Round 1

Question 1

In a school every student studies at least one language: French, German, or Spanish. There are 115 students in total. 70 study French, 65 study German and 60 study Spanish. $2x$ study French and German, x study German and Spanish and $2x$ study French and Spanish.

x study all 3 languages.

Find the value of x.

Question 2

Write

$$\frac{(6x^5y^3)^2}{(3x^2y^7)(4xy^{-3})}$$

in the form of ax^by^c where a, b and $c \in \mathbb{Z}$

Round 2

Question 1

A bag contains only red, green and blue counters.

- 8 of the counters are red.
- 15 of the counters are green.
- The rest of the counters are blue.

Sam chooses one counter at random from the bag.

The probability that this is a green counter is $\frac{3}{8}$.

How many blue counters are in the bag?

Question 2

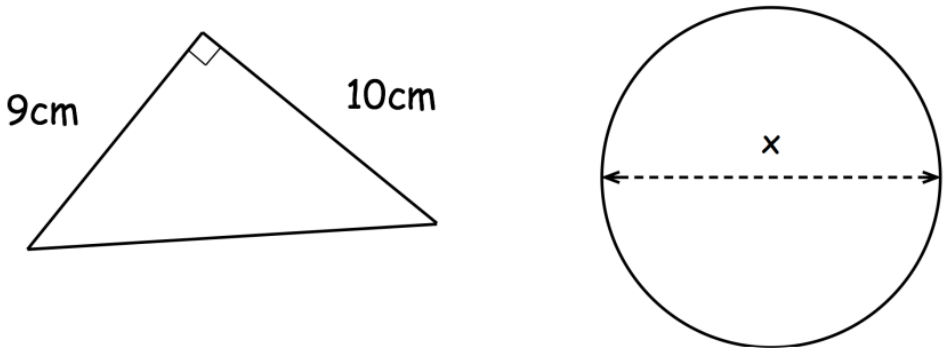
In a magic square, the numbers in each of the three rows, each of the three columns, and each of the two diagonals have the same sum. This sum is called the magic constant. The figure shown below is a magic square. Find u.

	$u+3$	
		12
$u+2$	$u-5$	u

Round 3

Question 1

Shown below are a right-angled triangle and a circle.



The perimeter of the triangle is equal to the circumference of the circle.

Find the diameter of the circle and give your answer correct to 2 decimal places.

Question 2

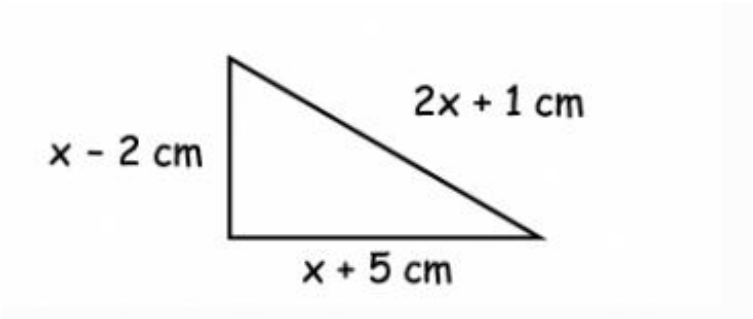
Starting on the 22nd floor of their apartment building, Tara goes up the stairs and Jenna goes up with the lift. Beginning when Tara starts going up, Jenna waits for 2 minutes for the lift. Tara goes up from each floor to the next floor in 15 seconds. The lift goes up from each floor to the next floor in 3 seconds. Tara and Jenna arrive on the nth floor at the same time. What is the value of *n*?

Round 4

Question 1

The islands of Nom and Dim have fewer than 2000 residents all together. Nom is bigger having at least 50 more residents than Dim. One third, one fourth, one fifth and one seventh of the population of Nom are all whole numbers. The sum of these whole numbers gives the population of Dim. What is the population of Dim?

Question 2



Solve for x, correct to two decimal places.

Round 5

Question 1

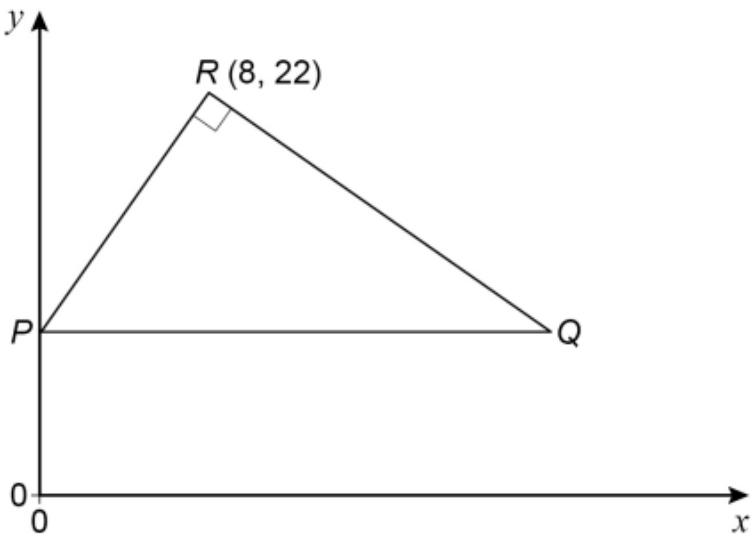
A football squad has 3 goalkeepers, 8 defenders, 9 midfielders, and 5 forwards. The mean height of all 25 footballers is 181cm. The mean height of the goalkeepers is 188cm. The mean height of the defenders is 187cm. The mean height of the midfielders is 176cm. Work out the mean height of the forwards.

Question 2

The points P, Q and R form a right-angled triangle.

R = $(8,22)$.

The slope of $[PR] = 2$.



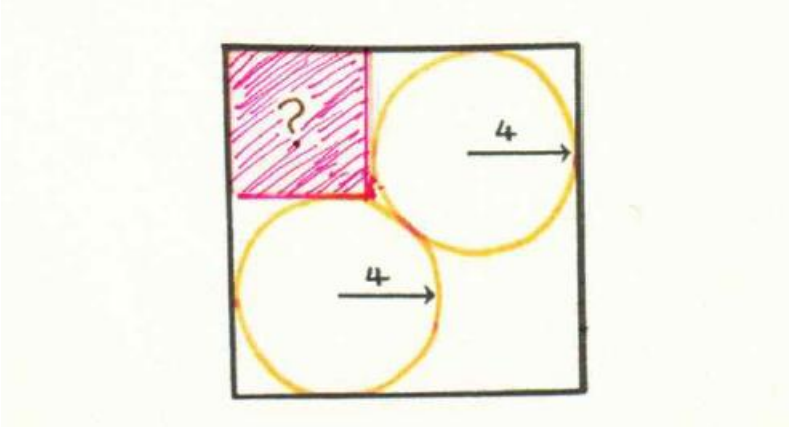
$[PQ]$ is parallel to the $x - axis$.

Work out the coordinates of point Q.

Round 6

Question 1

Find the area of the smaller shaded square to the nearest whole unit squared.



Question 2

On March 1st, 2001, the ratio of Ian's age to his mother's age was 1:11.

On March 1st, 2018, the ratio of Ian's age to his mother's age was 2:5.

Write the ratio of Ian's age to his mother's age on March 1st, 2030.

Solution to be given in the form $p:q$ with $p \; and \; q \; \in \; \mathrm{N}$ and the LCM of $p, q = 1$ (i.e. p and q are in their lowest form).

Round 7

Question 1

Sean is training for a marathon. He runs either route A or route B. During April, he runs route A nine times and route B five times. Route B is 8 miles longer than route A. In total, he runs 89 miles in April. In May, he will start running route C. Route C is 20% longer than route B. Work out the length of route C.

Question 2

The first three terms in an arithmetic sequence are

$$2k - 1 \qquad 5k + 2 \qquad 8k + 5$$

Find in terms of $\boldsymbol{k}$ the 20th term in the sequence.

Question 3

Solve for $x, x \in \mathrm{N}$

$$x + \frac{1}{3 + \frac{1}{x}} = \frac{16}{7}$$

Question 4

Cian deposits €8000 into a savings account for 4 years, earning compound interest. The interest rate is 6% for the first year, and 2.5% for each of the remaining years. Calculate the total interest earned as a percentage of his original investment. (% to 2 decimal places).

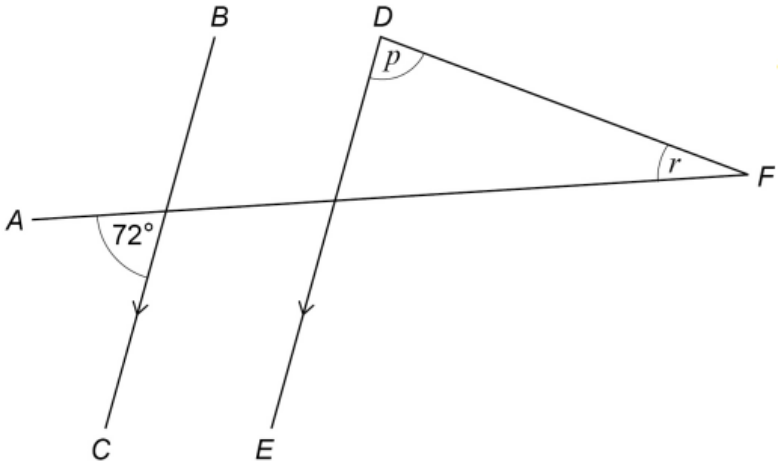
Round 8

Question 1

Two opposite sides of a square are increased by 40% while the other two sides are decreased by 50%. By what percentage is the area of the square decreased?

Question 2

The angle $\angle p$ is three times the angle $\angle r$ Calculate the size of angle $\angle p$.



Question 3

Find the value of a for which $5^a + 5^{a+1} = \sqrt{4500}$

Question 4

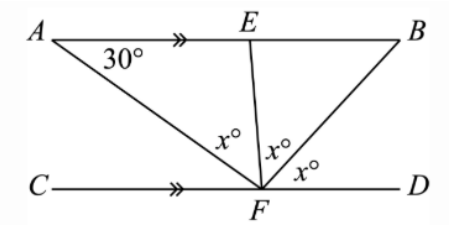
Travelling to a pop concert I know that if I average 30km/h for the journey I will arrive 1 hour early, but if I average only 20km/h for the journey I will arrive 1 hour late. How fast do I need to travel to arrive exactly on time?

Answers

Round 1	
1	$x = 20$
2	$3x^7y^2$
Round 2	
1	$x = 17$
2	$u = 11$
Round 3	
1	$d = 10.33$
2	32
Round 4	
1	778
2	$x = 4.27$
Round 5	
1	$mean = 176.2cm$
2	$(40,6)$
Round 6	
1	$32\ units\ squared$ (units not required)
2	$16:31$
Round 7	
1	$13.8\ miles$
2	$59k + 56$
3	$x = 2$ *Must have one answer only.*
4	14.15%
Round 8	
1	Answer 30% *(0.3 not acceptable as percentage requested)*
2	$p = 81°$
3	$a = 1.5\ or\ \frac{3}{2}$
4	$24km\ per\ hour$ $(km\ per\ hour\ not\ required)$

π Quiz National Final 2026 April 25th

Tie Break

1	Two locations A and B are connected by a 5km trail which features a lookout C. A group of 15 hikers started at A and walked along the trail to C. Another group of 10 hikers started at B and walked along the trail to C. The total distance travelled to C by all hikers from the group that started in A was equal to the total distance travelled to C by all hikers from the group that started in B. Find the distance (in kilometres) from A to C along the trail.
2	In the diagram, *AB is parallel to CD. Points E and F and on AB and CD respectively, so that* $\angle FAB = 30°$ $\angle AFE = \angle EFB = \angle BFD = x°$ What is the value *of* $x°$ *?* 
3	A ball of wool makes one winter glove. If the diameter is doubled, how many gloves could be made?
4	The mean, the median and the mode of the five numbers 12, 9, 11, 16, x are all equal. What is the value of x?
5	Solve for x, $1 - \frac{13}{x^2} = -5199$
6	A standard die with six faces is tossed onto a table. Michelle counts the total number of dots on the five faces that are not lying on the table. What is the probability that this total is at least 19?
7	Simplify $\frac{(5^{16} - 5^{15})}{4}$. Write your answer in the form a^b, where a is as small as possible and where *a* and *b* are Natural numbers. The answer must be in its simplest form.
8	The length of the diagonal of a square is 10. What is the area of this square?
9	The year 2023 is not prime since $7 \times 17 \times 17 = 2023$. What is the next numerically prime year?
10	$U = \{1,2,3,4,5,6,7,8,9,10,11,12,13,14\}$ $C = \{1,7,10,13\}$ $D = \{3,5,7,9,11,13\}$ List the elements of $C' \cap D'$

Answers to Tie Break

1	$x = 2\ km$ **(units not required)**
2	$x = 50°$
3	8 gloves
4	12
5	Answer $x = \frac{1}{20}\ or\ 0.05$ and $x = -\frac{1}{20}\ or\ -0.05$ (both solutions required + and -)
6	$\frac{1}{3}$
7	5^{15}
8	$50\ units^2$
9	2027
10	$C' \cap D' = \{2, 4, 6, 8, 12, 14\}$