THE NORTH LONDON INDEPENDENT GIRLS' SCHOOLS' CONSORTIUM

Group 2

YEAR 7
ENTRANCE EXAMINATION

MATHEMATICS

Friday 13 January 2012

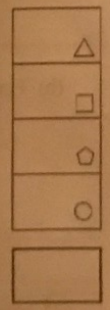
Time allowed: 1 hour 15 minutes

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.



1. Work out 2567 + 824

Answer: 3391

2. Work out 8709 − 637

Answer: 8072

3. Work out 578 × 4

Answer: 2312

4. Work out 1548 ÷ 6

Answer: 258

5. Write in figures the number three hundred thousand and thirty.

Answer: 300,030

6. Write the next two numbers in each sequence:

(a) 98, 92, 86, 80, 74, 68

(b) 1, 2, 4, 7, 11, 16, 22

+1 +2 +3 +4 +5 +6

7. A number is multiplied by 100 to give 2030
What is the number?

Answer: 20.3

8. Work out $\frac{2}{3}$ of 81

Answer: 54

9. Circle the two numbers from the list below which have a total of 0.15

0.6 0.1 **0.09** 0.5 0.14 **0.06**

10. Write these decimals in order of size, starting with the smallest:

2.3 2.23 2.303 2.203

Answer: 2.203, 2.23, 2.3, 2.303

11. Fill in the boxes below.

(a) 45 + 555 = 600

(b) 360 ÷ 10 = 3.6 × 10

(c) 24 ÷ (12 − 8) = 6

24 ÷ 4

12. A pineapple costs £2.47
James has a £10 note.
He buys as many pineapples as he can with his £10 note.

(a) How many pineapples does James buy?

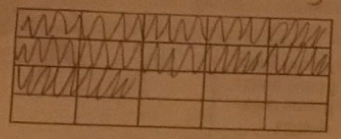
10 ÷ 2.47 = 4.048...

Answer: 4

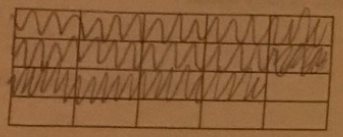
(b) How much change should James receive from his £10 note?

Answer: 12 pence

13. (a) Shade in $\frac{3}{5}$ of the shape below. $\frac{3}{5} = \frac{12}{20}$



(b) Shade in 70% of the shape below.



70% (20) = 14

(c) Which is bigger, $\frac{3}{5}$ or 70%?

↳ 60%

Give a reason for your answer.

Answer: 70% because $\frac{3}{5}$ = 60% and 70% > 60%

14. On Christmas Eve, the temperature in Cold City was −12°C.
At the same time, the temperature in Tropical Town was 20°C.

(a) How many degrees hotter was it in Tropical Town than in Cold City?

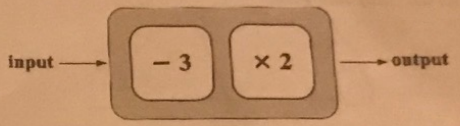
Answer: 32 °C

By Christmas Day, the temperature in Cold City had risen by 5°C.

(b) What was the temperature in Cold City on Christmas Day?

Answer: −7 °C

15. (a) The number machine below changes numbers according to the rule
subtract 3 and then multiply by 2



(i) Complete the input and output table for this machine.

	input	output
example	10	14
	7	8
	20	34
	3	0

(ii) There is one number where the output is the same as the input.
What is the number?

$2(x-3) = x$
$2x - 6 = x$
$x = 6$

Answer: 6

(b) A different number machine produces the input and output table below.

input	output
2	6
4	7
8	9
12	11

What is the rule for this number machine?

Answer: ÷ 2 then + 5

16. Caley starts with a number, doubles it and then subtracts 7
The result is 31
What number did Caley start with?

$2x - 7 = 31$

$x = 19$

Answer: 19

17. Becky is $10\frac{1}{2}$ years old.
Her brother is exactly 1 year and 8 months younger than Becky.
How old is her brother?

$9\frac{1}{2}$ - 8 months

9 yrs 6 months - 8 months

Answer: 8 years 10 months

18. The start and finish times of a film are shown on this notice.
For how long did the film last?

The Tiger Prince	
Start	7.45 pm
End	10.34 pm

Answer: 2 hours 49 mins

19. Jasper is making fairy cakes.
A recipe to make 24 fairy cakes requires the following ingredients:

230 grams flour
230 grams butter
230 grams sugar
4 eggs

(a) How much flour is needed to make 12 fairy cakes?

÷ 2

Answer: 115 grams

Jasper decides to make 36 fairy cakes. ÷2, x3

(b) Work out the amount of each ingredient which Jasper needs.

345 grams flour
345 grams butter
345 grams sugar
6 eggs

The chocolate icing for 24 cakes uses 60 grams of cocoa powder. 12 uses 30
Jasper decides to put chocolate icing on only half of his 36 fairy cakes. 36 so uses 90 grams

(c) How much cocoa powder does he use?

$\frac{1}{2}(90) = 45$

Answer: 45 grams

20. At the end of 2011, there were 1234 members of Feel Fit Gym.
During the year, 167 members had joined the gym and 38 had left.
How many members were there at the start of 2011?

1234 + 38 - 167 =

Answer: 1105

21. Here are 4 number cards:

5	9	2	4

The cards can be put together to form the number 2954

2	9	5	4

(a) Put all 4 cards together to make

(i) the largest possible odd number

Answer: 9425

(ii) the smallest possible multiple of 5

Answer: 2495

(b) Putting only 2 of the cards together, what is the largest possible square number?

59, 52, 54 45, 49, 42
95, 92, 94
25, 29, 24

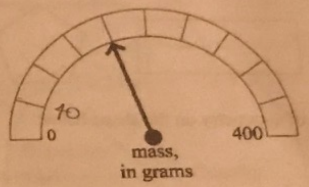
Answer: 49

(c) Arrange the number cards to give the largest possible answer to the subtraction below.

biggest smallest

9	5	-	2	4

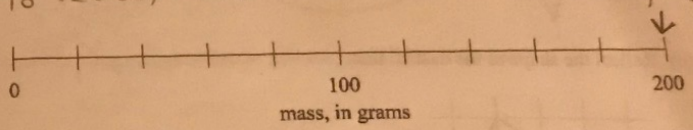
22. (a) What mass is shown on the scale below?



Answer: 160 g

(b) On the scale below, draw an arrow to represent one tenth of 2 kilograms.

1/10 (2000) = 200 2000 grams



23. In each part below, circle the most sensible unit to measure

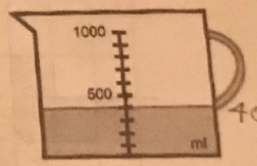
(a) the mass of a man

grams **tonnes** **kilograms**

(b) the volume of water in a bath

millilitres **litres** **inches** or gallons.

24. Kate originally had 1 litre of water in a jug.
She poured out some water and the diagram shows how much water is left in the jug.
How much water has Kate poured out from the jug?

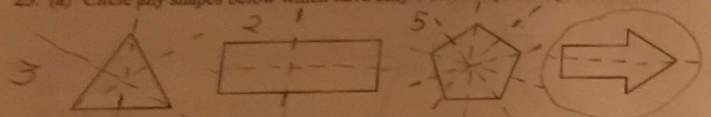


1000 - 400 = 600

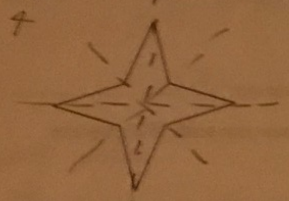
Answer: 600 ml

Regular Shape: Draw from vertex to middle of opposite side

25. (a) Circle any shapes below which have only 1 line of symmetry.

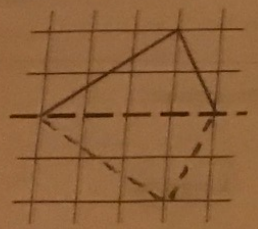


(b) Draw all the lines of symmetry on the shape below.

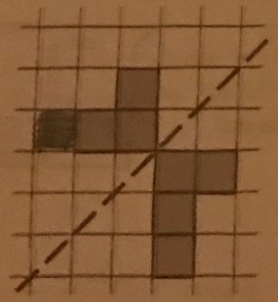


Note: 5 pointed star has 5 lines of symmetry

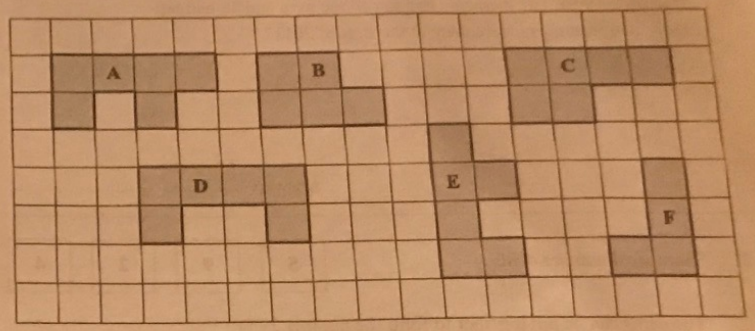
(c) Reflect the shape in the dashed line.



(d) Complete the diagram below so that the finished pattern has symmetry in the dashed line.



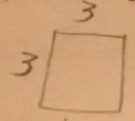
26. Below are some shapes drawn on a centimetre-squared grid.



(a) What is the perimeter of shape E?

Answer: 14 cm

(b) (i) Which 2 shapes will fit together to form a square?

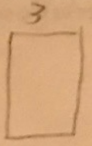


Answer: B and F

(ii) What is the area of the square formed?

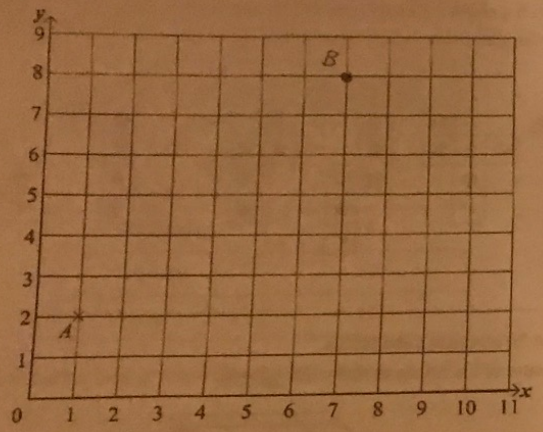
Answer: 9 cm^2

(c) Which 2 shapes will fit together to form a rectangle?



Answer: A and F

27. Point A is plotted on the coordinate grid below.



Point B has coordinates (7, 8)

(a) On the grid above, plot and label point B.

Point M is exactly halfway between points A and B.

(b) What are the coordinates of point M?

(1, 2) (7, 8)

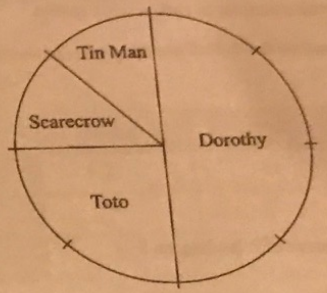
(4, 5)

Answer: (4, 5)

(c) Write down the coordinates of any other point which is exactly the same distance from point A as it is from point B.

Answer: (7, 2)

28. Kate asked some people to tell her their favourite character in the Wizard of Oz.
Here is a pie chart showing her results:



(a) What percentage of the people she asked liked Toto best?

Answer: 25 %

(b) What fraction of the people she asked liked the Tin Man best?

$\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$

Answer: $\frac{1}{8}$

24 people said that they liked Dorothy best.

(c) How many more people liked Dorothy than the Scarecrow?

$\frac{1}{2}$ represents 24 (Dorothy)

$\Rightarrow \frac{1}{4}$ represents 12

$\Rightarrow \frac{1}{8}$ represents 6 (Scarecrow)

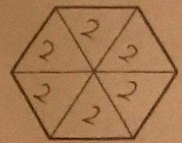
Answer: 18

cube – sides meet
– opp sides face
– vertices meet

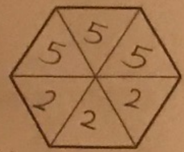
29. Each diagram below shows a fair spinner.
It is equally likely to land on any of the 6 sections.

For each spinner, write a number in each section so that

(a) it is certain to land on 2

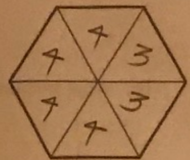


(b) there is an even chance of it landing on 5

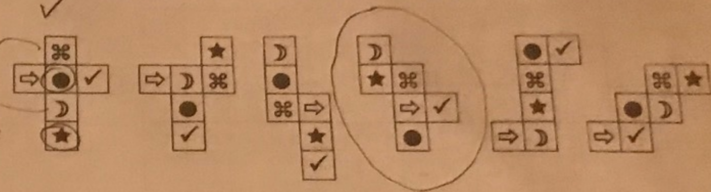


Note: could have put any number instead of 2

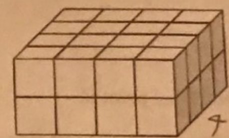
(c) it is twice as likely to land on 4 as on 3



30. A cube has a different symbol printed on each face.
The face with a circle is exactly opposite the face with a star.
Circle the diagram below which **cannot** be a net of this cube.



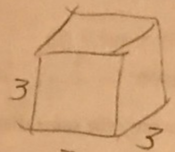
31. Robert has 70 identical cube bricks.
He uses some of his bricks to make this cuboid:



32 bricks
32 cm^3

From his remaining bricks, he uses some to make the largest cube that he can.
How many bricks does he use to make the cube?

38 remaining



27 cm^3

Answer: 27 bricks

32. Vanessa is practising for her violin exam.

Here is a table showing the number of minutes which she spent practising her violin on 5 days last week.

day	practice time (in minutes)
Monday	10
Tuesday	14
Wednesday	6
Thursday	10
Friday	15

(a) Work out her total practice time for these 5 days.

Answer: 55 min

(b) Work out her mean (average) practice time for these 5 days.

$\frac{10+14+6+10+15}{5} = \frac{55}{5} = 11$

Answer: 11 min

Vanessa also practised on Saturday.

Her mean practice time for all 6 days was 15 minutes.

(c) Work out for how many minutes Vanessa practised on Saturday.

$\frac{55+x}{6} = 15$

$55 + x = 90$

$x = 35$

Answer: 35 min

33. In a survey of 40 people, 23 were male.

Of the females, 11 were born in the UK.

Altogether, 28 people were born in the UK.

Some of this information has been put into the table below.

Complete the table.

	male	female	total
born in the UK	17	11	28
not born in the UK	6	6	12
total	23	17	40

34. In a race, the 4 fastest people were David, Chris, Al and Sam.

Use the following information to work out the order in which they finished:

(1) • David was faster than Al.

• Chris was faster than Sam.

(2) • Al finished 2 places after Chris.

(1) • Sam was not in 3rd place. (2)

D C S A S

Answer: 1st place David

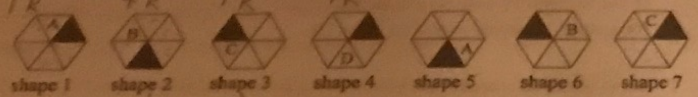
2nd place Chris

3rd place Al

4th place Sam

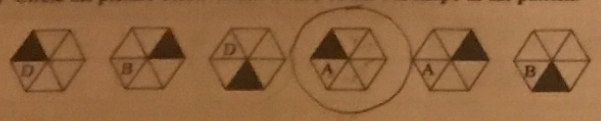
35. This is the start of a pattern of shapes:

1R 4R 1R 4R



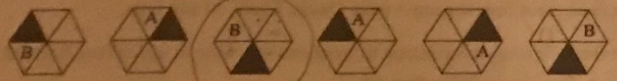
Letter is going round counter clockwise 1 at a time
Black moves 2 clockwise

(a) Circle the picture below which would be the 9th shape in the pattern.



9(2) = 18 CW (shaded)
9(1) = 9 ACW (A)

(b) Circle the picture below which would be the 14th shape in the pattern.



(c) Which is the first shape in the pattern (after shape 1) which is identical to shape 1?

1, 13, 25, 37...

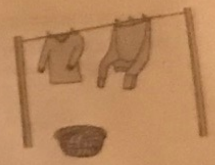
Shape 13 is A again in same position so +12
Shape 4 is shaded in same position so +3
1, 4, 7, 10, 13, 16, 19, 22, 25

Answer: shape 13

(d) Complete the picture below to show the 27th shape in the pattern.

So 27 is 2 on from A at beginning
and 2 on from shaded at beginning

36. When Helen hangs out her washing on the line, she always uses 3 pegs for a shirt and 2 pegs for a jumper.



(a) On Monday, Helen hangs 8 shirts and 4 jumpers on the washing line.
How many pegs does she use?

8(3) + 4(2)
= 24 + 8 = 32

Answer: 32

(b) On Wednesday, Helen hangs 5 shirts and some jumpers on the line.
She uses 21 pegs altogether.
How many jumpers does Helen hang on the line?

5(3) + 2x = 21
2x = 6
x = 3

Answer: 3

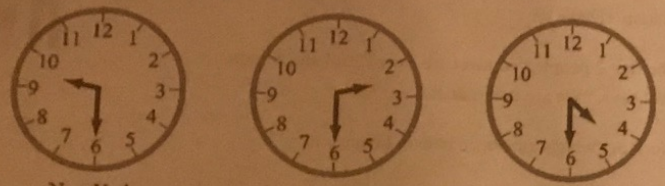
(c) On Friday, Helen uses 65 pegs.
She hangs an equal number of shirts and jumpers on the line.
How many shirts does she hang on the washing line on Friday?

let x be shirt/jumper

3x + 2x = 65
5x = 65
x = 13

Answer: 13

35. The time in New York is 5 hours behind the time in London.
The time in Addis Ababa is 2 hours ahead of the time in London.



(a) When it is 16.42 in London, what time is it in New York?

Answer: 11:42

(b) When it is 12.37 in New York, what time is it in Addis Ababa?

17:37 in London

Add 2 hrs to get Addis Ababa

Answer: 19:37

(c) An aeroplane leaves Addis Ababa at 19.00 on Tuesday and travels to New York.
The whole journey takes 14 hours.
At what time and on which day does it arrive in New York?

Arrives at 9:00 am on Wednesday

Addis Ababa time

London time is 7:00 am Wed

NY time is 2:00 am Wed

Answer: 02:00 on Wednesday

38. In the calculations below, each symbol represents a different number.
Work out the value of each symbol.

OR:

obvious x=2 then can do the rest

① ☺ + ☺ = ★
② ☺ × ☺ = ★
③ ★ + ⌘ = ★
④ ☺ + ★ = ♈
⑤ ♈ ÷ ☺ = ♋

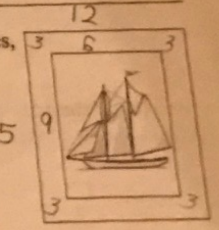
only option is x=2 so 4=4

① $2x = y$ → $x = 2, y = 4$
② $x^2 = y$
③ $y + z = y$ → $z = 0$
④ $x + y = s$ → $s = 6$
⑤ $\frac{s}{x} = m$ → $m = 3$

Answer: ☺ = 2
★ = 4
⌘ = 0
♈ = 6
♋ = 3

39. A photograph, which measures 12 centimetres by 15 centimetres, is mounted on a piece of red card so that there is a border of 3 centimetres all the way round the photograph.

What area of red card is showing?



15(12) − 9(6)

Answer: 126 cm²

(how many numbers; subtract them then add 1)
or terms

40 Suki writes a list of all the whole numbers from 1 to 19 inclusive.

She realises that, since the numbers from 10 to 19 have 2 digits each, she has written down 29 digits in total.

Suki continues her list until she has written down all of the whole numbers from 1 to 99 inclusive.

(a) How many digits has she written down in total?

1-9 = 9 digits

10-19 = 20 digits

9(20) + 9 = 189

Answer: 189

(b) How many times has she written down the digit 9?

9, 19, 29, 39, 49, 59, 69, 79, 89, 90, 91, 92, 93, 94, 95

96, 97, 98, 99

Answer: 20

(c) If she adds up all of the digits which she has written down, what is the total?

1+2+3 1-99

a=1, d=1

$S_n = \frac{n}{2}[2a+(n-1)d]$

$S_{99} = \frac{99}{2}[2+98(1)]$

$= 4950$

Answer: 4950

41 On planet Dichotomy, there are two tribes, Honestians and Liarists.

Honestians always tell the truth.

Liarists always lie.

The first 2 people you meet are called Paul and Simon.

Paul says, "We are both liarists."

Work out which tribe each person belongs to.

can't be both liarists if Paul is telling the truth so Paul is lieing and he is a liarist so Simon can't be liarist too otherwise would be telling the truth

Answer: Paul is a liarist

Simon is a honestians

Paul said we are both liarists and liarists always lie so Paul is a liarist. so he's lieing that both are liarists so Simon can't be a liarist

(Total: 100 marks)