# THE NORTH LONDON INDEPENDENT GIRLS' SCHOOLS' CONSORTIUM

## Group 1

## YEAR 7
## ENTRANCE EXAMINATION

# MATHEMATICS

**Friday 15 January 2016**

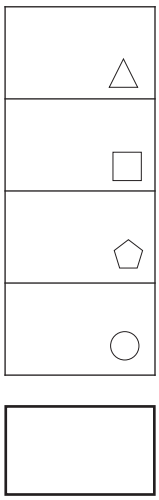
Time allowed: 1 hour 15 minutes

First Name: .....

Surname: .....

**Instructions:**

- Please write in pencil.
- Please try **all** the questions.
  If you cannot answer a question, go on to the next one.
- Do your rough working in the space near each question.
  Do not rub out your working as you may get marks for it.
- Calculators and rulers are NOT allowed.




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1. Work out $4689 + 2703$

Answer: .....

---

2. Work out $7305 - 946$

Answer: .....

---

3. Work out $3729 \times 6$

Answer: .....

---

4. Work out $4802 \div 7$

Answer: .....

---

5. Work out $\frac{3}{4}$ of 96

Answer: .....

6. Write down the next number in the sequence.

83, 76, 69, 62, ☐

Answer: .....

---

7. Write a number in each box to complete the statements.

(a) $20.4 \times 100 =$ ☐

(b) ☐ $\div 1000 = 1.05$

---

8. Write in numerals, the number that is *three hundred* less than *fourteen thousand and fifty*.

Answer: .....

---

9. Write the missing sign ( $=$ , $<$ or $>$) in the box.

$16 \times 7$ ☐ $17 \times 6$





10. In Moscow, the temperature is $-11°C$ and in Paris the temperature is 14 degrees warmer.

    What is the temperature in Paris?

    Answer: ..... °C

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11. Aisha thinks of a number.

    She adds four and then multiplies by 8

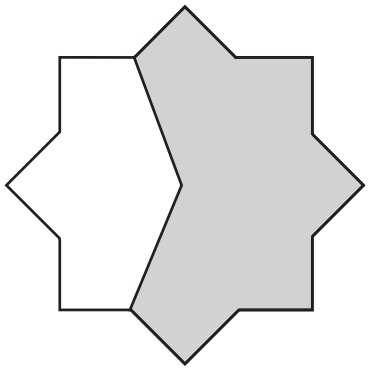
    Her result is 56

    What was the number Aisha first thought of?

    Answer: .....

---

12. What fraction of the shape below is shaded?



    Answer: .....

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13. Georgie left home at 7.55 a.m. and reached school 45 minutes later.

    At what time did Georgie reach school?

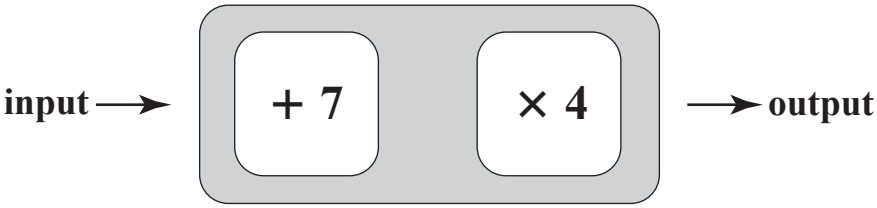
    Answer: ..... a.m.

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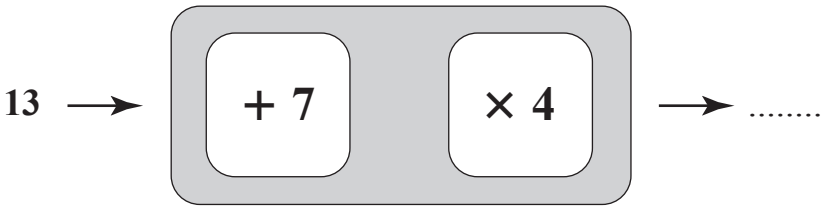
14. What is the difference between a tenth of 5 and a fifth of 10?

    Answer: .....

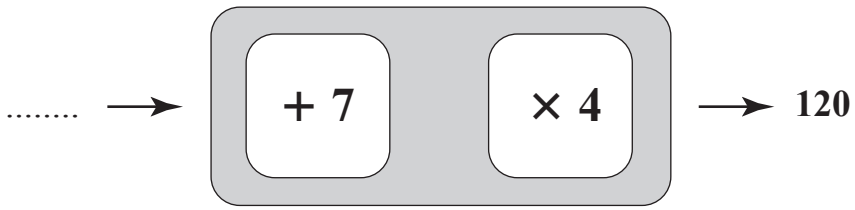
15. (a) The two-stage number machine below changes numbers according to the rule **'Add 7 and then multiply by 4'**




(i) Work out the output when the input is 13

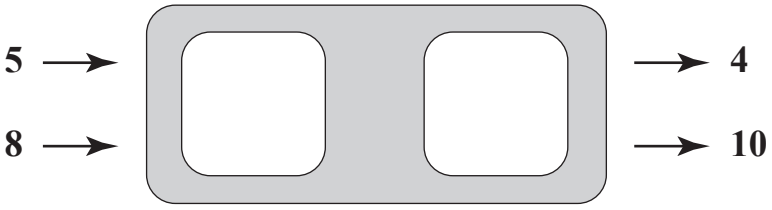



(ii) Work out the input when the output is 120




(b) There are two possible function machines that will give the results shown below.

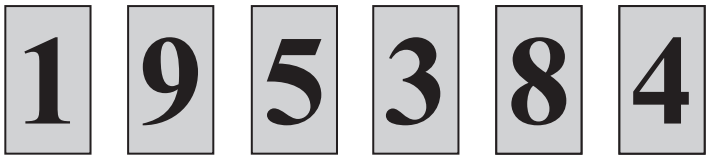
Work out the rules for the two possible machines.




Answer: ..... then .....

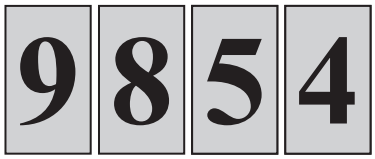
or ..... then .....

16. Jasmine has the six number cards shown below.




The cards can be placed side by side to form different numbers.

For example, using four of the cards, the largest 4-digit even number that can be made is 9854




(a) What is the smallest 5-digit multiple of 5 that can be made?

Answer: .....

(b) Using five cards, what is the nearest number to 50 000 that can be made?

Answer: .....

(c) What is the largest 3-digit multiple of 3 that can be made?

Answer: .....

(d) What is the largest 2-digit prime number that can be made?

Answer: .....

17. In a magic square the sum of the numbers in each row, column and diagonal is the same.

The numerals 1 to 9 are used in this magic square.

Complete the magic square.

| | | |
|---|---|---|
| 6 | | 2 |
| | 5 | |
| 8 | | |

18. Sammy has correctly performed the following multiplication using her calculator:

$$37 \times 42 = 1554$$

Without doing any long multiplications, use Sammy's calculation to help you write down the results of the following:

(a) $38 \times 42$

Answer: .....

(b) $37 \times 21$

Answer: .....

(c) $155.4 \div 42$

Answer: .....

19. Lily uses these ingredients to make strawberry sorbet:

| | |
|---|---|
| For 6 people | 300 millilitres water<br>100 grams sugar<br>450 grams strawberries<br>2 eggs |



(a) Calculate the ingredients needed to make this sorbet for 15 people.

Answer: ..... ml water

..... g sugar

..... g strawberries

..... eggs

(b) For how many people is Lily making this sorbet if she uses exactly1 kilogram of sugar?

Answer: ..... people

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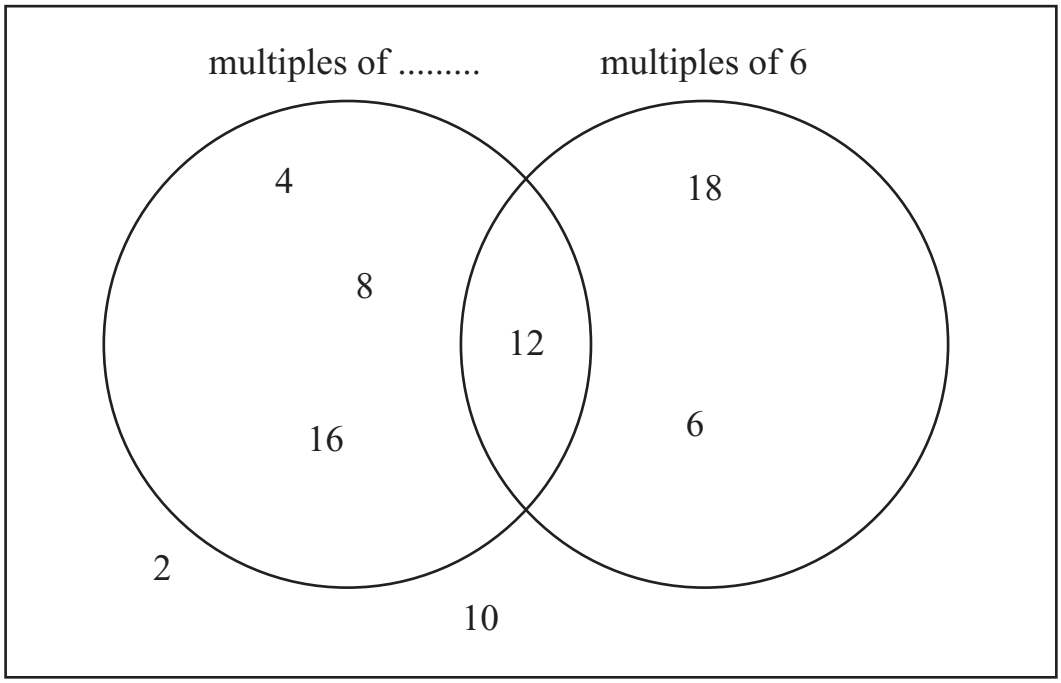
20. Celia and Autumn have each thought of an integer (whole number) between 0 and 20

The product of their numbers is 72 and the difference between the numbers is the same as Celia's number.

What is Autumn's number?

Answer: .....

21. The Venn diagram below is being used for sorting even numbers from 2 to 20 inclusive.




(a) Complete the label of the set.

(b) Write the numbers 14 and 20 in the correct regions of the diagram.

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22. Kiwi fruits cost 78p each; cherries cost 8p each.

Gina buys as many kiwi fruits as she can for £5, and spends all of her change on cherries.

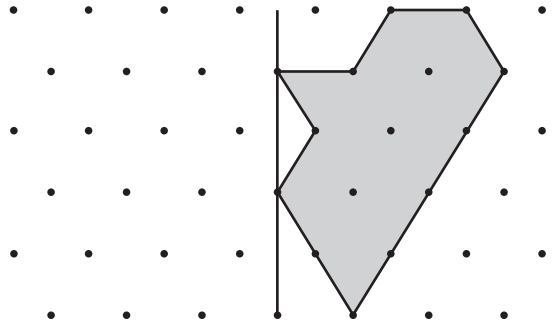
(a) How many kiwi fruits does Gina buy?

Answer: .....

(b) How many cherries does Gina buy?

Answer: .....

23. Reflect the shape in the mirror line.



**mirror line**

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24. James missed the 4.20 p.m. train by three minutes.

| | Train A | Train B |
|---|---|---|
| London | 4.20 p.m. | 5.02 p.m. |
| Staplehurst | 5.16 p.m. | 5.59 p.m. |

How long must he wait to catch the 5.02 p.m. train?

Answer: ..... minutes

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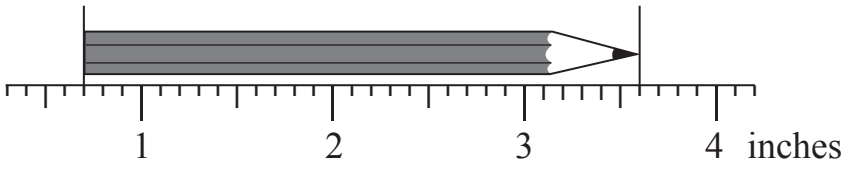
25. A square has perimeter 20 cm.

Work out the area of the square.

Answer: ..... $cm^2$

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26. What is the length of the pencil?




Answer: ..... inches

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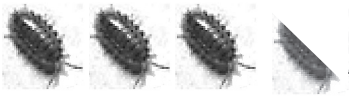
27. Joanne's marks in five spelling tests are: 7 9 8 7 6

What is the range of her marks?

Answer: .....

28. The pictogram below shows the results of a survey into the numbers of woodlice found under pots in a greenhouse.

One symbol  represents **two** woodlice.

| | |
|---|---|
| **Pot A** |  |
| **Pot B** |  |
| **Pot C** |  |
| **Pot D** |  |
| **Pot E** |  |

(a) How many woodlice were found under pot A?

Answer: .....

(b) What was the total number of woodlice found?

Answer: .....

Charlotte removes a third of the woodlice from pot B and 20% of the woodlice from pot C. She puts these woodlice under a new pot, F.

(c) How many woodlice are under pot F?

Answer: .....

29. Mum, Dad and Granny have three cakes:

Chocolate, strawberry and coffee.

Mum likes chocolate or coffee.

Dad likes chocolate, and Granny likes all three.

How can it be arranged, so that they each get a cake that they like?

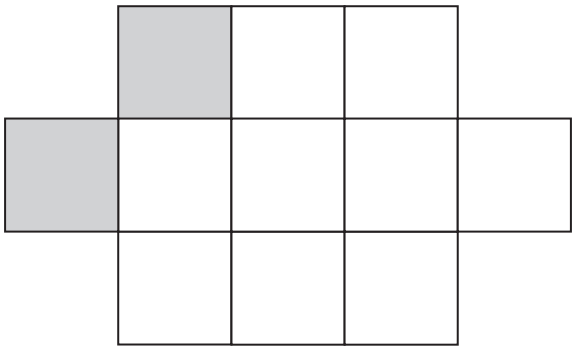
Answer: Mum .....

Dad .....

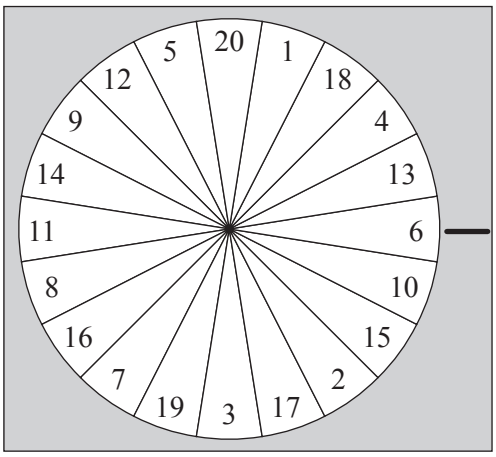
Granny .....

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30. Shade in four squares, so that the finished shape has exactly two lines of symmetry.

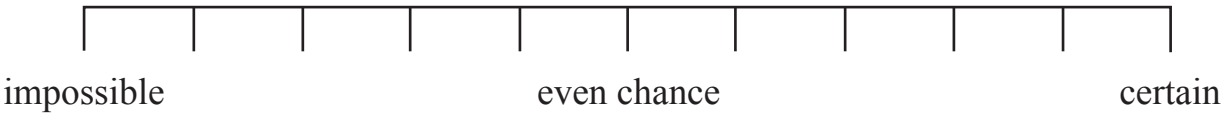


31. The diagram shows a spinner with the numbers 1 to 20




Vanessa spins the spinner.

The spinner is equally likely to land on each section of the disc.




On the likelihood scale above

(a) mark with letter A the likelihood that the spinner lands on an even number

(b) mark with letter B the likelihood that the spinner lands on a multiple of 5

(c) mark with letter C the likelihood that the spinner lands on 21

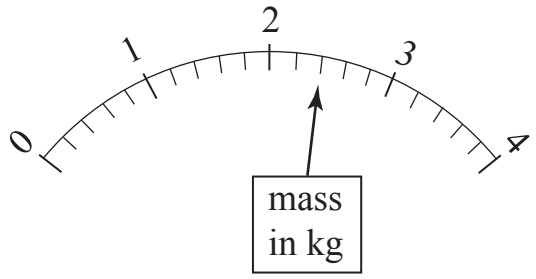
(d) mark with letter D the likelihood that the spinner lands on a cube number.

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32. Tick the correct box for each statement:

| | Always true | Sometimes true | Never true |
|---|---|---|---|
| A square has four right angles | | | |
| A pentagon has five obtuse angles | | | |
| A rhombus has all four sides different lengths | | | |

33. The reading on the scale below shows the mass of a parcel.




Write down the mass

(a) in kilograms

Answer: ..... kg

(b) in grams.

Answer: ..... g

---

34. Zoya has a jug of capacity 1.5 litres which is full of lemonade.
She has eight cups each of capacity 150 ml.
Zoya fills the cups with lemonade from her jug.

(a) What volume of lemonade is left in the jug?

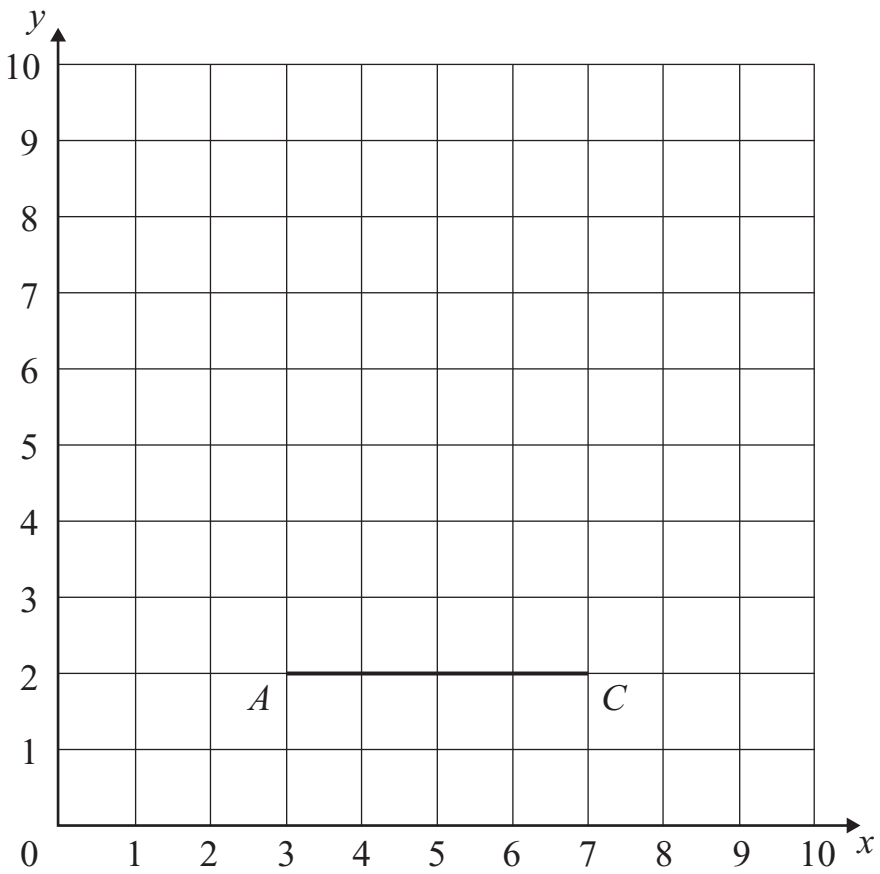
Answer: ..... ml

Zoya has five 2 litre bottles of lemonade.

(b) How many times could Zoya completely fill her jug from these bottles?

Answer: .....

35. (a) On the centimetre square co-ordinate grid below, plot and label the points $P$ (3, 4), $Q$ (6, 5) and $R$ (5, 8).




$PQRS$ is a square.

(b) Write down the co-ordinates of point $S$.

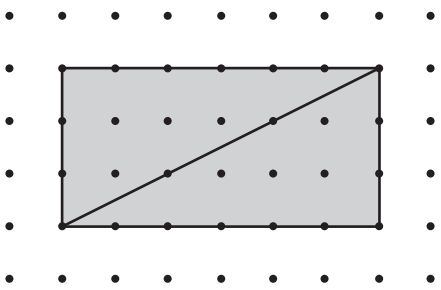
Answer: (....., .....)

$AC$ is the longer diagonal of kite $ABCD$ which has area 4 cm$^2$.

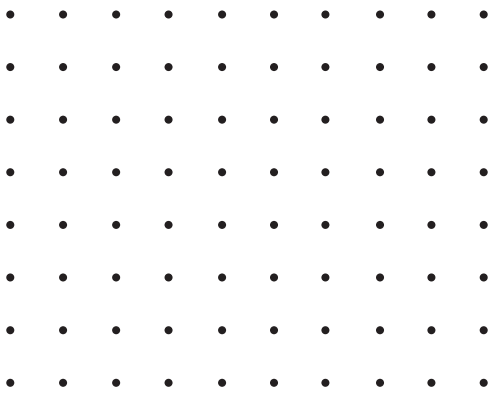
$AB$ is longer than $BC$.

(c) Draw kite $ABCD$.

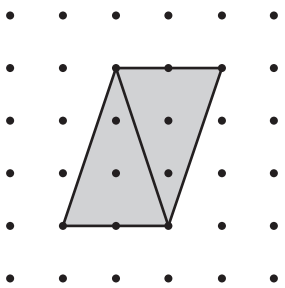
36. Fred fits together two triangles to form a rectangle.



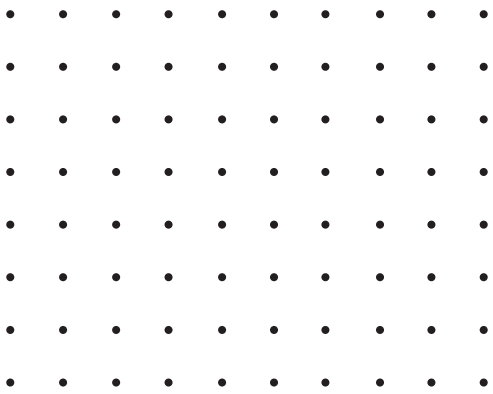
(a) On the grid below, show how Fred can fit together the same two triangles to make a parallelogram which is not a rectangle.



Fran fits together two isosceles triangles to make a parallelogram.



(b) On the grid below, show how Fran can fit together the same two isosceles triangles to make a rhombus.



37. Susan has a rectangular card that measures 18 cm by 6 cm.



(a) What is the perimeter of the card?

Answer: ..... cm

(b) What is the area of the card?

Answer: ..... $cm^2$

Rectangular stickers measure 3 cm by 2 cm.

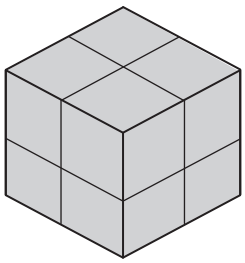
Susan wants to cover the front of the card with stickers, without any overlapping.

(c) What is the maximum number of stickers she can fit on the front of the card?

Answer: .....

---

38. Cube A has a volume of 8 $cm^3$.



not to size

cube A

Another cube, B, has edges which are twice the length of the edges of cube A.

Work out the volume of cube B.

Answer: ..... $cm^3$





39. A tea leaf weighs 0.008 grams.

(a) What would be the mass of 1000 tea leaves?

Answer: ..... g

(b) How many tea leaves would you expect there to be in a 1 kg pack of tea?

Answer: .....

(c) A tea bag contains 250 tea leaves.
The tissue covering weighs 0.5 g.

How many tea bags will there be in a 250 g packet of tea bags?
(The 250 g includes the mass of the bags and not just the tea leaves.)

Answer: .....

40. Myrtle wants to buy an ice-cream.

The options are:

| | | | | | | |
|---|---|---|---|---|---|---|
| **container** | cone | 20p | (C) | tub | 15p | (T) |
| **flavour** | mint | 60p | (M) | vanilla | 50p | (V) |
| **topping** | flake | 25p | (F) | sprinkles | 20p | (S) |

(a) Complete a table to show all the different combinations that Myrtle could choose.
A start has been made for you.

*You may not need all of the lines in the table.*

| container | flavour | topping |
|---|---|---|
| C (cone) | M (mint) | F (flake) |
| C | M | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
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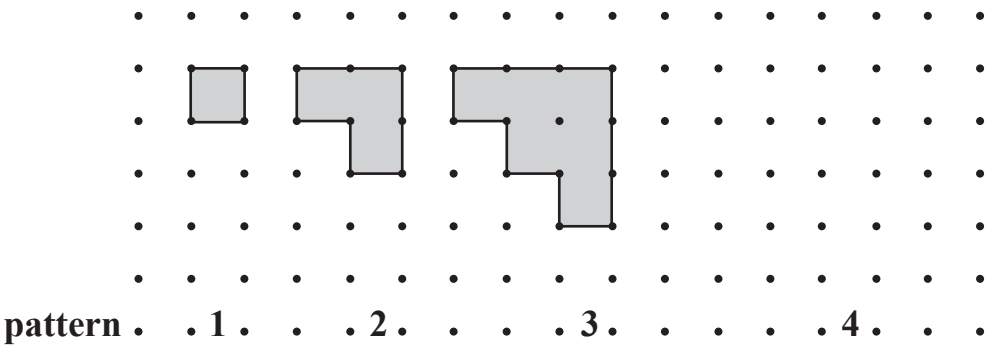
(b) Myrtle has exactly 95p and wishes to spend all her money.

Which two combinations of container, flavour and topping could she choose?

Answer: container ..... flavour ..... topping .....

container ..... flavour ..... topping .....

41. The diagram below shows patterns drawn on a square dotted grid.

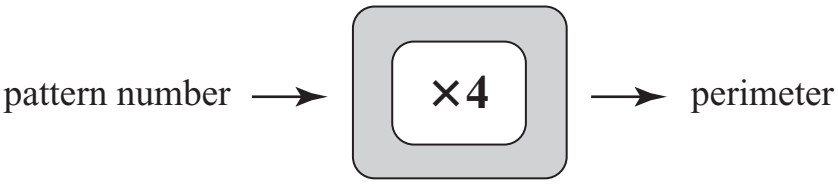



(a) Draw pattern 4 on the grid above.

(b) Complete the table below.

| pattern number | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| number of squares | 1 | 3 | | | |
| perimeter (units) | 4 | 8 | | | |

Sarah suggests that the perimeter of a particular pattern can be worked out using the number machine below.




(c) Use Sarah's idea to calculate the perimeter of pattern 10

Answer: .....

Emilia suggests that the number of squares in a pattern can be worked out by following these instructions, in order:

- Start with the pattern number, *n*.
- Add 1 to give a new number, *m*.
- Multiply *m* by *n*.
- Divide by 2

(d) Use the instructions to calculate the number of squares in pattern 100

Answer: .....

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42. Three hedgehogs, Rana, Sarah and Tina, are collecting leaves.

Rana collects twice as many as Sarah.

Sarah collects one and a half times as many as Tina.

Between them they collect 198 leaves.

How many leaves did each hedgehog collect?

Answer: Rana .....

Sarah .....

Tina .....

43. Starting with a 2-digit number, Geraldine applies the rule

***Square the difference between the digits***

repeatedly until her result is a single-digit number.

Examples:

- $72 \xrightarrow{5^2} 25 \xrightarrow{3^2} 9$ *$(7 - 2)^2$ then $(5 - 2)^2$ (2 steps)*
- $90 \xrightarrow{9^2} 81 \xrightarrow{7^2} 49 \xrightarrow{5^2} 25 \xrightarrow{3^2} 9$ *$(9 - 0)^2$ then $(8 - 1)^2$ and so on (4 steps)*
- $19 \rightarrow 64 \rightarrow 4$ *(2 steps)*

(a) Apply the rule to the following starting numbers:

(i) 28

Answer: 28 → .....

(ii) 73

Answer: 73 → .....

(b) List all the starting numbers between 10 and 30 inclusive which give the single digit result 4 in a single step.

Answer: .....

For multiples of 11 such as 22 and 55, the result will be zero.

For other starting numbers the numbers in the steps are all square numbers.

(c) List, in order, the possible single digit results.

Answer: .....

(d) What do you think will be the most common single digit result if you calculate the result for every 2-digit starting number?

Answer: .....

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44. In the same time that Tom can run 100 metres, Jerry can run only 60 metres.

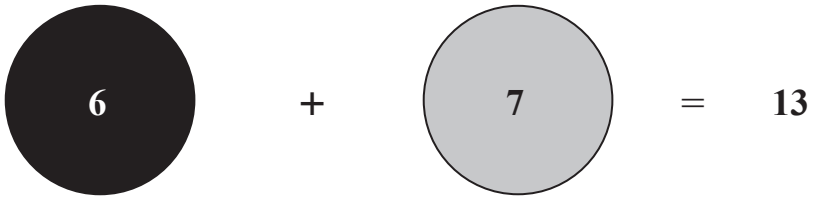
Tom and Jerry have a competition.

When Jerry has run 100 metres, Tom sets off in pursuit.

How many metres will Tom run before he catches Jerry?

Answer: ..... metres

45. Paula has two counters, with different whole numbers on each side.
She throws them once and adds the numbers she sees:




Paula throws her counters several more times and gets the following totals:

**12, 15, 16**

(a) What number is on the other side of the black counter?

Answer: .....

(b) What number is on the other side of the grey counter?

Answer: .....

Irma gives Paula a third counter.

When Paula throws all three counters together she can get the following totals:

**13, 14, 16, 17, 20, 21, 23, 24**

(c) What are the two numbers on the third counter?

Answer: ..... and .....

(Total: 100 marks)