Week 74

The main draw for the Wimbledon men's or ladies' Tennis Championship has 128 entrants. If we doubled the number of entrants in the draw to 256, how many matches would there have to be in the traditional knockout format for there to be a winner?

Answer

255

It is a knockout tournament, and logically only the winner will remain undefeated. Every other competitor will lose one, and only one match. So if there are 4 entrants, there will have to be 3 matches, and 3 people have to lose. With 8 entrants, there will be 7 matches and 7 people have to lose. With 128 entrants, there have to be 127 losers, and hence 127 matches. And for 256 participants, you will have 255 losers, so 255 matches. Mathematically, you could model the number of matches as 2 to the power of *n* and then subtract one i.e. 2 to the power of 8, which is 256 and then subtract one to give us 255.

Week 73

In homage to host Jeremy Paxman retiring from BBC quiz show University Challenge after 29 years, here are three bonus questions. Can you answer them and find the connection between the three answers?

Bonus 1: A small, narrow human-powered watercraft typically propelled by a long, double-bladed paddle. Originally used by people such as the Inuits.

Bonus 2: In music, a word of Latin origin which means a note having the time value of two crotchets. A half note.

Bonus 3: In the human body, this is a group of muscles and tendons that stabilize the human shoulder. It is usually followed by the word cuff.

Answers

Bonus 1: kayak
Bonus 2: minim
Bonus 3: rotator

Connection

These are all palindromes, a word that reads the same backwards as forwards.

Week 72

For the coronation of King Charles III, a puzzle maker creates a monument designed with the following monarchs from these isles: Richard III, Elizabeth I, Anne, Victoria and Charles III.

Can you explain the logic behind the selection of these monarchs for the monument?

Solution

These are all the last monarchs in their house. Richard III was the last in the Plantagenet dynasty. Elizabeth I was the last Tudor. Anne was the last Stuart. Victoria was the last Hanover. And, as it stands, Charles is currently the last Windsor.

<u>Week 71</u>

Celebrity Hunted is a TV show where 10 personalities take on the role of fugitives in a real-life thriller for charity "Stand Up To Cancer". Bobby Seagull is paired up with YouTuber & ex Strictly Come Dancing contestant Saffron Barker. Watch Channel 4 at 9pm on Tuesday 25th April to see Bobby seeking refuge at Emmanuel College.

Bobby & Saffron hide in one of the 400 undergraduate rooms in College. Assume that the hunters can only search one undergrad room at a time and it takes them 30 seconds on average to search each room. How long will it take hunters to search every undergrad room in college?

Solution

400 rooms x 30 seconds = 12,000 seconds
12,000 seconds / 60 = 200 mins
3 hours 20 mins

<u>Week 70</u>

On Good Friday on 7th April, our puzzle writer Bobby Seagull is on the BBC series "Pilgrimage: The Route Through Portugal". Seven personalities of different faiths and beliefs head off on a personal journey along the northern route of the Fatima Way in Portugal. They have to cover 364km over 15 days.

https://www.bbc.co.uk/mediacentre/2023/pilgrimage-portugal-bbc-one-bbc-iplayer

Assuming the pilgrims set off at 9am everyday and walk till 6pm with an hour rest for lunch, what average speed in km/hour will they have to travel to complete their journey?

Solution

Per day, the pilgrims travel for 8 hours (removing 1 hour for lunch). So the pilgrims will travel for 15 days x 8 hours = 120 hours in total. 364 km / 120 hours = 3.03km/hour

<u>Week 69</u>

Your word puzzle features the name of 18th century polymath and illustrious Emmanuel member, Thomas Young. Using just the letters from his name ("Thomas Young"), what is the longest word you can make? As a clue, there are two 8-letter words available. The first word is borrowed from ancient Greek and is about the freedom to use your own laws. The second word is the plural of a place frequented for entertainment or socialising.

Solution

Autonomy
Hangouts

<u>Week 68</u>

For a Burns Night formal, the Emma Head Chef prepares the traditional Scottish dessert Cranachan. This is a mixture of oatmeal, raspberries, double cream, honey and whisky.

The recipe requires twice as many tablespoons pf oatmeal compared to honey, and twice as many tablespoons of honey compared to whisky. If a large Cranachan requires using the tablespoon 21 times in total, how many tablespoons of whisky will be needed?

Solution

3 tablespoons of whisky required.
Set up as ratios
Whisky = x
Honey = 2x
Oatmeal = 4x
7x = 21 tablespoons. x = 3 tablespoons.

Week 67

Bobby Seagull and Eric Monkman, his University Challenge friend from Wolfson College, appear on BBC Two's Celebrity Antiques Road Trip on Friday 16th December at 7.30pm. They search for treasures in antiques shops and compete to make the most money at auction.

One of the actual items that Bobby buys for the programme is an Emmanuel College Boat Club photo from the early 1900s. Assume Bobby purchased the photo for £50. At auction, Bobby manages to sell the photo for £80. However, he has to pay 15% commission on the sale price and also 20% VAT on the sale price. What is his profit or loss?

(Note: These are not the actual purchase and sale prices. You'll have to watch the show to find out!)

Solution

15% Commission on £80 = £12
20% VAT on £80 = £16
Total costs = £28

£80 sale price - £50 purchase cost - £28 commission & VAT = £2 profit

Week 66

Write down the answers to the following two clues.

Clue 1: What short word means to be in a position in which the lower part of the body is resting on a seat?

Clue 2: What is the plural of the geological phenomenon that occurs when hot materials from the earth's interior are thrown out of a volcano?

With all the letters available from the answers to you two clues, can you us all the letters in any order, to come up with a Halloween themed word?

Solution

Superstition. Clue 1: Sit. Clue 2: Eruptions.

You take a journey on the London underground network using the following lines in this specific order: Central, London Overground, Circle, District, Piccadilly, Elizabeth and Metropolitan. Why might an art teacher use this sequence to help his students?

Clue: A history teacher teaching the death of Richard Duke of York at the 1460 Battle of Wakefield during the Wars of the Roses might also use this sequence for his students.

Solution

The colours of the London underground lines in this journey are Red, Orange, Yellow, Green, Blue, Indigo and Violet (the last two are purple, but I've chosen to interpret them as these shades of purple). If we take the first letter of these colours ROYGBIV, these follow the start of the mnemonic Richard of York Gave Battle In Vain to help remember the colours of the rainbow.

Week 64

American tourists Elon and Mark are visiting the UK on holiday. They both have exactly three UK coins each in their wallets. Elon's coins are all different from each other. Mark has three coins of the same value. If Elon has half as much money as Mark, what coins do they each have?

Extension: Could this scenario work if Elon has twice as much money as Mark?

Solution

Mark has three 50p coins adding up to £1.50. Half of this is 75p for Mark, which consists of 50p, 20p and 5p.

You can do trial & error or set up a systematic table to help investigate

Solution

Mark	Elon	Can you create with 3 different coins?
3 x 1p	1.5p	No
3 x 2p	3p	No
3 x 5p	7.5p	No
3 x 10p	15p	No
3 x 20p	30p	No
3 x 50p	75p	Yes – 50p + 20p + 5p
3 x £1	£1.50	No
3 x £2	£3.00	No

Extension

As all three coins have to be different for Elon, there is no solution to this. This only works if you can use two of the same coin.

Mark	Elon	Can you create with 3 different coins?
3 x 1p	6p	No
3 x 2p	12p	No (10p + two 1p)
3 x 5p	30p	No (20p + two 5p)
3 x 10p	60p	No (50p + two 5p)
3 x 20p	£1.20	No (£1 + two 10p)
3 x 50p	£3.00	No (£2 + two 50p or three £1)
3 x £1	£6.00	No
3 x £2	£12.00	No

Week 63

Can you solve this Commonwealth Games arithmetic?

Ghana + Pakistan = St Kitts and Nevis
Ghana + New Zealand = Singapore
St Kitts and Nevis + New Zealand = ?

Hint: Fans of astral vexillology would enjoy this puzzle!

Solution

Australia
Count the number of stars on each flag
Ghana (1) + Pakistan (1) = St Kitts and Nevis (2)
Ghana (1) + New Zealand (4) = Singapore (5)
Therefore, what would St Kitts and Nevis (2) + New Zealand (4) = 6 and the Australian flag has 6 stars

Week 62

The Commonwealth Games in Birmingham start on Thursday 28th July. How many medal events are there in Athletics? Clues: 1. It is a two digit prime number. 2. The sum of its two digits add up to 14

Solution
59

Week 61

From 18th July to 17th August is the UK's South Asian Heritage Month. The initiative aims to commemorate, mark and celebrate South Asian history and culture, and build an understanding of the diverse heritage that continues to link the UK with South Asia. Using the hint of being related to countries of South Asia, Which is the odd word out and why?

bungalow - cheetah - jungle - ketchup

Solution

Ketchup is the odd word out as it is derived from the Chinese word ketsiap meaning pickled fish sauce. All the other words are drawn from South Asian languages. Cheetah is derived from Hindi word Chita meaning "spotted one". Bungalow is from Hindi bangla ("belonging to Bengal") from a type of cottage built for early European settlers in the late 17th century. Jungle is from the 18th century via Hindi from jangala meaning "rough and arid" (terrain)

Week 60

A teacher has to get a student, a set of exam papers and a box of calculators driven from the school to an exam centre.

In his car, he only has space for him and one other thing.

If the student and set of exam papers are left together, the student will look at the papers.

If the set of exam papers are left with the box of calculators, the calculator batteries will leak onto the papers.

Solution

How does the teacher do it?

The teacher takes the exam papers with him to the exam centre (the student and calculators are fine together). He leaves the exam papers at the centre and drives back to the school.

The teacher then drives the student back to the exam centre and since he can't leave the student and exam papers together, he brings back the exam papers to the school.

Again, since the exam papers and calculators can't be left together, he leaves the exam papers and he drives the box of calculators across and leaves it with the student at the exam centre.

He then drives back to pick up the exam papers at the school and heads to the exam centre the last time.

Week 59

28th June is commemorated by mathematicians as Tau Day. Tau or 2 pi is the ratio between the circumference of a circle and its radius, approximately 6.28 and the 28th June can be written as 6/28 in the American calendar system. To celebrate Tau Day, you order a pizza. In terms of surface area, which is larger: an 18 inch pizza or two 12 inch pizzas?

Solution
The 18 inch pizza has counter intuitively more pizza!
Area of a circle is pi x radius x radius
Area of 18 inch pizza = pi (18/2)^2 = 81 pi inches squared
Area of 12 inch pizza = 2pi (12/2)^2 = 72 pi inches squared

Week 58

A "champagne bottle & cake" meal deal to celebrate the Queen's Platinum Jubilee costs £24. There are 2 options:
Option 1: Buy Two, Get One Free
Option 2: Buy Three, Get 30% Off

Without calculating, which deal would you instinctively go for? Now with a calculator, see if your instinct was right.

Solution
So Option 1 is better and by £2.40
Option 1: £24 + £24 = £48 in total (third one free)
Option 2: Buy 3 x £24 = £72
30% of £72 = £21.60 (can do 10% is £7.20 and multiply by 3 to get 30%). £72 - £21.60 = £50.40

Week 57

The UK's National Numeracy Day was on 18th May, celebrating all things maths. Here is a question that (shockingly) half of all adults would struggle with (even with the aid of a calculator). A book is available for £7 and the price increases by 5% due to inflation. What is the new price?

Solution

5% of £7 is 35p. So the new cost is £7.35

Week 56

Saturday 14th May is the 66th edition of the Eurovision Song Contest. Entries from France, Germany, Spain, Italy and the United Kingdom are guaranteed places in the final every year. With the following theoretical song choices, why might only the UK entry get the infamous nul points?

France's song is "Can humans only imagine roads?".

Germany's song is "Very original ice cream eggs".

Spain's song is "Super clever aliens learn eternally".

Italy's song is "Love you really in colour".

UK's song is "Animal zoos exert regal opulence".

Solution

If you look at the acronym for each of the songs, they spell out CHOIR (France), VOICE (Germany), SCALE (Spain), LYRIC (Italy) and AZERO (UK). The first four spell out words to do with music whereas the UK's just spells "a zero", quite literally nul points!

Week 55

It is World Book Night on Saturday 23rd April. To mark this, I want to start reading James Joyce's 265,000 word novel "Ulysses". I read an average of 300 words per minute and aim to read for 15 minutes each night. How many nights will it take me to complete "Ulysses"?

Solution
59 nights
300 words per minute means 300 x 15 = 4,500 words per night
265,000 / 4,500 = 58.9 nights
So 59 nights

Week 54

13th April is the anniversary of the popular but slightly erroneous quote "Houston, we have a problem" from the radio communications between Apollo 13 astronauts and NASA Mission Control Center. The distance from the Moon to the Earth is approximately 380,000 km. A spacecraft can travel at an average of 5,000 km an hour. If they leave the Earth at 7am on Easter Monday, what day and time will they reach the Moon, assuming they have no problems?

Solution
Time = distance / speed = 380,000 / 5,000 = 76 hours
76 hours = 3 days + 4 hours
So it will reach the Moon at Thursday 11am

Week 53

Our Emmanuel College team had a brilliant run on University Challenge, finally being eliminated this Monday to the mighty Imperial College in the semi-finals. Using only letters from the word "University" what is the longest word that can be formed? As a clue, it is 9 letters long (uses all but the "Y" in the word "University") and can be followed by words "questioning" and "lighting" to give two phrases.

Solution
Intrusive

Week 52

With victory over King's College London in the Quarter Final play off, Team Emma have reached the semi final of University Challenge. We play Imperial College London on Monday 21st March (TBC) for a place in the Grand Final. On our TV screens, assuming our captain Malcolm always sits on the third seat from the left, how many different ways can you arrange a team of four?

Solution
6. As the captain's seat is fixed, the question is how many ways can we arrange the 3 remaining seats.

Week 51

Bobby Seagull is a resident expert on Channel 4 quiz show The Answer Trap and a participant on new E4 series "The Real Dirty Dancing" (inspired by classic 1987 film). Here is an appropriate Answer Trap style puzzle. From this list of 9, identify which 7 are real dance styles and which 2 are Answer Traps (not dances).

"BOLERO" "CHA-CHA" "AMONTILLADO"

"SAMBA" "FOXTROT" "MINUKKU"

"MOUSE BAIT" "JIVE" "OTE'A"

Answers

Amontillado is a variety of sherry wine named after the Montilla region of Spain.

Mouse Bait is just an anagram of Strictly Come Dancing professional Oti Mabuse.

Week 50

"Organise BBC Game" is an anagram for which legendary UK TV quiz show presenter who passed away this week?

Answer
Bamber Gascoigne

Week 49

Team Emma started our Quarter Final group stages of University Challenge on Monday, the 4th time in 6 years we have reached the Quarters. For the 8 teams in the Quarter Finals, they qualify for the Semi Final knockouts if they win 2 matches or are eliminated if they lose 2 matches in the group stages. What is the minimum number of matches in total needed to complete the Quarter Final group stages?

Solution
10 matches

Week 48

On 11th January 1569 was possibly the first ever lottery draw in England, held to raise money for Queen Elizabeth I's Royal navy and foreign exploration. The first modern National Lottery as we know it was held in 1994. You had to select six numbers between 1 and 49 and would win if your six selections would match the six numbered balls picked randomly by the lottery machine. What was the probability of picking the six correct numbers?

Solution
The probability of picking the six numbers is 1 in 13,983,816

6/49 x 5/48 x 4/47 x 3/46 x 2/45 x 1/44 = 720/10,068,347,520 = 1/13,983,816

Week 47

The Strictly Come Dance final is on Saturday and so we have a puzzle themed on the scoring. The judges Craig, Motsi, Shirley and Anton each give a score between 1 – 10 for each of the finalists. One dancer does an unusual Christmas waltz dressed up as elves and so attracts a disagreement in scores from the judges. Anton and Shirley both give a score that is double that of Craig. Assume the average score for this dancer is 6 and Motsi gives a score of 9. So what scores were awarded by Anton, Shirley and Craig?

Solution
Anton and Shirley give 6 points and Craig gives 3. As the average score is 6, the total score by the four judges is 24. As Motsi has given 9, the remaining three judges give a score of 15 (6 + 6 + 3 = 15).

Week 46

Nobel Prize laureates are given their Nobel medals on Friday 10th December. So a primary school class bakes circular mince pies in the design of a Nobel medal. They cut each Nobel medal circular mince pie into three parts. The first portion is a quarter of the mince pie. The second portion is a third of the mince pie. In degrees, what is the angle of the remaining final portion of the mince pie?

Solution
150 degrees.
One quarter = 90 degrees. One third = 120 degrees. 90 + 120 = 210. Total pie is 360 degrees, so the remaining portion is 150 degrees.

Week 45

23rd November is a fun day in the maths world as it is Fibonacci Day. 23rd November in month/date format is 11/23. These digits form a mathematical Fibonacci sequence where every number after the first two is the sum of the preceding two. So to celebrate here is a mathematical anagram. Rearranging all the letters in the two word phrase "READING TOOL", what other two word phrase can you form that relates to the Fibonacci sequence?

Solution
Golden Ratio is an anagram of Reading Tool. The Golden Ratio is the limit of the ratios of successive terms of the Fibonacci sequence (equivalent to 1.618...). This ratio is said to appear in geometry, art, architecture and many other areas as some believe that the Golden Ratio makes a beautiful shape.

Week 44

It's COP 26 in Glasgow, so an appropriately themed puzzle. With an average global temperature rise of 1.5℃, the UN expect the Arctic Ocean to be free of sea ice one summer per century. With 2℃ warming, they expect one summer free of sea ice per decade. Over the next century, how many more summers would the Arctic Ocean be free of ice, if average temperatures rose by 2 versus 1.5℃?

Solution
9 more ice free summers

2 degrees Celsius: free of sea ice once a decade, so 10 in 100 years.

1.5 degrees Celsius: free of sea ice once in a hundred years, so 1 in 100 years.

Week 43

22nd October would have been the 102nd birthday of Doris Lessing, the oldest person ever to win a Nobel Prize for Literature. Using just the letters from her name "DORIS LESSING", what is the longest single word you can make? As a clue, the word is a plural of the noun which means to move away from the main subject you are talking about."

Solution

Digressions

Week 42

As Bobby is the current UK's Library Champion (a role previously occupied by Mary Beard and Stephen Fry), he is writing his puzzle about this week's UK's #LibrariesWeek from 4 - 8 October. This is a week's celebration of the role of libraries in our country. Before the pandemic, there were 194 million in person visits annually to libraries in England. If each visit is 15 minutes long, how many days of visits is this in total to the nearest million?

Solution
2 million days of visits
194 million visits x 15 minutes (0.25 hours) = 48,500,000 hours
48.5m hours / 24 hours = 2,020,833.33 days

Week 41

Strictly Come Dancing has returned to our screens! Triple Olympic swimming gold medalist Adam Peaty & his pro partner Katya Jones perform an innovative dance that attracts a wide disagreement in scores from the judges.

Craig, Motsi, Shirley and Anton each give a score of 1-10. Shirley and Motsi both give a score double that of Craig. Assume the average score of the couple is 6 and Anton scores 9. What scores were awarded by Craig, Shirley & Motsi?

Solution
If the average score is 6, then between the 4 judges they give out 24 in total.
As Anton gives 9, then there is 15 left between the 3 judges.

For the next bit, you can use trial & improvement (just guess different scores that fit which is what most people do). Or a tiny bit of algebra!

If Craig gives a score of X, then Shirley and Motsi both give a score double that, so 2X each.
Craig = X, Shirley = 2X, Motis = 2X
Total is 5X = 15
X = 3 which is Craig's score
And Shirley and Motsi both score double, which is 6

Week 40

Primary & secondary school summer holidays have come to an end. Two students, George and Charlotte purchased stationery. George bought 3 packets of pens and 2 geometry sets for £12 and Charlotte bought 2 packets of pens and 2 geometry sets for £10. How much is one geometry set?

Solution
You can solve using simultaneous equations from your school days or use a method of inspection. If you compare what George and Charlotte bought, the difference is that George has one additional packet of pens. He spends £2 more than Charlotte. So a packet of pens cost £2. With three packets, this means he has spent £6 on pens. This leaves £6 from his £12 to spend of 2 geometry sets, which are £3 each.

Friday sees the return of Premier League football. There are 20 teams in the top division with each team playing each other home and away. How many matches are played in total in the entire division over the course of one season?

Answer
380 different matches. There are multiple methods to solve this. In brief, every single team faces 19 other teams twice a season (home and away). This is 19 x 2 = 38. So the total number of matches is the sum of the sequence 38 + 36 + 34 + ... + 6 + 4 + 2. This is the same mathematically as 2 x (19)(20)/2 = 380.

Or more intuitively, you can think of 38 games played by 20 teams to give 760. But we are double counting. For example, the first opening Brentford Arsenal fixture is double counted as both Brentford and Arsenal will include this in their tally. So we divide 760 by 2 to get 380.

Week 38

Bobby Seagull was resident expert on The Answer Trap, a Channel 4 weekday quiz series. Even if you're not travelling abroad this summer, identify which 7 are "Island Nations" and which 2 Answer Traps do not fit into this category.

BORNEO COMOROS JAMAICA
SEYCHELLES JAPAN PALAU
TONGA ICELAND ESWATINI

Answer Traps
Borneo - this is the 3rd largest island in the world, but it is not an "island nation" as it is divided among three counties: Malaysia and Brunei in the north, and Indonesia to the south.

Eswatini - bordered by Mozambique and South Africa, this landlocked African country was formerly known as Swaziland.

Week 37

To celebrate the launch of "Emma Enables", we have an appropriately themed word puzzle. Using only the letters in the two words "Emma Enables", what type of middle-eastern cuisine could you make?

Solution
Lebanese. In fact, this is also the longest word you can make from "Emma Enables" at 8 characters long (as well as amenable, ensemble, leaseman, leasemen and nameable)

Week 36

Bobby Seagull is a resident expert on The Answer Trap, a new Channel 4 quiz show at 3pm every weekday. From this list of 9, identify which are names of UEFA Euro 2020 host cities and which are UK top 10 singles (in their first release). There are two Answer Traps which fit into neither category.

BERLIN PARIS BAKU
BUCHAREST VIENNA BARCELONA
MUNICH BILBAO ROME

Solution
Euros host cities = Baku, Munich, Rome, Bucharest
UK Top 10 songs = Paris (Chainsmokers), Barcelona (Freddie Mercury), Vienna (Ultravox)

Traps: Berlin - band name, Bilbao - original Euros location, but was changed.

Note: The song "Munich" only reached #22 on its original release but was re-released a year later and reached #10.

Week 35

Bobby Seagull is a resident expert on The Answer Trap, a new Channel 4 quiz show at 3pm every weekday. From this list of 9, identify which are names of Spanish footballers who have played in the Premier League (famously known by one name) and names of painters from the Impressionist art movement. There are two Answer Traps which fit into neither category.

ADRIAN MICHU BAZILLE

ANCONA MONET PISARRO

RENOIR LEROY NAYIM

Solution

Spanish footballers = Adrian, Michu, Nayim

Impressionist painters = Monet, Pisarro, Renoir, Bazille

Answer traps

1. Leroy - The term "Impressionism" was coined in derision by art critic Louis Leroy for his review "The Exhibition of the Impressionists". It is taken from the Monet painting "Impression: soleil levant".

2. Ancona - Ronni Ancona is an impressionist comedian but not an impressionist painter.

Week 34

We are expecting Emma alumni from around the world to watch the launch of "Emma enables". Based on a classic problem, we devise an ambitious idea to mark "Emma enables" by wrapping blue & pink coloured rope all the way around the Earth's equator (about 40,000 km)! How much MORE rope would we need for it to sit 15cm above the ground, all the way around?

A. 1 metre
B. 1 kilometre
C. 1,000 kilometres

Solution

A. In actual fact, 1 metre extra would lift the string by 15.9cm.

Counter intuitively, the answer will be the same for the Sun, the Moon, any other planet or indeed a sphere of any size. The additional length of rope 2 x pi meters x 0.15m = 0.94 metres.

The maths requires the formula circumference = 2 x pi x radius
So the additional bit of rope (h) makes the new radius R = r + h
C = 2pi (r + h) = 2pi x r + 2pi x h
The length of the rope at ground level is equal to the Earth's circumference. C = 2pi x radius

The length of the rope raised above the ground by any height h:
C = 2pi (R-original + h) = 2pi x R-original + 2pi x h
As the first part is the circumference of Earth, the new part is the 2pi x h.
As h = 0.15m, the additional length requires is 2pi x h = 2 x 3.14 x 0.15 = 0.94m

Week 33

On Monday 10th May, Bobby Seagull is one of two resident experts on The Answer Trap, a brand new day time Channel 4 quiz show hosted by Countryfile's Anita Rani. The show will be on straight after Countdown at 3pm every day for the next 6 weeks.

Teams compete to sort a series of answers into the correct categories to try and win a cash prize. However, Bobby and Only Connect champion Frank Paul set Answer Traps that fit into neither category. Here is an example of a typical question.

From this list of 9, identify which are creatures from Greek myth and which are characters from the Pokemon cartoon series. There are two Answer Traps which fit into neither category.

CENTAUR LIKITUNG KRAKEN
HYDRA PIKACHU SQUIRTLE
JUBJUB GORGON MAROWAK

Solution
Greek myth = Centaur, Hydra, Gorgon
Pokemon characters = Likitung, Pikachu, Squirtle, Marowak
Answer Traps:
1. Kraken. It makes an appearance in the Greek myth-inspired film "Clash of the Titans". It is actually a mythical sea monster in which Scandinavians of the 18th century believed to exist.
2. Jubjub. Bird mentioned in the Lewis Carroll's nonsense poem Jabberwocky

Week 32

We recently had the final of the BBC quiz Only Connect. Here is a puzzle inspired by the gameshow. Can you work out what might come fourth in this sequence? 1 is Libya. 2 is Indonesia. 3 is Germany. As a hint, clue 1 as Libya is only true from 1977 to 2011.

Solution
Mauritius would fit this sequence, or any flag with 4 bands or 4 different colours. Libya (1977-2011) had one colour of green. Indonesia has two bands of red and white. Germany has three bands of black, red and gold.

Week 31

In a year's time, the first round of the 2022 French presidential election will be between 8th and 23rd April. To mark the occasion, Emmanuel Macron receives gifts from many world leaders at the Élysée Palace. From nearby countries, Boris Johnson sends a lantern, Angela Merkel sends a bottle and Vladimir Putin sends a mirror. From further afield, Narendra Modi sends a necktie, King Jong-un sends a piano and Joe Biden sends a watch. Following these gifts, what might make a logical suggestion from the Canadian Prime Minister, Justin Trudeau, to send to President Macron?

Solution
The leaders send a gift that begins with the same letter as their capital city. So Boris Johnson sends a lantern from London, Vladimir Putin sends a mirror from Moscow and Joe Biden sends a watch from Washington DC and so on. The capital city of Canada is Ottawa so Mr Trudeau can send any gift beginning with the letter "o" perhaps an ornament or even an oyster!

Week 30

To mark April Fools' Day, Del Boy tells his brother Rodney that he'll give him a million pounds if he can find two whole numbers that multiply together to give one million. It sounds easy but Del Boy says that Rodney is not allowed to pick numbers that contain any zeroes. What two numbers does Rodney choose?

Solution
64 x 15,625 = 1,000,000

Week 29

14th March is celebrated as the International Day of Mathematics as the date written as 3/14 is an approximation of the mathematical constant Pi of 3.14. To celebrate, you order pizzas of thin crust variety. In terms of the top surface area, which is more: a large 14 inch pizza or three small 8 inch pizzas?

Solution
The 14 inch pizza has counter intuitively more pizza!
Area of a circle is pi x radius x radius
Area of 14 inch pizza = pi (14/2)^2 = 49 pi inches squared
Area of three 8 inch pizzas = 3 x pi (8/2)^2 = 48 pi inches squared

Week 28

To celebrate World Book Day on 4th March, Premier League Fulham footballer and bookworm Joe Bryan sets himself a reading challenge. Joe wants to complete Leo Tolstoy's epic 587,000-word novel "War and Peace". He reads an average of 300 words a minute but only reads during football matches of 90 minutes and the 15 minutes half time break. How many matches would Joe need to attend if wanted to read "War and Peace" during the match and half term intervals?

Solution
19 matches. 587,000 / 300 = 1956.67 minutes

Reading time per match is 105 minutes.
1956.67 minutes / 105 minutes per game = 18.63 matches.
So he would need to attend 19 matches, which is half a Premier League season!

<u>Week 27</u>

To celebrate the start of the Chinese new year on Friday as the year of the ox, two siblings Peter and Layla buy some animal shaped sweets. They buy some cheaper rat-shaped sweets as the year of the rat was 2020, and some pricier ox-shaped sweets. Peter buys 4 ox sweets and 2 rat sweets for £9. Layla buys 2 ox sweets and 2 rat sweets for £5. How much do the ox-shaped and rat-shaped sweets cost individually?

<u>Solution</u>
Ox sweets = £2. Rat sweets = £0.50.
You can set up simultaneous equations or solve by inspection. Peter buys 2 ox sweets more for an additional £4. So ox sweets are £2 each. This means that 2 rat sweets cost £1, with 1 costing £0.50

<u>Week 26</u>

For Burns Night, a chef had prepared the traditional Scottish dessert Cranachan, which is a mixture of oatmeal, raspberries, double cream, honey and whisky. The recipe required twice as many tablespoons of oatmeal compared to honey, and twice as many tablespoons of honey compared to whisky. If a large Cranachan required using the tablespoon 21 times in total, how many tablespoons of whisky was needed?

<u>Solution</u>
3 tablespoons of whisky required. Set up as ratios

Whisky = x, Honey = 2x, Oatmeal = 4x

7x = 21 tablespoons. x = 3 tablespoons.

<u>Week 25</u>

19th January 1419 was a major event in the Hundred Year's War. English forces loyal to Henry V captured Rouen, the capital of Normandy from the Norman French. The size of the English contingency was 2.5 times larger than the French one. If the total combined English and French forces were 14,000, how many were on each side?

<u>Solution</u>
English =10,000 and French = 4,000.

You can solve through trial and error or by setting up simultaneous equations with E = English and F = French.

Equation 1: E + F = 14,000

Equation 2: E = 2.5F

Substitute E = 2.5F into the first equation gives us:

2.5F + F = 14,000

3.5F = 14,000

F = 4,000

And so E = 10,000

Week 22

Nobel Prize laureates are given their Nobel medals on 10th December. So a primary school class bakes circular mince pies in the design of a Nobel medal. They cut each Nobel medal circular mince pie into three parts. The first portion is a quarter of the mince pie. The second portion is a third of the mince pie. In degrees, what is the angle of the remaining final portion of the mince pie?

Solution
150 degrees.
One quarter = 90 degrees. One third = 120 degrees. 90 + 120 = 210. Total pie is 360 degrees, so the remaining portion is 150 degrees.

Week 21

It is currently Maths Week England, a national celebration of maths! From last year's data, 6,000 schools watched the daily videos and 8,000 schools did the quiz. If 3,000 schools did both the videos and the quiz, what is the smallest number of schools that could have participated in Maths Week England? Hint: Using Venn diagrams might help

Solution
11,000.

Maximum number of schools if no overlap is 6,000 + 8,0000 = 14,000. Assuming 3,000 did both, then 11,000 is the minimum.

Week 20

William Blake, the poet, printmaker and painter was born on 28th November 1757 - so happy birthday Mr Blake! Tyger tyger burning bright, can you get this puzzle right. On a particular working day, Blake spent 40% of the working day writing poetry, a quarter of his working day printmaking and the remaining 3.5 hours on painting. How long was his working day?

Solution

40% poetry + 25% printmaking = 65%. So remaining 35% = 3.5 hours. So the total day is 10 hours long.

Week 19

The United Nations officially came into existence 75 years ago on 24th October in 1945. As part of this puzzle, original plans to celebrate in the capital cities of the Permanent Five of the Security Council had to be postponed. Instead, parties are to be held in the capitals of the following countries: Portugal, New Zealand, Liberia, Argentina and Cambodia. Apart from their geographic spread, why were these capital cities appropriate replacements?

Solution

The capital cities of the Permanent Five are London (UK), Washington DC (USA), Moscow (Russia), Beijing (China) and Paris (France). The capitals of the replacement countries have a corresponding initial letter that begins with the same letter as our original capitals L, M, W, B, P. Lisbon, Wellington, Monrovia, Buenos Aires and Phnom Penh.

Week 18

Libraries Week is a week-long celebration starting 5th October. 50% of the UK's 67.6 million population hold a library card which is 0.76 millimetres thick. If we put all of the UK's library cards into 1 stack, how tall in kilometres would this be?

Solution
It would be 25.7km tall.
50% of 67.6 million = 33.8 million cards
0.76mm in metres is 0.00076m
0.00076m x 33.8 million = 25,688 metres = 25.688 km
This is 3 times the height of Mount Everest (8,848m) and taller than the largest mountain in the Solar System (Olympus Mons on Mars is 21.9km).

Week 17
It was Roald Dahl Day on September 13th. The character Matilda had devised a spell to ward off bad luck for the day! Her charm is: "Deified madam refer level rotor racecar". Explain a possible linguistic reason behind this magic spell.

Solution
All the words in the spell are palindromes which we spell the same forwards and backwards.

Week 16
1st September was the 50th anniversary of the inspirational 1970 novella Jonathan Livingston Seagull. Jonathan's life is not about the daily squabbles for food. Jonathan Livingston Seagull instead finds meaning in life through flying and teaching others to fly better and higher. In one of his classes, his student Fletcher starts flying at 9am at 20mph. Jonathan starts 30 minutes later and flies at 25 mph. At what time will the teacher and student meet each other?

Solution
 In the 30 minutes that Fletcher starts flying before Jonathan, Fletcher has travelled 10 miles. The difference in speeds between the two is 5mph. So it will take Jonathan two more hours to catch up the 10 miles head start.

Week 15
400 years ago on 5th August 1620, the Mayflower ship left Southampton to embark on a historic transatlantic voyage to America. Due to various delays departing British waters, it would only drop its anchor 3,300 miles away at Cape Cod 99 days later on 11th November 1620. Was the average sailing speed of the Mayflower more than 2 miles per hour?

Solution
No. It is less than 2 miles per hour average sailing speed based on these inputs. The reality is that the delays leaving the coast of Britain (6th September 1620) mean that its actual sailing speed was marginally greater than 2 miles per hour. But based on these figures:
Distance = 3300 miles

Hours = 99 days x 24 hours = 2,376 hours
Speed = Distance / Time = 3300 miles / 2,376 = 1.39 miles per hour, so less than 2 miles per hour

Week 14
Can you believe that the character Harry Potter turned 40 years old on Friday 31st July?! Harry's wife Ginny, and his friends Hermione and her husband Ron want to celebrate his birthday. They plan on sharing 4 pints of Butterbeer in a single jug. Unfortunately the bartender has lost all the jugs which have a capacity of 4 pints. Ginny has an empty jug with a 5 pint capacity and Ron has an empty jug with a 3 pint capacity. With only 10 pints of Butterbeer left at the tap, how does Hermione use the magic of maths to measure precisely 4 pints of Butterbeer?

Solution
There are multiple ways of completing this puzzle and as such, this is only one method. Let's call the 5-pint jug, Jug A, and the 3-pint jug, Jug B.
1. Hermione pours 5 pints in Jug A from the tap.
2. She pours 3 pints from Jug A into Jug B. So Jug A has 2 pints in it.
3. She pours away the 3 pints in Jug B.
4. Then she pours the 2 pints from Jug A into the now empty Jug B.
5. She pours 5 pints into Jug A from the tap.
6. Finally she pours 1 pint from Jug A into Jug B. So Jug A has 4 pints in it.

Week 13
Thursday 16th July was the first ever *Reading Together Day*, co-ordinated by *The Reading Agency* to help the nation celebrate reading. You set yourself the task of reading the 2020 CILIP Carnegie Medal winning book Lark by Anthony McGowan. There are 100 pages with an average of 300 words per page. You read 200 words a minute starting at 9am. Assume you have a 5 minute biscuit break after every 30 minutes of reading, what time will you finish the book?

Solution
300 words x 100 pages = 30,000 words
30,000 words / 200 words per minute = 150 minutes
Timeline:
9.00 - 9.30am: First 30 minutes of reading
9.30 - 9.35am: Biscuit break 1
9.35 - 10.05am: Reading minutes 30-60
10.05 - 10.10am: Biscuit break 2
10.10 - 10.40am: Reading minutes 60 - 90
10.40 - 10.45am: Biscuit break 3
10.45 - 11.15am Reading minutes 90 - 120
11.15 - 11.20am Biscuit break 4
11.20 - 11.50am Reading minutes 120-150

Week 12

Set up by BBC Countryfile presenter Anita Rani, 18th July to 17th August is the UK's first ever South Asian Heritage Month. Using all the letters from the two words OASIS HAUNT, what other two word phrase can you make related to this new celebration event?

Solution

South Asian!

Week 11

This month saw the 150th anniversary of the death of writer Charles Dickens. Using only the letters from the name Charles Dickens, what is the longest word you can make? As a hint, the word involves an iconic scene of something breaking in Only Fools and Horses.

Solution

Chandeliers

<u>Week 10</u>

This week's puzzle is inspired by maths communicator Johnny Ball's 1970s show "Think of a Number". I am thinking of a two-digit number that is a prime number. When the digits are reversed, it is still a prime number. The difference between these two-digit primes is a positive square number. What numbers am I thinking of?

Solution

37 and 73. The difference is 36 which is a square number.

<u>Week 9</u>

For BBC Two's Monkman & Seagull's Genius Adventures, Bobby visited the SS Great Britain. This first iron steamer to cross the Atlantic Ocean in 1845 took 14 full days to travel from Bristol to New York at a distance of 3,359 miles. Was the average sailing speed of the SS Great Britain more than 10 miles per hour?

Solution

No it is less than 10 miles per average sailing speed based on these inputs.
Distance = 3359 miles
Hours = 14 days x 24 hours = 336 hours
Speed = Distance / Time = 3359 miles / 336 = 9.997 miles per hours, so just missing out on the 10 miles per hour speed.

<u>Week 8</u>

Monday 25th May is episode 2 of the BBC Two series, Monkman & Seagull's Genius Adventures. The University Challenge friends Eric Monkman and Bobby Seagull explore British inventions from 1750-1900. Eric and Bobby looked at the first edition of the 1791 Encyclopedia Britannica which has 2400 pages. Eric and Bobby have a reading speed of a page every 4 minutes. How many 9am -6pm working days with an hour break will it take them to complete the Encyclopedia?

Solution

20 working days
A page every 4 minutes means it takes them they can read 15 pages an hour.
2400 pages /15 pages per hour = 160 hours
160 hours / 8 working hours per day = 20 working days

<u>Week 7</u>

Monday 18th May at 9pm is the start of BBC Two's Monkman & Seagull's Genius Adventures, a geeky road trip series about British inventions and discoveries from 1750-1900. To celebrate, Eric and Bobby organise a virtual watching party. They invite twice as

many friends from Emma compared to Wolfson. They invite twice as friends from Wolfson compared to all other colleges. 56 friends were invited in total. How many were from Emma?

Solution

Let "other colleges" be x. Then Wolfson is 2x and Emma is 4x. Total friends are 7x = 56. So x = 8. So Emma is 4x = 32.

Week 6

Next Wednesday 13th May is the UK's first every National Numeracy Day Virtual Festival, a day of online events on www.numeracyday.com to help with numeracy while the nation is at home. National Numeracy ambassadors Bobby Seagull, Countdown's Rachel Riley and Money Saving Expert's Martin Lewis saw a poster that read "Ticket prices increased by 10% in year 1 and 10% in year 2, so an overall increase of 20%". However the National Numeracy ambassadors say that it is 21% overall. Why are they correct?

Solution

You have multiply 1.10 x 1.10 = 1.21. This is a 21% increase as the increases are compounded not simple percentage increase.

Week 5

On Monday 4 May, Bobby Seagull has his brain scanned for BBC Two's Horizon documentary at 9pm "The Great British Intelligence Test". You make a very rough model of Bobby's brain as a mathematically perfect sphere! If you double the radius of this brain, how many times larger would the new volume be?

Solution

The volume is 8 times larger.The formula for the volume of a sphere is 4/3 x pi x r^3. The key component is the r cubed. This question is about scale factors. We have a radius of 1 and then double it to 2. The volume of the second sphere is 8 times larger (2 x 2 x 2).

Week 4

In February, it was the 200th anniversary of the birthday of John Tenniel, renowned for his illustrations of the original "Alice's Adventures in Wonderland". Using only the letters from the word WONDERLAND, what is the longest word you can make? Hint: It uses all letters apart from the second D.

Solution
LANDOWNER

Week 3

Immediately after Monday's final of University Challenge, Bobby Seagull is interviewing both finalist teams for his #QuizForNHS donations campaign on his YouTube channel. Each team has four players. In his interview, assuming the captain always sits on the third seat from the left, how many different ways can you arrange a team of four?

Solution

Answer is 6. As the captain's seat is fixed, the question is how many ways can we arrange the 3 remaining seats.

Week 2

In 1979, Emma admitted women undergraduates for the first time. Our first mixed intake had 134 students. The number of women is 3 more than its nearest square number and also 12 more than its nearest cube number. Can you work out the number of women and men in Emma's first mixed intake?

Solution
39 women and 95 men. 39 is 3 more than than the nearest square number of 36 (6 squared) and 12 more than the nearest cube number of 27 (3 cubed).

Week 1

Write out the the letters in the name of our founder Walter Mildmay. Now cross out a letter for each time they appear in the country whose capital city is Valletta and the surname of the actor who portrayed Willy Wonka in 1971. With the two remaining uncrossed letters, what country's two letter ISO code is remaining?

Solution
Valletta is the capital of Malta. The actor who starred as Willy Wonka is Gene Wilder. If you cross out the letters from words Malta and Wilder from Walter Mildmay, you have M and Y remaining. This forms the two letters ISO code for Malaysia.