1.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye												
Kaye												
Elle												
Emma												
Grey												
Purple												
Brown												
Black												
Green												
Aqua												
Blue												
White												

Four Design students (Jaye, Kaye, Elle and Emma) each created a chequerboard tile pattern based on two distinct colours or tones; each chose a "warm" colour (red, yellow, orange or pink), offset by a "cool" colour (green, aqua, blue or white). Each chose either grey, purple, brown or black grout to separate their tiles.

From the clues, work out the three colours or tones comprising each tile pattern, and the student who produced it.

(i) The four designs are Kaye's, the one containing orange tiles, the one containing green tiles and the one with black grouting.

(ii) Elle's pattern had no pink in it.

(iii) Jaye, the user of aqua tiles and the user of the red tiles were the first three to finish.

(iv) Blue tiles and brown grout were not used in the same design.

(v) Jaye produced neither the design using pink tiles nor the design using green tiles.

(vi) Black and yellow did not appear together in any of the four designs.

(vii) Elle and the user of the red tiles are sisters.

(viii) The orange tiles were not used with either white tiles or grey grouting; the grey grouting was not used with either yellow or aqua tiles.
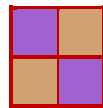
2.

SEQUENCES

a. What is the last letter needed to complete this sequence?

O, T, T, F, F, S, S, E, N, ____

b. What is the next number in this sequence?

30,   28,   25,   21,   16,   _

3.

LETTER LINK

What simple rule includes the letters **a,e,f,h,i,k,l,m,n,t,v,w,x,y** and **z**

and excludes the letters **b,c,d,g,j,o,p,q,r,s** and **u** ?

4.

You have a cylindrical container just big enough to hold three tennis balls. Now you want to make a label for the container, and you have to decide whether to wrap the label around the cylinder or place it parallel to the cylinder. Which direction is longer: For your answer, write either "**lengthways**" or "**wraparound**"
Assume that the container wall is so thin as to be negligible.
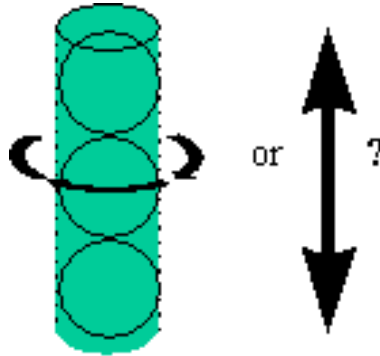
5.

I've Got Your Number (1)

I am thinking of a whole number between 1 and 20, inclusive.

- If my number is less than 10, then it is even.
- If my number is not divisible by 3, then it is prime.
- If my number is not a factor of 60, then it is a factor of 102.
- If my number, divided by 7, leaves a remainder greater than 4, then my number is greater than 14.
- If one less than my number is a square number, then the reciprocal of my number is less than 3/7.
- If one more than my number is a square number, then my number is not divisible by 5.

What is my number?

You might find this useful for working out purposes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

6.

How Old Is Granny?

Tom asked his Granny how old she was. Rather than giving him a straight answer, she replied:

"I have 6 children, and there are 4 years between each one and the next. I had my first child (your Uncle Peter) when I was 19. Now the youngest one (Your Auntie Jane) is 19 herself. That's all I'm telling you!"

How old is Tom's Granny?

7. I've Got Your Number (2)

I am thinking of a whole number between 1 and 20, inclusive.
- If my number is even, then it is also a multiple of 3.
- If my number is not a multiple of 3, then it is greater than the length of the diagonal of a square with an area of 81.
- If my number is not greater than the length of the diagonal of a square with an area of 81, then it is square.
- If my number is not square, then it is one greater than a multiple of 5.

What is my number?

You might find this useful for working out purposes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

8. The Glittering Prizes

Mr & Mrs Jones had good reason to be proud of Ed, Belle and their other two children who had each recently won a different competition and had received a certificate or some other award, each from a different source; (one was from a Scout Troop).
From the clues provided, state the age of each child, and say what award he or she received, and the organization that bestowed it.

(i)   The oldest child, who is 14 (and who is not Sue) encouraged one of her three siblings to enter the competition which won the gift card.
(ii)   The girl who received the trophy is younger than the brother who is twice the age of another child, whose age is an even number of years and who received an award from a Junior Athletics club. (Three different children are mentioned in this clue)
(iii)   Mal is four years younger than the child who received a school award.
(iv)   The youngest child's award was neither the book nor the gift card.
(v)   The winner of the on-line competition was a boy.

The following table may be useful in solving this puzzle.

Age	Name	Award	Organisation

9. I've Got Your Number (3)

I am thinking of a whole number between 1 and 20, inclusive.
- Either my number is greater than the hypotenuse of a right triangle with sides of 5 and 12, or it is less than the diameter of a circle with an area of 48.
- My number is less than the longest possible side of a triangle with sides of 7 and 11, and greater than the shortest possible side of the same triangle.

- My number is either odd or a multiple of five, but not both.
- My number is the smaller of the two numbers that fit all of the above requirements.

What is my number?
You might find this useful for working out purposes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

10.   A FORK in the ROAD

The last logic puzzle in this set is well-known, but is worth repeating here.

A traveler comes to a fork in the road. A sign warns him that if he chooses one direction (either left or right), it will bring him success; but if he chooses the other direction, it will lead to his doom.

To help him decide, there are two sentries. One always tells the truth; the other always lies. The traveler does not know which sentry is which, but he is allowed to ask one question only, of one sentry only. What is his best strategy for choosing the correct path?

Answers:

Worked solutions start on the next page.

1. Jaye used orange and blue tiles with purple grout.
   Kaye used red and white tiles with grey grout
   Elle used yellow and green tiles with brown grout.
   Emma used pink and aqua tiles with black grout.

2. a. T   b. 10

3. The capital forms of the first group of letters are written using straight lines. The capital forms of the second group require curves.

4. "Wraparound" is longer than "lengthways".

5. 17

6. 58

7. 9

8. Mal, who is 6 years old received a certificate from his junior athletics club.
   Sue, who is 10 years old received a trophy from her school.
   Ed, who is 12 years old received a gift card from the on-line competition.
   Belle, who is 14 years old received a book from a scout troop.

9. 7

10. Ask his chosen sentry "*Which path would the other sentry say is the path to success*?" then take the opposite path.

SOLUTIONS:

1. If you record the direct information from the clues in table form, it looks like this:

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X						
Kaye			X		X							X
Elle	X			X								
Emma												
Grey		X	X			X						
Purple												
Brown							X					
Black		X	X		X							
Green			X	X								
Aqua	X											
Blue												
White			X									

Since neither Jaye nor Elle used red or pink tiles, Kaye and Emma must have used either red or pink tiles; but NOT yellow or orange tiles. **These Xs** can be added.

Since neither Jaye nor Elle used red or pink tiles, and the grey grouting and the black grouting were used with either the red tiles or the pink tiles, neither Jaye nor Elle can have used grey grouting or black grouting. **These Xs** can be added.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X			X			X
Kaye		X	X		X							X
Elle	X			X					X			X
Emma		X	X									
Grey		X	X			X						
Purple												
Brown							X					
Black		X	X		X							
Green			X	X								
Aqua	X											
Blue												
White			X									

Emma is the only one who could have used the black grouting. This leads to Kaye being the only one who could have used the grey grouting.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X			X			X
Kaye		X	X		X				✓	X	X	X
Elle	X			X					X			X
Emma		X	X						X	X	X	✓
Grey		X	X			X						
Purple												
Brown							X					
Black		X	X		X							
Green			X	X								
Aqua	X											
Blue												
White			X									

Since Kaye and the person who used grey grouting are the same person, **these Xs** can be added.
Since Jaye and Kaye were not the two who used either green tiles or aqua tiles, the green tiles and aqua tiles must have been used by Elle and Emma. Neither Elle nor Emma used blue or white tiles. **These Xs** can be added.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X			X			X
Kaye		X	X		X	X			✓	X	X	X
Elle	X			X			X	X	X			X
Emma		X	X				X	X	X	X	X	✓
Grey		X	X		X	X						
Purple												
Brown						X						
Black		X	X		X	X	X					
Green				X	X							
Aqua	X											
Blue												
White			X									

The pattern with the aqua tiles has the black grouting. As has already been established, that's Emma's pattern.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X			X			X
Kaye		X	X		X	X			✓	X	X	X
Elle	X			X		X	X	X	X			X
Emma		X	X		X	✓	X	X	X	X	X	✓
Grey		X	X		X	X						
Purple						X						
Brown						X	X					
Black		X	X		X	✓	X	X				
Green			X	X								
Aqua	X											
Blue												
White			X									

Since Emma, the user of the aqua tiles and the user of the black grouting are the same person, **these Xs** can be added.

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X			X	X	X			X			X
Kaye		X	X		X	X			✓	X	X	X
Elle	X			X		X	X	X	X			X
Emma	X	X	X	✓	X	✓	X	X	X	X	X	✓
Grey		X	X		X	X						
Purple						X						
Brown						X	X					
Black	X	X	X	✓	X	✓	X	X				
Green			X	X								
Aqua	X	X	X	✓								
Blue												
White			X									

The rest of the squares can now be filled in

	Red	Yellow	Orange	Pink	Green	Aqua	Blue	white	Grey	Purple	brown	black
Jaye	X	X	✓	X	X	X	✓	X	X	✓	X	X
Kaye	✓	X	X	X	X	X	X	✓	✓	X	X	X
Elle	X	✓	X	X	✓	X	X	X	X	X	✓	X
Emma	X	X	X	✓	X	✓	X	X	X	X	X	✓
Grey	✓	X	X	X	X	X	X	✓				
Purple	X	X	✓	X	X	X	✓	X				
Brown	X	✓	X	X	✓	X	X	X				
Black	X	X	X	✓	X	✓	X	X				
Green	X	✓	X	X								
Aqua	X	X	X	✓								
Blue	X	X	✓	X								
White	✓	X	X	X								

2. *One, two, three, four, five, six, seven, eight, nine, **T**EN*

3. The difference between each successive pair of numbers in the sequence increases by one at each step. The last term is (16 − 6) = 10

4. If the diameter of each ball is "d", then the length of the cylinder is 3d and its circumference is Πd or ~3.14d

5. • If my number is less than 10, then it is even.

| ~~1~~ | 2 | ~~3~~ | 4 | ~~5~~ | 6 | ~~7~~ | 8 | ~~9~~ | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

  • If my number is not divisible by 3, then it is prime.

| ~~1~~ | 2 | ~~3~~ | 4 | ~~5~~ | 6 | ~~7~~ | ~~8~~ | 9 | ~~10~~ | 11 | 12 | 13 | ~~14~~ | 15 | ~~16~~ | 17 | 18 | 19 | ~~20~~ |

  • If my number is not a factor of 60, then it is a factor of 102.

| ~~1~~ | 2 | ~~3~~ | 4 | ~~5~~ | 6 | ~~7~~ | ~~8~~ | ~~9~~ | ~~10~~ | ~~11~~ | 12 | ~~13~~ | ~~14~~ | 15 | ~~16~~ | 17 | ~~18~~ | ~~19~~ | ~~20~~ |

  • If my number, divided by 7, leaves a remainder greater than 4, then my number is greater than 14.

| ~~1~~ | 2 | ~~3~~ | 4 | ~~5~~ | ~~6~~ | ~~7~~ | ~~8~~ | ~~9~~ | ~~10~~ | ~~11~~ | ~~12~~ | ~~13~~ | ~~14~~ | 15 | ~~16~~ | 17 | ~~18~~ | ~~19~~ | ~~20~~ |

  • If one less than my number is a square number, then the reciprocal of my number is less than 3/7.

| ~~1~~ | ~~2~~ | ~~3~~ | 4 | ~~5~~ | ~~6~~ | ~~7~~ | 8 | ~~9~~ | ~~10~~ | ~~11~~ | ~~12~~ | ~~13~~ | ~~14~~ | 15 | ~~16~~ | 17 | ~~18~~ | ~~19~~ | ~~20~~ |

  • If one more than my number is a square number, then my number is not divisible by 5.

| ~~1~~ | ~~2~~ | ~~3~~ | 4 | ~~5~~ | ~~6~~ | ~~7~~ | ~~8~~ | ~~9~~ | ~~10~~ | ~~11~~ | ~~12~~ | ~~13~~ | ~~14~~ | ~~15~~ | ~~16~~ | **17** | ~~18~~ | ~~19~~ | ~~20~~ |

6. If Granny's youngest child is now 19, the oldest child is (19 + 4 + 4 + 4 + 4 +4) = 39. If Granny was 19 when the oldest child was born, she is now 39 + 19 = 58

7.
  • If my number is even, then it is also a multiple of 3.

| 1 | ~~2~~ | 3 | 4 | 5 | 6 | 7 | ~~8~~ | 9 | ~~10~~ | 11 | 12 | 13 | ~~14~~ | 15 | ~~16~~ | 17 | 18 | 19 | ~~20~~ |

  • If my number is not a multiple of 3, then it is greater than the length of the diagonal of a square with an area of 81. (A square with an area of 81 has a length of 9 units and a diagonal of 9√2 or approx 12.7

| ~~1~~ | ~~2~~ | 3 | 4 | ~~5~~ | 6 | ~~7~~ | ~~8~~ | 9 | ~~10~~ | ~~11~~ | 12 | 13 | ~~14~~ | 15 | ~~16~~ | 17 | 18 | 19 | ~~20~~ |

- If my number is not greater than the length of the diagonal of a square with an area of 81, then it is square.

~~1~~	~~2~~	~~3~~	4	~~5~~	~~6~~	~~7~~	~~8~~	9	~~10~~	~~11~~	~~12~~	13	~~14~~	15	~~16~~	17	18	19	~~20~~

- If my number is not square, then it is one greater than a multiple of 5.

~~1~~	~~2~~	~~3~~	4	~~5~~	~~6~~	~~7~~	~~8~~	**9**	~~10~~	~~11~~	~~12~~	~~13~~	~~14~~	~~15~~	~~16~~	~~17~~	~~18~~	~~19~~	~~20~~

8. One way of approaching this puzzle is to start with all the possibilities, then use the clues to eliminate where possible

Age	Name	Award	Organisation
(youngest)	Belle Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts
	Belle Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts
	Belle Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts
14	Belle Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts

Direct elimination from first reading of the clues gives

Age	Name	Award	Organisation
(youngest)	~~Belle~~ Ed Mal Sue	~~Book~~ Certificate ~~Gift card~~ Trophy	Athletics club on-line ~~School~~ Scouts
	~~Belle~~ Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts
	~~Belle~~ Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club on-line School Scouts
14 (girl)	Belle ~~Ed~~ ~~Mal~~ ~~Sue~~	Book Certificate ~~Gift card~~ ~~Trophy~~	~~Athletics club~~ on-line School Scouts

From clue (ii), *The girl who received the trophy is younger than the brother who is twice the age of another child, who received recognition from a Junior Athletics club. (Three different children are mentioned in this clue)*
Sue won the trophy, but not for athletics.
The winner of the athletics competition is Ed or Mal
From clue (v), *The winner of the on-line competition was a boy.* (Ed or Mal)
So Belle and Sue received their award from either Scouts or School
From Clue (iii) *Mal is four years younger than the child who received a school award.*

Age	Name	Award	Organisation
(youngest)	Ed Mal Sue	Certificate Trophy	Athletics club ~~on-line~~ Scouts
	Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club ~~on-line~~ School Scouts
(Boy, 8 or 12)	Ed Mal ~~Sue~~	Book Certificate Gift card ~~Trophy~~	~~Athletics club~~ on-line ~~School~~ ~~Scouts~~

14	**BELLE**	Book Certificate	~~on-line~~ School Scouts

Age	Name	Award	Organisation
(youngest)	Ed Mal Sue	Certificate Trophy	Athletics club Scouts
	Ed Mal Sue	Book Certificate Gift card Trophy	Athletics club School Scouts
(Boy, 8 or 12)	Ed Mal	Book Certificate Gift card	**ON-LINE**
14	**BELLE**	Book Certificate	School Scouts

If Belle received the school award, then Mal is four years younger (10) and is twice the age of his brother Ed (5) who received the Scouts Award. Not possible, as Ed's age is an even number of years - Clue (ii).

So Belle did not receive the School Award; she received the Scouts Award. That would make the youngest child Mal, winning the Athletics Award with Sue second-youngest, winning the School Award.

Ed is twice as old as Mal, and Mal is four years younger than Sue.

If Ed is 12, Mal is 6 and Sue is 10

If Ed is 10, Mal is 5 (not possible) and Sue is 9

If Ed is 8, Mal is 4 and Sue is also 8 (not possible)

So Ed is 12, Mal is 6 and Sue is 10

Age	Name	Award	Organisation
6	**MAL**	**CERTIFICATE**	**ATHLETICS CLUB**
10	**SUE**	**TROPHY**	**SCHOOL**
12	**ED**	**GIFT CARD**	**ON-LINE**
14	**BELLE**	**BOOK**	**SCOUTS**

9.

• Either my number is greater than the hypotenuse of a right triangle with sides of 5 and 12, or it is less than the diameter of a circle with an area of 48.

The hypotenuse of that triangle is 13 units.

The diameter of a circle with an area of 48 square units would be twice its radius.

$\Pi r^2 = 48$

$r^2 = 48/\Pi$ or approx. 15.3

r is approx. 3.9

diameter is approx. 7.8

so the proposition becomes "either my number is greater than 13 or it is less than 8"

1	2	3	4	5	6	7	~~8~~	~~9~~	~~10~~	~~11~~	~~12~~	~~13~~	14	15	16	17	18	19	20

• My number is less than the longest possible side of a triangle with sides of 7 and 11, and greater than the shortest possible side of the same triangle.

If the triangle has two short sides of 7 and 11 then the limit of the longest side approaches, but must be less than 18. If the two longer sides of the triangle are 7 and 11, then the limit for the shortest side approaches, but must be greater than 4.

~~1~~	~~2~~	~~3~~	4	5	6	7	~~8~~	~~9~~	~~10~~	~~11~~	~~12~~	~~13~~	14	15	16	17	~~18~~	~~19~~	~~20~~

• My number is either odd or a multiple of five, but not both.

~~1~~	~~2~~	~~3~~	4	~~5~~	~~6~~	**7**	~~8~~	~~9~~	~~10~~	~~11~~	~~12~~	~~13~~	~~14~~	~~15~~	~~16~~	**17**	~~18~~	~~19~~	~~20~~

• My number is the smaller of the two numbers that fit all of the above requirements. (Must be 7, not 17)

10. If the sentry you chose to ask is the truth teller, he would say (correctly) that the other sentry's advice would be the wrong answer.
If the sentry you chose to ask is the liar, he would also say (incorrectly) that the other sentry's advice would be the wrong answer.
Either way, if you do the opposite, that's the correct choice of path.