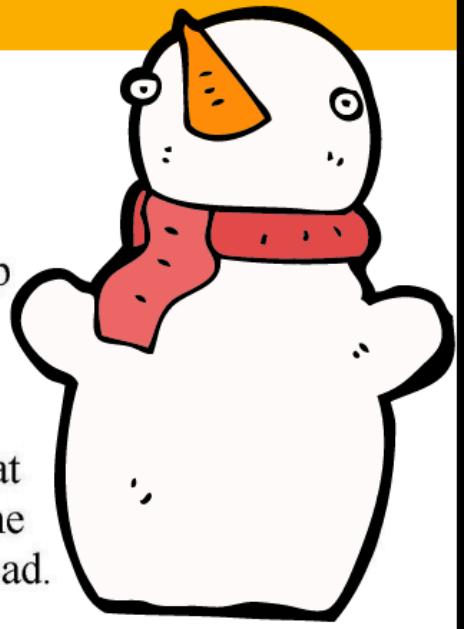
DECEMBER 1st

QUESTION

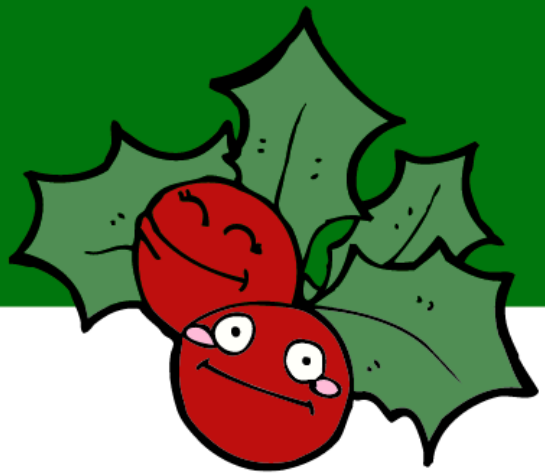


Sally and Gary have made a snowman out of three spherical balls of snow, with the top sphere making up the head.

Sally measures the snowman's height as 126 cm.

Gary measures the widths of each sphere. He finds that the middle sphere is one and a half times as wide as the head, and the bottom sphere is twice as wide as the head.

What is the width of the snowman's head?



DECEMBER
2nd
QUESTION

Holly and Ivy each had some mince pies.

Holly said "If I gave Ivy half my mince pies, she would then have three times as many mince pies as I would then have."

Ivy said "If I gave Holly four of my mince pies, she would then have five times as many mince pies as I would then have."

How many mince pies did each of them have?

DECEMBER
3rd

QUESTION

A mathematical Granny told her grandchildren that she was going to put a square-angled triangle of chocolate in their Christmas stockings.

"What is a square-angled triangle?" they asked.

"It is a triangle all of whose angles, in degrees, are square numbers," she replied.

What are the sizes of the angles in a square-angled triangle?

DECEMBER
4th

QUESTION

Caspar, Balthazar and Melchior are shopping for gold. The goldsmith first shows them a cuboid ingot of solid gold measuring 3cm × 4cm × 12cm, and weighing 2.4 kg.

Next he shows them an ingot of solid gold in the shape of a cube. This weighs 3.6 kg.

What is the length of each edge of this cube?

DECEMBER
5th

QUESTION

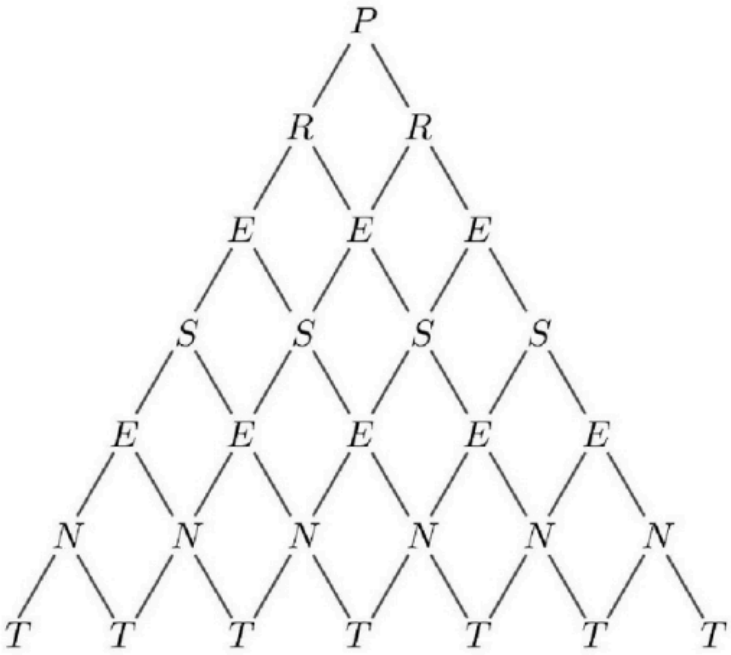
Francesca Fox is curled up near the Christmas tree. She is sleeping as she does every day between 6am and 6pm. The rest of the time she spends telling stories on all night radio.

A sign on the tree reads

> Two hours ago, Francesca Fox was doing the same thing as she will be doing in one hour's time.

For how many hours a day is the statement on the sign true?

DECEMBER 6th QUESTION



In how many ways can you make the word *PRESENT*, starting with *P* and moving downwards at each step?

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DECEMBER
7th
QUESTION

The Fairy Godmother says she will give the contents of her purse to the first person who works out how many coins it contains.

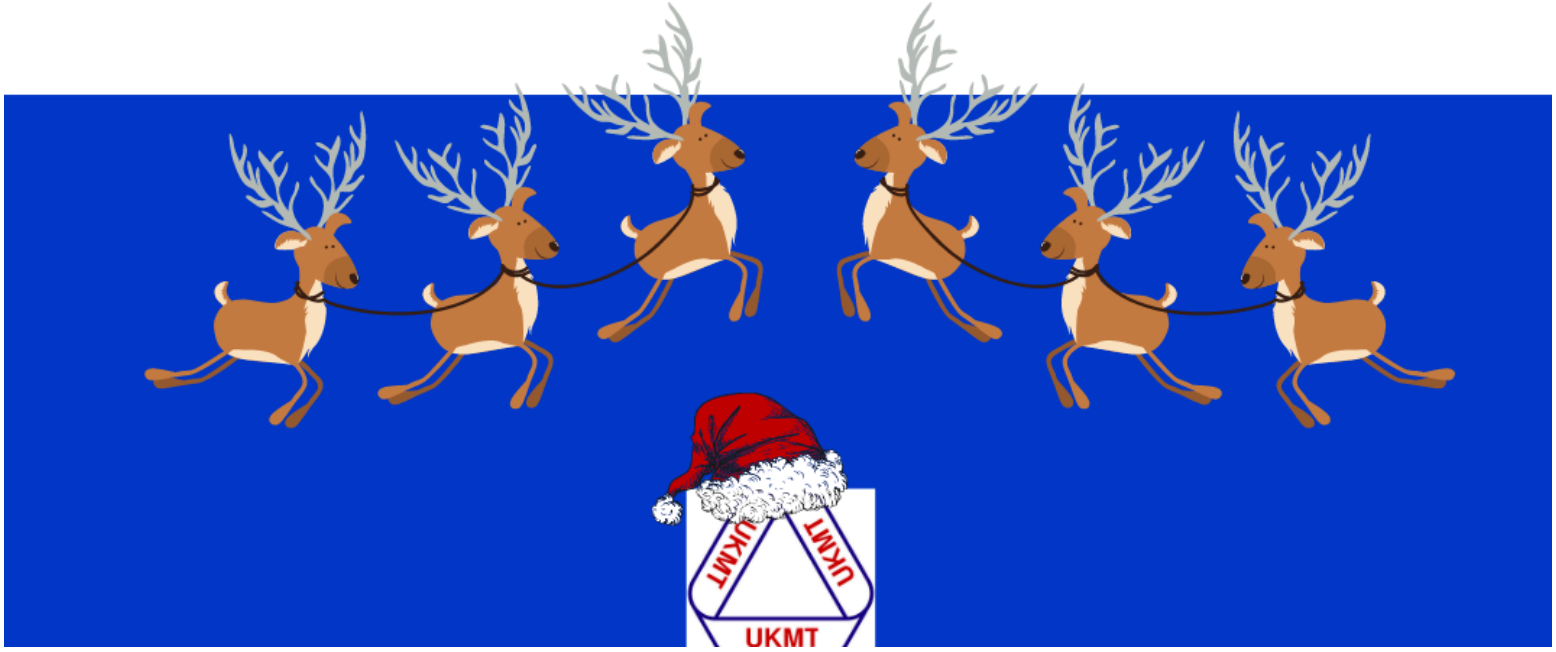
As a clue she says that she has the smallest numbers of coins in her purse that would enable her to pay exactly, without requiring any change, whichever amount from 1p to 50p that she is asked for.

How many coins does she have in her purse?

DECEMBER
8th
QUESTION

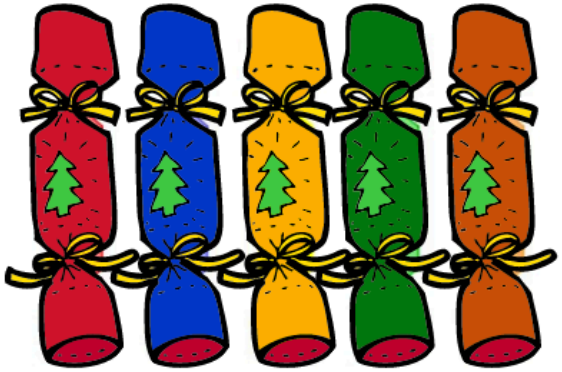
Santa loves setting problems for his friends. Claudia asks him how many reindeer and how many elves he has. Santa says "This year I have a group of reindeer and elves with a total of 17 heads and 56 legs."

How many reindeer and how many elves does Santa have?



DECEMBER 9th QUESTION

Zofia has 5 Christmas crackers. They are different colours – red, blue, yellow, green and orange. Zofia places the crackers on the table in a row at random. What is the probability that the red and blue crackers are next to each other?



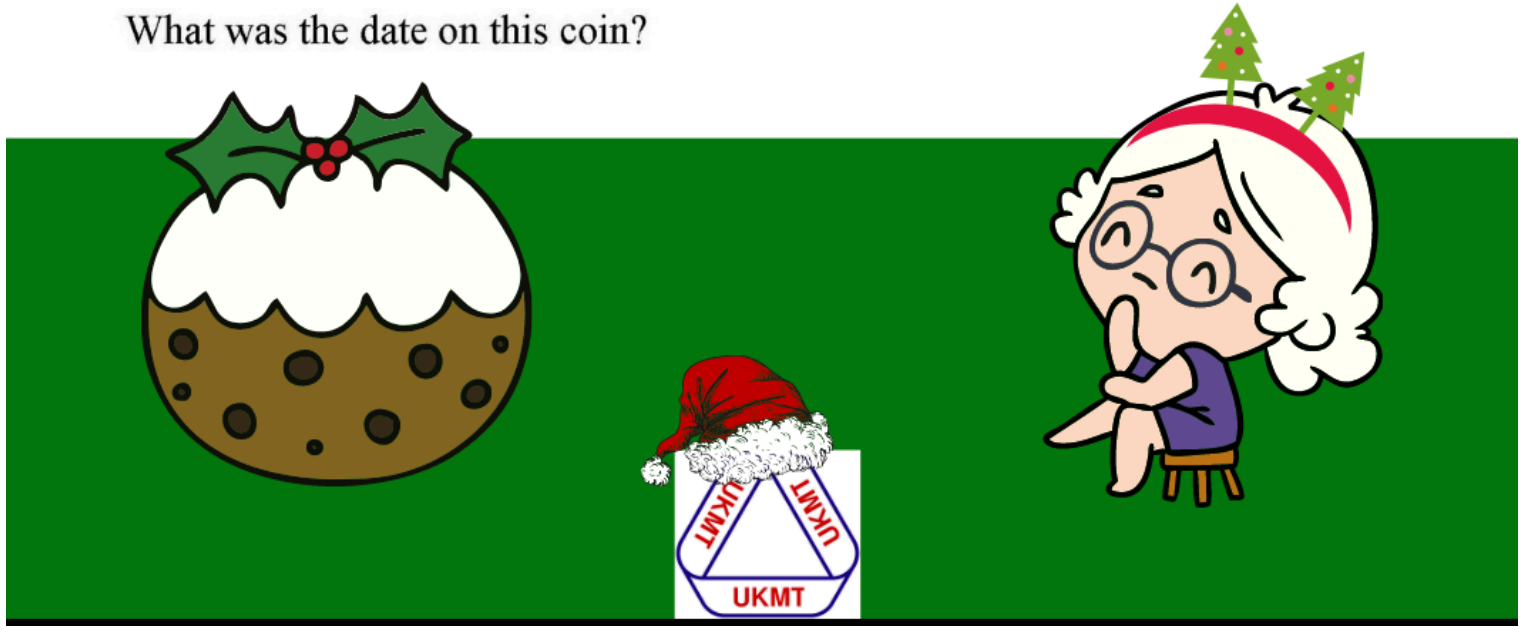
DECEMBER 10th

QUESTION

Old Mother Hubbard was making a Christmas pudding. She added an old fashioned sixpenny coin to the mixture.

This coin had on it a date from the twentieth century. The year number on the coin leaves remainder four when divided by seven and also when divided by eleven.

What was the date on this coin?

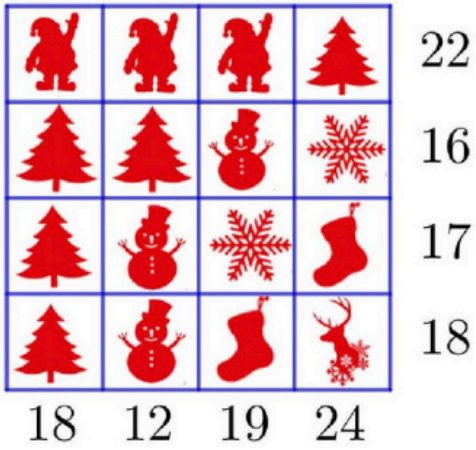


DECEMBER 11th

QUESTION

Each different image in the grid has a different value. The total of each row and column is written at the end of each row and below each column.

Find the value of each image.



DECEMBER 12th

QUESTION

A mathematical Grandmother left a plate of mince pies on the table with her four grandchildren, and came back to find it empty!

Art said "Bert and I ate the same number of pies between us as Caz did by herself."

Bert said "Art ate the same number as Diz and I together had."

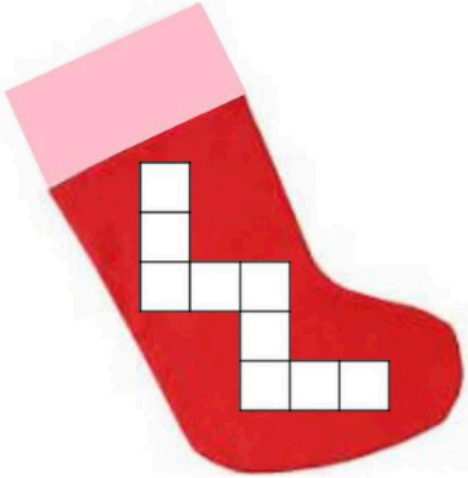
Caz said "The number of pies I ate plus twice Diz's number is equal to twice Art's number plus Bert's."

Diz just smiled, because she knew Granny had left the smallest number of pies possible for these statements to all be true.

How many pies did Granny leave on the plate?

DECEMBER 13th

QUESTION



The grid on the Christmas stocking has nine squares.

Show how to put the digits 1 to 9 in the squares with one digit in each square, so that the sum of the three digits in each row and in each column is 13.

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DECEMBER 14th

QUESTION

I have two candles. They have the same height but one is thicker than the other. I light them at the same time. Each candle burns down at a constant rate. It takes the thicker candle four hours to burn down completely, while the thinner candle takes three hours.

How long after being lit is the thicker candle twice the height of the thinner candle?

DECEMBER 15th

QUESTION

Complete this Christmas Tree Sudoku, so that each row, column and 3×3 square contains each of the integers from 1 to 9.

3	9			1			6	8
6			9	2	8			3
		1		3		7		
	6			4			9	
9			8	5	2			7
		3		6		5		
	2			7			8	
5				8				4
			5	9	4			

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DECEMBER 16th QUESTION

Natalie wants to create the perfect box of chocolates for her family. Each chocolate will be made of either dark or milk chocolate. The flavour of each filling will be either mint or orange.

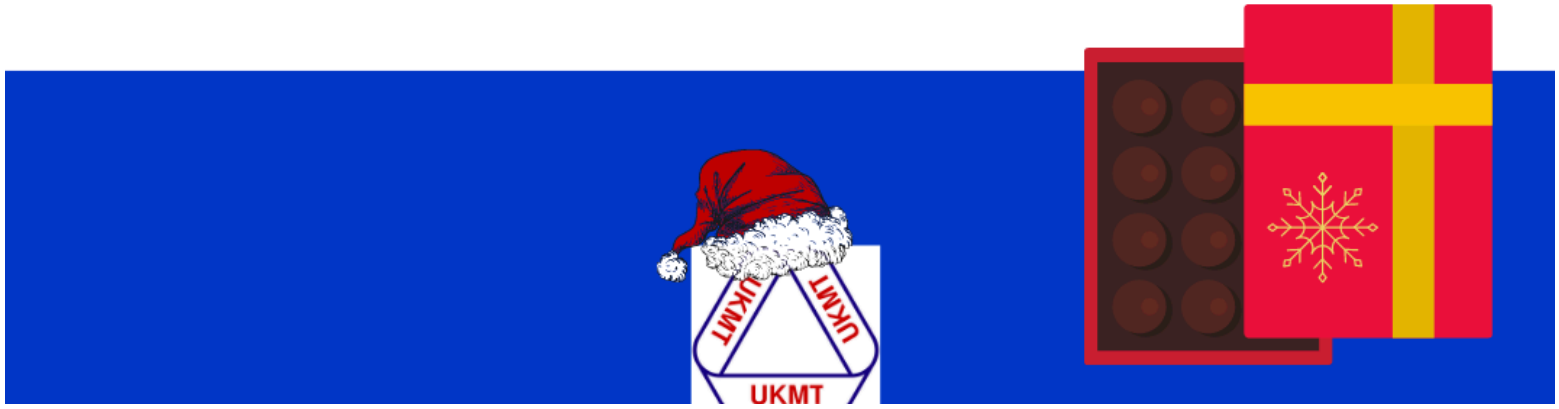
She wants the selection of the chocolates in the box to match the preferences of her family. This means that:

the ratio of dark chocolates to milk chocolates should be 4 : 5,

the ratio of mint chocolates to orange chocolates should be 1 : 1, and

the ratio of dark-orange chocolates to milk-mint chocolates should be 3 : 4.

What is the smallest number of chocolates that Natalie could put in the box?



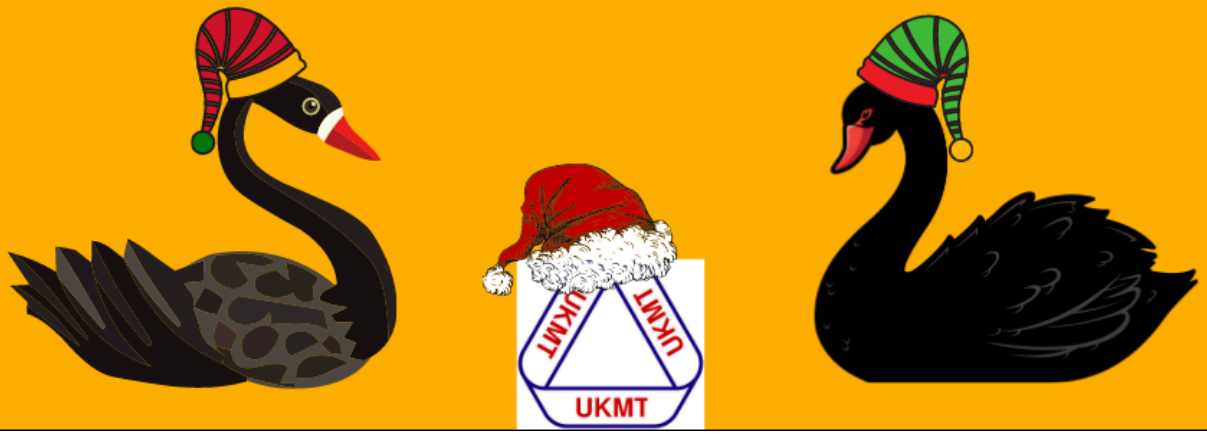
DECEMBER 17th

QUESTION

On the twelfth day of Christmas there were twelve drummers drumming, eleven pipers piping, ten lords a-leaping, nine ladies dancing, eight maids a-milking, seven swans a-swimming, six geese a-laying, five gold rings, four calling birds, three French hens, two turtle doves and a partridge in a pear tree.

Add up the total number of legs (birds and humans), musical instruments, milk pails and beaks. Multiply this total by the number of gold rings.

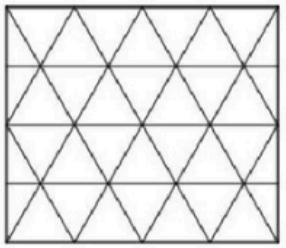
What is the cube root of your final answer?



DECEMBER 18th

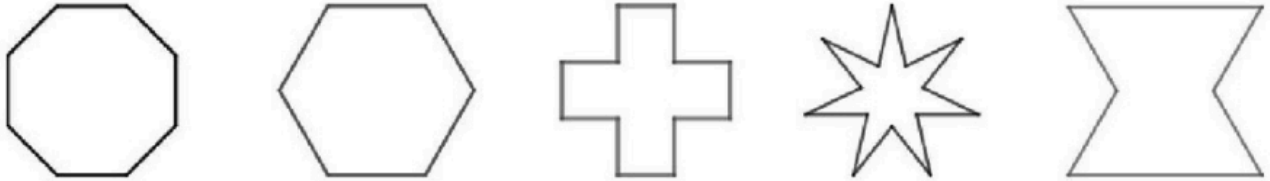
QUESTION

Mauritz is designing some gift wrapping paper. He wants his design to be based on a single shape that can be used to tessellate the paper.



This means that the paper will be covered by non-overlapping copies of the same shape. For example, the diagram on the right shows how equilateral triangles can be used to make a tessellation.

How many of the following shapes could Mauritz choose for his design?



DECEMBER 19th

QUESTION

Sophie makes a jug of hot chocolate every day in December for herself and her three children.

They all drink hot chocolate on December 1st.

Sophie drinks hot chocolate every day in December.

Her daughter Amari drinks hot chocolate every second day, that is, on December 1st, 3rd, 5th and so on.

Her elder son Barry drinks hot chocolate every third day, that is, on December 1st, 4th, 7th and so on.

Her younger son Charlie drinks hot chocolate every fifth day, that is, on December 1st, 6th, 11th and so on.

On how many days does Sophie get the whole jug of hot chocolate to herself?

DECEMBER
20th

QUESTION

This star has rotational symmetry of order 5. Therefore the five marked angles are all equal.

What is the size, in degrees, of each of these angles?

DECEMBER 21st

QUESTION

Alice, Chris, Kay, Leah and Sam are five sisters who have lined up, each with a present for their mother. Use the following information to fill in the table to show the order in which they are standing and which is their present.

- Chris is immediately to the left of Alice.
- The sister whose present is a box of chocolates is standing immediately to the left of the sister whose present is a pair of gloves.
- Sam is at the right-hand end of the line.
- Kay is immediately to the right of Leah.
- Leah's present is a pendant.
- The sister at the left-hand end of the line is giving her mother a brooch.
- One of the presents is a silk scarf.

Sister					
Present					

DECEMBER 22nd

QUESTION

Amy and Ben are comparing prices for large gift bags and rolls of wrapping paper.

In Emmi's emporium, large gift bags cost £6 and rolls of wrapping paper cost £4. There is a special offer today: buy 4 rolls of wrapping paper and get one large gift bag free or buy 2 large gift bags and get one roll of wrapping paper free.

At Caspar's cavern both items cost £6 each or £10 for a pack containing one of each. In addition if you buy two packs there is a 25% discount.

Amy and Ben need to buy at least 5 large gift bags and 5 rolls of wrapping paper. What is the cheapest way of doing it and how much will it cost?

DECEMBER 23rd

QUESTION

"This winter evening half-light", said King Wenceslas "makes me think of half-one numbers."

"What is a half-one number?" asked his page.

"It is a positive integer," replied the King, "such that exactly half the positive integers up to and including this number contain the digit 1. For example, 2 is the smallest half-one number because half the integers in the list 1, 2 contain the digit 1.

Which is next half-one number after 2?

DECEMBER 24th

QUESTION

On the last Monday of the term in one Maths class the teacher has asked a question and is listening carefully as the pupils give their answers.

"Fifty-six," says Elvira.

"Two hundred," says Rebecca.

"Fifty-nine," says Felix.

"One thousand," says Tom.

"Five hundred," says Fred.

"Ninety-nine," says Nick.

"One," says Rhianna.

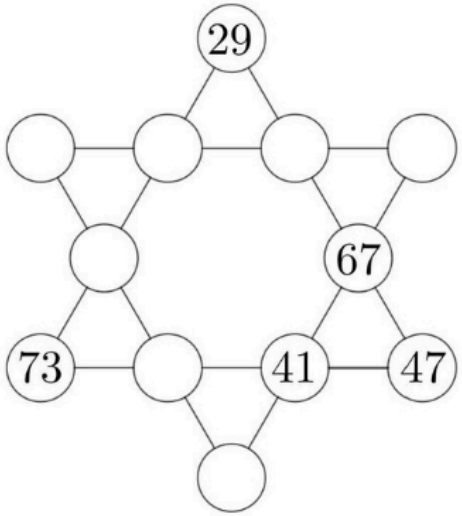
"Well done," says the teacher, "you are all right, including Clive."

What answer did Clive give?

DECEMBER 25th

QUESTION

Here is a magic star for the top of the Christmas tree.



The numbers that go in the twelve circles are all prime numbers in the range from 29 to 73. Five of these primes are shown.

It is a magic star because the totals of the primes in each row of four circles are all the same.

Fill in the missing seven prime numbers.

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