THE NORTH LONDON INDEPENDENT GIRLS' SCHOOLS' CONSORTIUM

Group 2

YEAR 7
ENTRANCE EXAMINATION

MATHEMATICS

Friday 10 January 2014

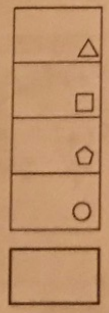
Time allowed: 1 hour 15 minutes

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 345 + 6789

Answer: 7134

2. Work out 3201 − 456

Answer: 2745

3. Work out 865 × 7

Answer: 6055

4. Work out 3832 ÷ 8

Answer: 479

5. 11 and 12 are consecutive whole numbers.
Write down two consecutive whole numbers which add up to 75

Answer: 37 and 38

6. Which number divided by 1000 gives 2.08?
2.08 × 1000

Answer: 2080

7. Circle the number which will be in the middle when the numbers below are written in order of increasing size. 3.465 3.546 3.564 3.64 3.645

3.64 **3.564** 3.654 3.465 3.546

8. (a) Work out one fifth of 180

Answer: 36

(b) Work out $\frac{5}{8}$ of 96

Answer: 60

9. Work out the sum of the numbers:

0.04 0.6 0.16

Answer: 0.8

10. Farmer Andrew's chickens lay a total of 314 eggs.
Each egg box holds only 6 eggs.
How many egg boxes will Farmer Andrew be able to **completely fill** with these eggs?

$314 \div 6 = 52.\dot{3}$

Answer: 52

11. Write a number in each box in order to make the calculations correct.

(a) $3 \times 6 + \boxed{7} = 25$
18

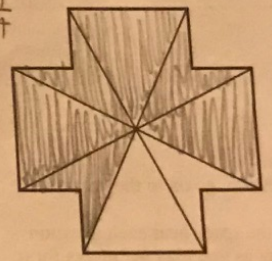
(b) $88 \div 4 = \boxed{31} - 9$
22 2

(c) $7^2 = 51 - (\boxed{\frac{1}{2}} \times 4)$
49

12. Shade 75% of the shape below.

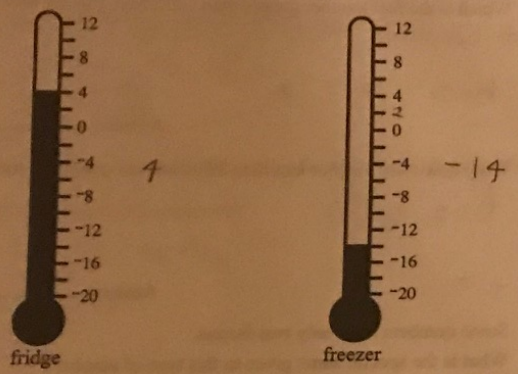
Shade $\frac{1}{2}$ then $\frac{1}{4}$

4 arrows
4 triangles
$.75(4) = 3$



Harder than usual since not all identical pieces

13. The thermometers below show the temperatures, in °C, inside a fridge and a freezer.



4

-14

(a) How many degrees warmer is it in the fridge than in the freezer?

Answer: 18 degrees

The temperature in the freezer should be 3 degrees colder.

(b) What temperature should it be in the freezer?

Answer: -17 °C

14. Given that $7.84 \times 6 = 46.8$, work out the value of 7.84×18

46.8 x 3

140.4

This is wrong, it's 47.04 but use their result anyway

Answer: 140.4

should be 47.04 x 3 = 141.12

15. The composer Johann Sebastian Bach lived for 65 years and 4 months.
The composer Georg Philipp Telemann lived for 86 years and 3 months.

For how much longer did Telemann live than Bach?

86 - 66 = 20 years

+ 8 months + 3 months = 11 months

OR: think 1 month off

21 years

Answer: 20 years 11 months

16. A recipe to make 12 blueberry muffins requires 300 grams of flour and 180 grams of blueberries, in addition to other ingredients.

(a) Charlotte wants to make just 9 muffins. ÷ 4, x 3

How many grams of each of the following ingredients will she need?

(i) flour

$\frac{300}{4} \times 3$

Answer: 225 g

(ii) blueberries

$\frac{180}{4} \times 3$

Answer: 135 g

(b) Paul has a one kilogram bag of flour. If he uses the whole kilogram of flour to make blueberry muffins, how many can he make?

1000g, 300 grams makes 12

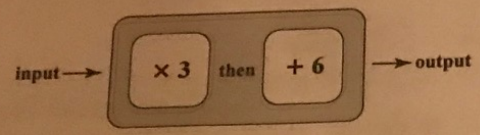
25 grams makes 1

$\frac{1000}{25} = 40$

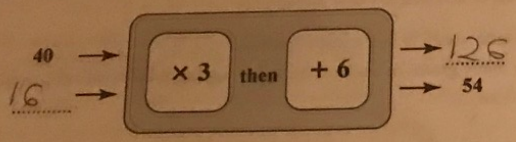
Answer: 40

17. (a) The number machine below changes numbers according to the rule

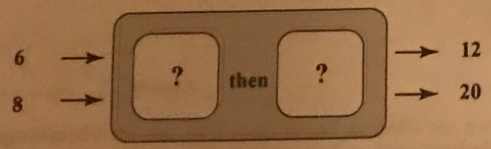
multiply by 3, then add 6



Complete the input and output numbers for the machine.



(b) There are two possible function machines which will give results shown below.
Work out both possible answers.



Answer: -3 then ×4

or ×4 then -12

18. The number 8 has four factors: 1, 2, 4 and 8

(a) Which is the first number greater than 10 to have exactly **four** factors?

Not 12 this has 1, 2, 3, 4, 6, 12

14 has 1, 2, 7, 14

Answer: 14

(b) Write down any number less than 20 which has exactly **three** factors.

9 has 1, 3, 9

Answer: 9

(c) Some numbers have only **two** factors.
What is the special name given to this type of number?
It may help you to write down some numbers with only two factors.

Answer: prime number

19. (a) A packet of 9 chocolate cookies costs £2.61
What is the cost of 4 of these chocolate cookies?

2.61 × 4
9

Answer: £ 1.16

(b) Carla bought 2 books from a shop, and paid a total of £8.50
One book cost 60 pence more than the other.
What was the price of the **cheaper** book?

difference sum

tells you sum and difference

similar to 2013 #16 and 24

x + 4 = 8.50
x = 4 - .60
⇒ 4 - .60 + 4 = 8.50
⇒ 24 = 9.10
4 = 4.55
x = 3.95

OR: 8.50 - .60
2

Answer: £ 3.95

20. The number sequences in this question all go up or down by a fixed number.

(a) Write a number in each box to continue the sequence.

(i) 5.4, 5.8, 6.2, 6.6, [7]

+.4

(ii) 1.3, 1.23, [1.16]

-0.07

(b) In a number sequence, the 2nd term is 6 and the 5th term is 18, as shown below.

What is the **7th term** in the sequence?

2, 6, 10, 14, 18, 22, 24

18 - 6 = 12

12 / 3 = 4

+4

Answer: 24

21. Mr Cooper's car uses 3 litres of petrol to travel 50 kilometres.

Petrol costs £1.45 per litre.

How much will Mr Cooper spend on petrol to drive 600 kilometres from Oxford to Glasgow?

600 / 50 = 12

12 x 3 = 36 litres

36 x 1.45

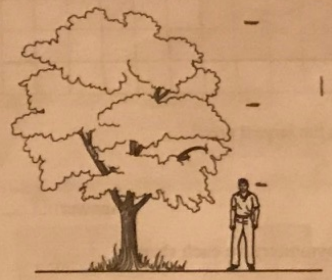
Answer: £ 52.20

22. (a) Estimate, in centimetres, the length of the line below.

Answer: 5.5 or 6 cm

(b) The man in the diagram is 1.8 metres tall.

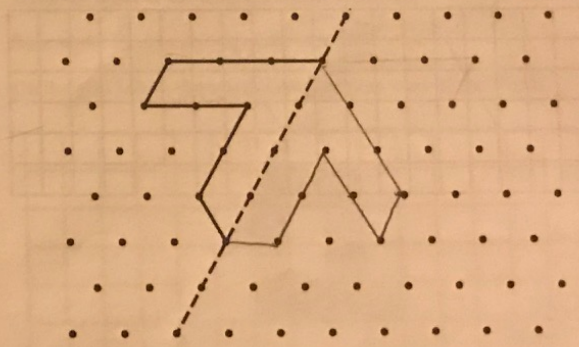
Use this fact to estimate the height of the tree.



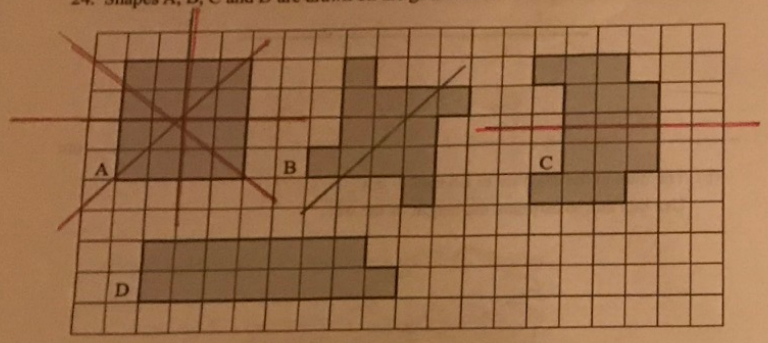
1.8 x 3

Answer: 5.4 m

23. Reflect the shape below in the dashed line.



24. Shapes A, B, C and D are drawn on the grid below.



(a) Which shape has the largest area?

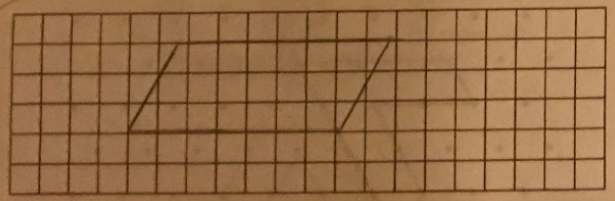
16, 13, 15, 15

Answer: A

(b) Draw all lines of symmetry on each shape.

(c) On the grid below, draw a shape made up of 8 little squares which has rotational symmetry order 2 but has no lines of symmetry. parallelogram

Rotational symmetry order 2 means that the shape will fit onto itself exactly 2 times when it is turned about its midpoint.



wrong - my diagram

25. (a) This is what Evie sees when she glances at her clock in the mirror.

Write the time her clock actually shows, using the 12-hour clock.

13:41

Answer: 01:41

(b) A film lasting 2 hours and 20 minutes started at 16:55

At what time did it finish?

Answer: 19:15

(c) Three friends started a sponsored silence at exactly 15:00 and, one by one, burst out in giggles at the times shown in the table below.

name	time silence ended
Holly	16:29
Rebecca	17:08
Stacey	16:23

(i) For how much longer did Rebecca remain silent than Holly?

200 mins (+10)

Answer: 39 mins min

(ii) If each girl was sponsored 10 pence for each minute that she remained silent, how much money did the three girls raise in total?

1 hr 29 mins + 2 hrs 8 mins + 1 hr 23 mins

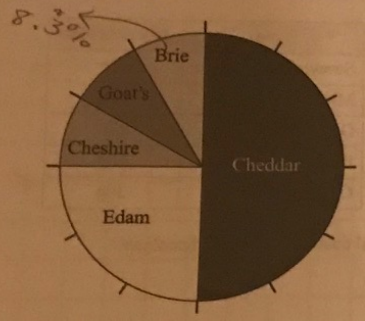
4 hrs 60 mins

= 5 hrs = 300 mins

300 x .10 = 30

Answer: £ 30

26. Ben asked people about their favourite type of cheese.
The results of his survey are shown below.



(a) What percentage of the people said Edam?

Answer: 25% %

(b) What fraction of the people said Brie?

$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$

Answer: $\frac{1}{12}$

18 people said Edam.

(c) How many people said Goat's Cheese?

$\frac{18}{3} = 6$

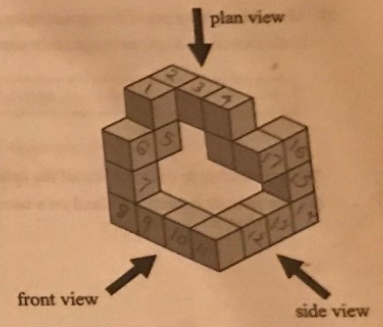
Answer: 6

(d) How many more people said Cheddar than said Cheshire?

6 cheshire
36 cheddar
36 - 6 = 30

Answer: 30

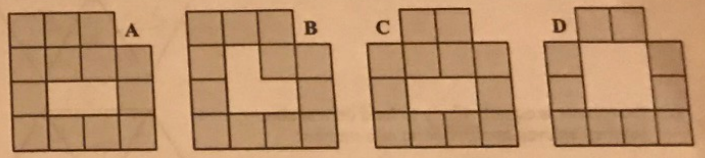
27. This object is made from cubes.
There are no hidden cubes.



(a) How many cubes are needed to make the object?

Answer: 17

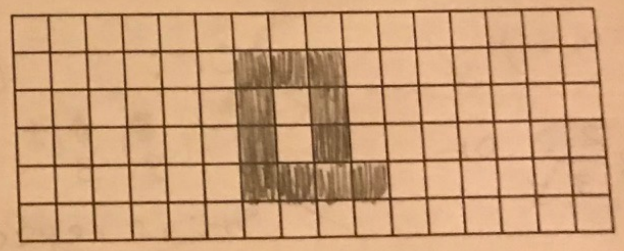
(b) The diagrams below show possible front and side views of the object.



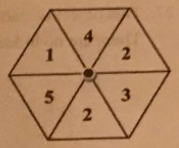
Write the letter of the diagram which shows the

front view B side view C

(c) On the grid below, draw and shade the plan view of the object.



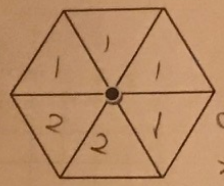
28. Miss Smart has a set of hexagonal spinners.
Each section on a spinner contains a number between 1 and 6



Write a number in each section of the spinner so that

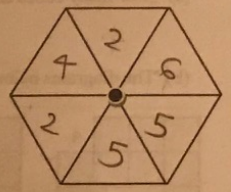
(a) the spinner is certain to land on a number less than 3

similar to

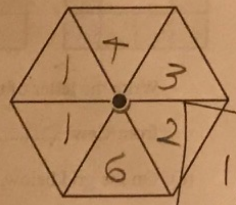


Many possible answers for all

(b) the spinner is twice as likely to land on an even number as on the number 5



(c) the spinner is equally likely to land on a square number, an even number or an odd number



P(square number) = 1/2 ✓

P(odd) = 1/2 ✓

P(even) = 1/2 ✓

2, 2, 2 or
3, 3, 3

correct answer

1, 1, 2, 3, 4, 6
3 odd
3 even
3 square

Or:

✗ 1, 2, 2, 3, 4, 5 — 2 square ✗, 3 even ✓, 3 odd ✓

✗ Or: if repeat 1, 1, 5, 5, 22 — 2 even ✓✓, 2 square ✓✓, 4 odd ✗

29. *Chocolate Heaven* sells 10 different types of hand-made chocolates.
The price of each type of dark chocolate is shown in the table below.

type	dark chocolate
Strawberry Surprise	28p
Mint Memories	35p
Damson Delight	27p
Fruity Flake	25p
Caramel Cup	30p

(a) What is the total cost of the 5 dark chocolates?

Answer: £ 1.45

(b) What is the mean (average) cost of a dark chocolate?

1.45 / 5

Answer: 0.29 p

For each type of chocolate, there is a milk chocolate version which costs 2p less than the dark chocolate version.

(c) Write down the mean cost of a milk chocolate.

.26 + .33 + .25 + .23 + .28 / 5 = 1.35 / 5 =

OR: just take off 2 from above since all chosen

Answer: 27 p

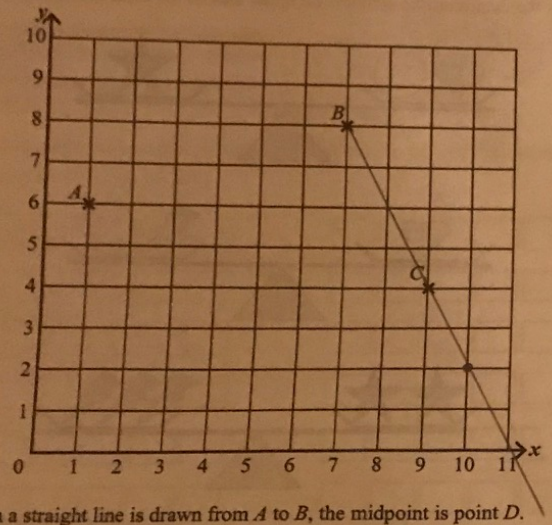
(d) Jill buys one of each type of dark chocolate and each type of milk chocolate as a gift for her friend.

Using your answer to part (a) or otherwise, work out the cost of all 10 chocolates.

1.45 + 1.35

Answer: £ 2.80

30. Points A, B and C have been plotted on the coordinate grid below.



(a) When a straight line is drawn from A to B, the midpoint is point D.
Write down the coordinates of point D.

(1, 6) (7, 8)

Answer: (4 , 7)

(b) The point E is such that if a line is drawn from B to E, point C is two thirds of the way from B to E.
Write down the coordinates of point E.

Answer: (10 , 2)

31. Field crickets chirp according to the temperature of their surroundings.
You can use the following rule to work out the temperature:

temperature in °C = (number of chirps per minute − 40) ÷ 7 + 10

(a) Freddie, the field cricket, chirps 61 times per minute.
Work out the temperature of Freddie's surroundings.

$(61 - 40) \div 7 + 10$
$= 21 \div 7 + 10$
$= 3 + 10$

Answer: 13 °C

(b) Flora, the field cricket, chirps 41 times in 30 seconds.
Work out the temperature of Flora's surroundings.

$(82 - 40) \div 7 + 10$
$42 \div 7 + 10$
$= 6 + 10$
$= 16$

Answer: 16 °C

(c) The temperature of Flossie's surroundings is 18°C.
Work out how many times Flossie chirps in 1 minute.

$\frac{(x - 40)}{7} + 10 = 18$

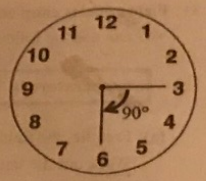
$\frac{x - 40}{7} = 8$

$x - 40 = 56$
$x = 96$

Answer: 96

OR: $(18 - 10) \times 7 + 40$

32. Between 3 a.m. and 6 a.m. the hour hand on a clock moves through an angle of 90°.



Work out the angle which the hour hand on a clock moves through between

(a) 9 a.m. and 10 a.m. 60 mins

$\frac{90}{3} = 30°$ ✓

Answer: 30 °

(b) 12:45 and 13:15

30 mins

Check $\frac{1}{2}(30°) = 15°$

Answer: 15 °

(c) 6.30 p.m. and 8.50 p.m.

1 hr 20 mins

$30° + \frac{1}{3}(30°)$

$= 30° + 10°$

Answer: 40 °

33. Jane bought a packet of sweets.

A quarter of them were green, a third of them were red and the rest were yellow.
There were 10 yellow sweets.

What was the total number of sweets in the packet?

$\frac{1}{4} + \frac{1}{3} = \frac{7}{12}$

So $\frac{5}{12}$ yellow

$\frac{5}{12} x = 10$

$x = \frac{10 \times 12}{5} = 24$

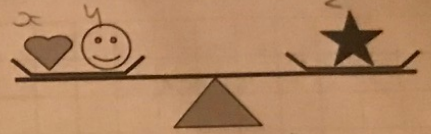
Answer: 24

Similar to 2009 #1

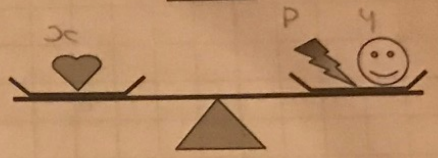
* 34. In the balancing puzzle below, each symbol represents a different number.
In all of the diagrams, the symbols on either side of the scale are balanced.

OR:

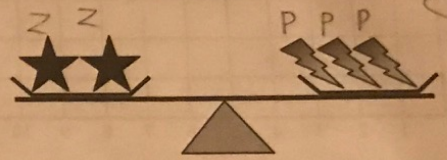
60 mins : 30 mins = 2 : 1



$x + y = z$

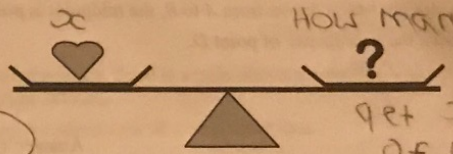


$x = p + y$



$z + z = p + p + p$

$2z = 3p$



How many y

?

get x in terms of y only

$x = ?$ terms of y

Work out how many  are equivalent to one  .

$x = z - y$

$= \frac{3p}{2} - y$

$= \frac{3(x-y)}{2} - y$

Answer: 5

$2x = 3x - 3y - 2y$

$x = 5y$

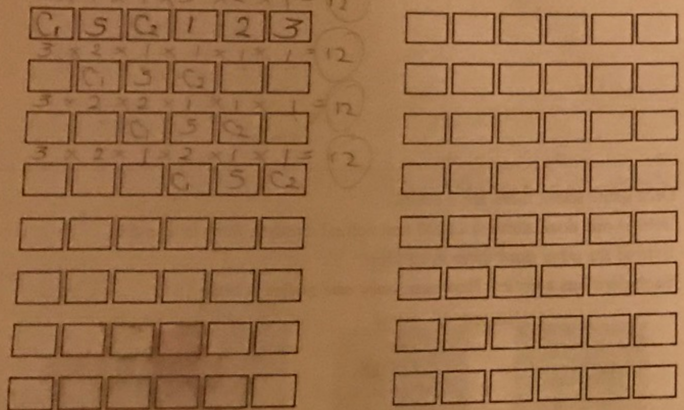
35. In a doctor's waiting room, there are 6 seats in a row.

Mr Spencer arrives with his 2 children. He wants to sit between his 2 children.

3 other people arrive who do not mind where they sit.

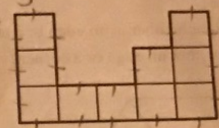
How many different possible seating arrangements are there of the 6 people?

You may find the boxes helpful.



Answer: 48

36. (a) The shape below is made from squares.



not to size

The perimeter of the shape is 100 centimetres.

Work out the area of the shape.

$\frac{100}{20} = \frac{10}{2} = 5$

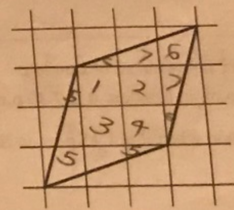
25×10

Answer: 250 cm²

(b) Work out the area of the shape drawn on the centimetre-squared grid below.

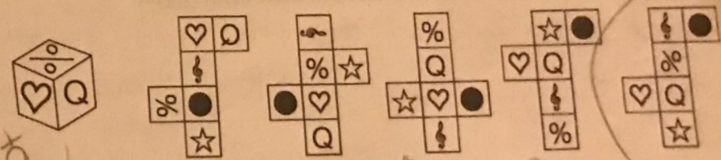
Rhombus (pushed over square)

$3 \times 3 = 9$



Answer: 7 cm²

37. Circle the net which could make the cube shown.

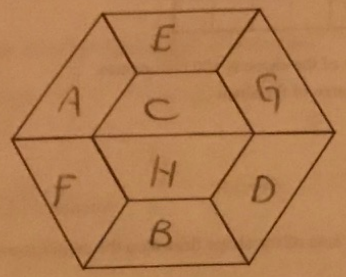


Similar

Shouldn't see its equivalent pair

Pairs

38. Write a letter from A to H inclusive in each box in the diagram below.
Each letter should be used exactly once.
Consecutive letters are not allowed to touch either at an edge or a corner.
For example, B cannot touch C or A at either an edge or a corner.



A
B
C
D
E
F
G
H

39. The time in Sri Lanka is $4\frac{1}{2}$ hours ahead of London.
(For example, when it is 3 p.m. in London, it is 7.30 p.m. in Sri Lanka.)

(a) What time is it in London when it is 1.15 p.m. in Sri Lanka?

Answer: 8:45 am

The time in New York is 5 hours behind the time in London.
Bill's journey from New York to Sri Lanka takes exactly 30 hours.
Bill leaves New York on Wednesday at 19:40

(b) On which day and at what time does Bill arrive in Sri Lanka?

19:40 + 30 hrs = 1:40 AM Friday (NY time)
= 6:40 AM Friday (London)
= 11:10 AM Friday

Answer: on Friday at 11:10

✓ B = 5 ✓ L = 8
✓ T = 3
✓ E = 7
✓ A = 6

40. Each letter in the words below represents a number less than 10
The values of the letters in each word are then multiplied together to give the result shown.

Given that
BAT = 90, LET = 168 and BET = 105,
what is the value of TABLE?

(1) 90 = 3x30 = 2x15 = 3x5
(2) 168 = 2x84 = 2x42 = 2x21 = 3x7
(3) 105 = 5x21 = 3x7
= 3x5x7

Answer: 5040

$2x3^2x5$ $2x5x9$ $2^3x3x7 = 3x7x8$
common factor B in (1), (3) = 5 so B = 5

41. On a game show, there are 3 doors.
Behind one door, there is £1000 and behind another, there is a spider!
Behind the other door there is nothing.
Each door has a notice. However, **only one notice is true.**

common factor E in (2), (3) so E = 7

T is common in all (1), (2), (3) so T = 3

L(7)(3) = 168
L = 8

5(A)(3) = 90
A = 6

1	2	3
There is nothing behind door 3.	The spider is behind this door.	There is a spider behind door 1.

not possible

N = nothing, S = spider, NS = no spider

Behind which door is £1000?

• if (1) true does that ⇒ (2), (3) false?
NS NS N, so 1 not true

• if (2) true does that ⇒ (1), (3) false?
NS S ?
nothing or 1000
nothing or 1000

• if (3) true does that ⇒ (1), (2) false?
S NS ?
nothing or 1000
Nothing or 1000

Answer: 3

so 2 has spider: 1 is false which says nothing behind 3, so 3 must have 1000

here 1 is false so 3 can't have nothing so 3 must have 1,000 (caps here)

(Total: 100 marks)