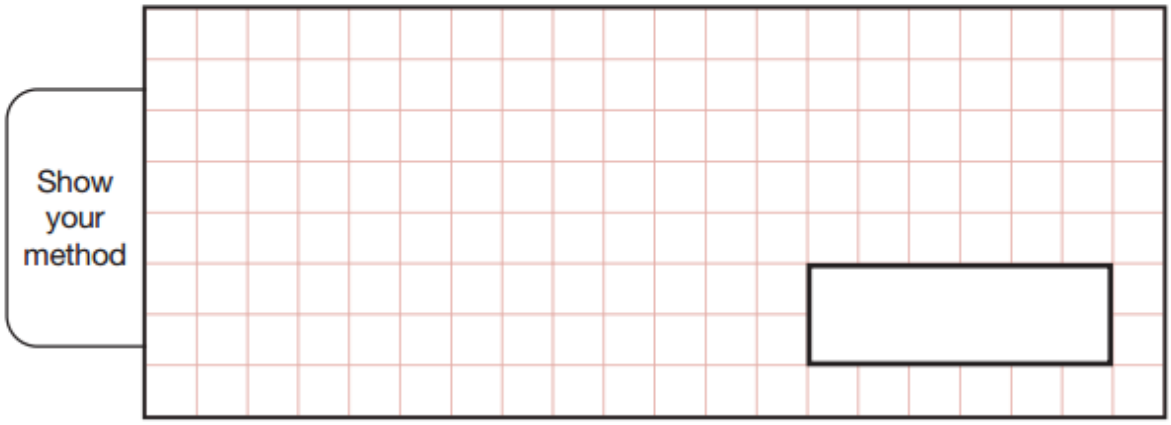
What is the units digit of $\mathbf{7^{12}}$?

..... (1)

Page Total

31. In this multiplication each letter stands for a **different** digit. What digit does **D** represent?

$$\begin{array}{rcccc} & A & 6 & B & C \\ \times & & & & 7 \\ \hline D & 9 & E & 9 & 8 \end{array}$$



(3)

32. On each of the cards below, $\boldsymbol{n}$ can be any positive number. The answers given by the cards are all positive numbers.

n^2	$0.8n$	$\sqrt{n}$	$\frac{n}{0.8}$	$\frac{1}{n}$

(a) Which card(s) will always give an answer less than n ?

..... (1)

(b) When $\boldsymbol{n = 1}$, which card(s) will give an answer of one?

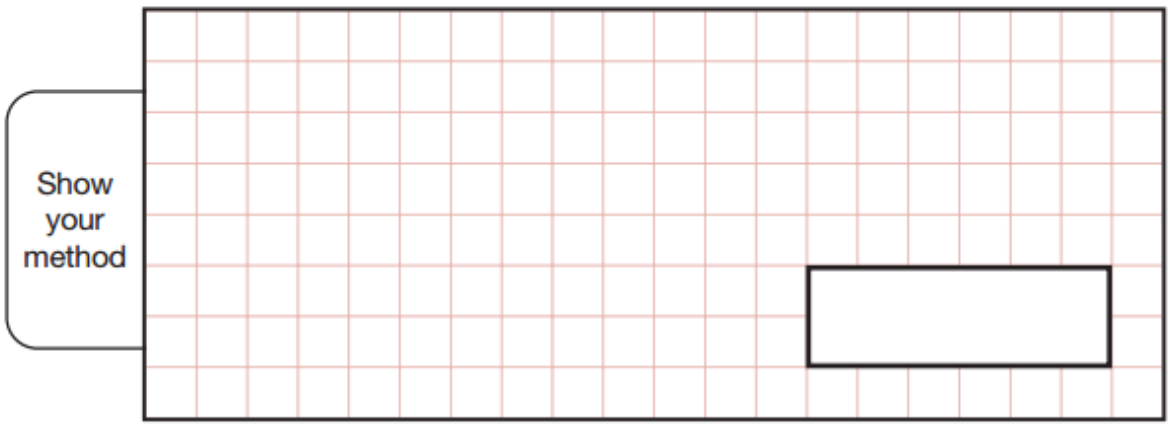
..... (2)

(c) When $\boldsymbol{n = 4}$, which card(s) will give an answer of **less than 4**?

..... (2)

33. 'Yummy' chocolate bars are packed in either boxes of 5 or boxes of 12.

What is the **smallest** number of full boxes required to pack **exactly** 2019 'Yummy' bars?



(3)

This is the end of the Examination.

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