The CENTRE for EDUCATION
in MATHEMATICS and COMPUTING
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2025 Team Up Challenge

June 2025

Answer Keys

2025 Team Up Challenge

Team Paper Answer Key

Question	Answer
1	19°C
2	$(1, 4)$
3	2
4	6
5	31
6	Adian and Chandra
7	C, G, A, and F
8	7
9	3
10	70 107
11	24 cm
12	$\frac{15}{90}$ or $\frac{1}{6}$
13	B and F
14	30
15	1 : 3

2025 Team Up Challenge

Crossnumber Puzzle Answer Key

8	■	7	1	■	4	2	6	■
8	■	■	5	8	5	■	6	4
5	1	0	■	7	■	■	1	0
■	3	■	8	6	4	■	■	3
6	2	2	6	■	1	3	2	0
4	■	■	1	3	5	■	3	■
1	1	■	■	3	■	3	1	2
5	9	■	7	5	3	■	■	9
■	6	7	8	■	9	7	■	2

2025 Team Up Challenge

Logic Puzzle Answer Key

Departure Time	Passenger's Name	Destination	Purpose
12:15 p.m.	Helenka	Vancouver	business
1:15 p.m.	Mijo	Tokyo	vacation
4:15 p.m.	Iveta	Rome	school
5:15 p.m.	Tuur	Paris	business
6:15 p.m.	Gaurav	Halifax	family

2025 Team Up Challenge

Relay Answer Key

Practice Relay				
	Player 1	Player 2	Player 3	Player 4
Answer	7	35	120	80

Relay A				
	Player 1	Player 2	Player 3	Player 4
Answer	13	22	172	25

Relay B				
	Player 1	Player 2	Player 3	Player 4
Answer	8	10	12	$\frac{9}{24}$ or $\frac{3}{8}$

Relay C				
	Player 1	Player 2	Player 3	Player 4
Answer	18	36	128	45

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Solutions

Team Paper

1. Since $3-(-16)=3+16=19$, it follows that it is 19°C warmer in Kitchener.

ANSWER: 19°C

2. In a rectangle, opposite sides must be parallel. Suppose the fourth vertex of the rectangle is (a,b). The right side of the rectangle joining the points $(7,2)$ and $(7,4)$ is vertical, and so the left side of the rectangle must also be vertical, and pass through $(1,2)$. Thus, the vertices $(1,2)$ and (a,b) have the same x-coordinate, and so $a=1$.

   Similarly, the bottom side of the rectangle joining the points $(1,2)$ and $(7,2)$ is horizontal, and so the top side of the rectangle must also be horizontal, and pass through $(7,4)$. Thus the vertices $(7,4)$ and (a,b) have the same y-coordinate, and so $b=4$. The coordinates of the fourth vertex of the rectangle are therefore $(1,4)$.

ANSWER: $(1,4)$

3. In the diagram, 10 of the squares are shaded. Since 75% of 16 is equal to $0.75\times 16=12$, we want 12 of the squares to be shaded. Thus, $12-10=2$ more squares must be shaded.

ANSWER: 2

4. It takes the frog exactly 8 hops to hop around the circle of lily pads and end up back on lily pad 3. Since $8\times 9=72$, after 72 hops the frog will have hopped around the circle of lily pads a total of 9 times, and will be back on lily pad 3. After 3 more hops, the frog will have completed 75 hops and be on lily pad 6.

ANSWER: 6

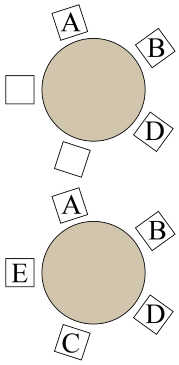
5. In order for each fraction to be an integer, the denominator must divide the numerator.
   Consider the list of numerators: 12, 13, 14, 15, and 16. The number 15 is the only number in the list that is divisible by 5, and so 5 is the denominator of the fraction with numerator 15, resulting in the fraction $\frac{15}{5}=3$.
   From the remaining numerators 12, 13, 14, and 16, the number 12 is the only number that is divisible by 3. Thus, 3 is the denominator of the fraction with numerator 12, resulting in the fraction $\frac{12}{3}=4$.
   Continuing in this way, 4 is the denominator of the fraction with numerator 16, 2 is the denominator of the fraction with numerator 14, and 1 is the denominator of the fraction with numerator 13. The sum is then

$$\frac{12}{3}+\frac{13}{1}+\frac{14}{2}+\frac{15}{5}+\frac{16}{4}=4+13+7+3+4=31$$

   The value of the sum is 31.

ANSWER: 31

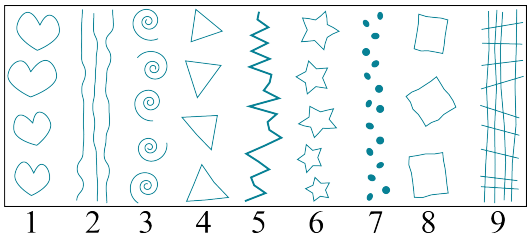
6. We first place Bagus in the chair between Adian and Daisuke. Then the two remaining empty chairs are next to each other. One of them is next to Adian and the other is next to Daisuke.



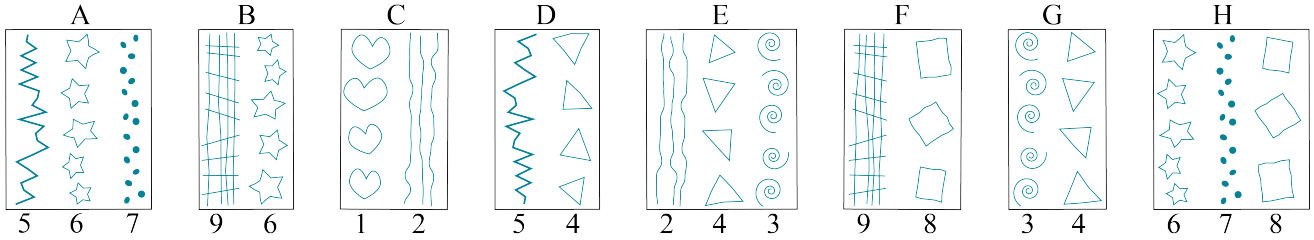
Since Ebba is not beside Daisuke, Ebba must be in the empty chair next to Adian. It follows that Chandra is in the empty chair next to Daisuke. Thus, the two people next to Ebba are Adian and Chandra.

ANSWER: Adian and Chandra

7. First, notice that there are 9 different columns of drawings in the picture. We number these 1 through 9, as shown.



Using these numbers, we can identify the drawings in each strip of paper, as shown.



If a strip was used in the drawing, then the numbers on the strip should be consecutive (either increasing or decreasing). From this, we can conclude that strips B and E cannot have been used in the drawing.

Since strip C is the only strip with drawing 1, then Ekain must have used strip C. Ekain must have also used strip G, as it is the only remaining strip with drawing 3 (since we already eliminated strip E). Thus we have strips C and G, which include drawings 1, 2, 3, and 4.

Since we already have drawing 4, we can eliminate strip D. Thus, Ekain must have used strip A, as it is the only remaining strip with drawing 5. Thus, we have drawings 1 to 7 and need only a strip with drawings 8 and 9. Thus, we can eliminate strip H and it follows that strip F is the final strip that Ekain used. Therefore, Ekain used strips C, G, A, and F.

ANSWER: C, G, A, and F

8. Since $a \nabla b = 3a + b$, it follows that $a \nabla 5 = 3a + 5$. Then $3a + 5 = 26$, and so $3a = 21$. Thus $a = \frac{21}{3} = 7$.

ANSWER: 7

9. Suppose the squares are numbered, from left to right, from 1 to 35. Then, using each square's number, we can identify which squares have a smiley face and which squares have a flower.

   Squares with a smiley face: 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34
   Squares with a flower: 2, 6, 10, 14, 18, 22, 26, 30, 34

   The squares with both a smiley face and a flower are squares 10, 22, and 34. Thus, 3 squares will contain both a smiley face and a flower.

ANSWER: 3

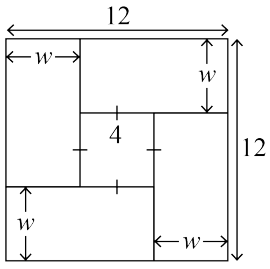
10. Every five-digit palindrome is of the form $abcba$, where a is a digit between 1 and 9 inclusive, b is a digit between 0 and 9 inclusive, and c is a digit between 0 and 9 inclusive (and a, b and c are not necessarily different).
    For the palindrome to be as large as possible, a must be as large as possible.

    - If $a = 9$ then the sum of the digits is $9 + b + c + b + 9 \geq 18$.
    - If $a = 8$ then the sum of the digits is $8 + b + c + b + 8 \geq 16$.
    - If $a = 7$ then the sum of the digits is $7 + b + c + b + 7 \geq 14$.

    Since $a = 9$ and $a = 8$ both result in the sum of the digits exceeding 15, the value of a can be at most 7. In this case, the digit sum is $7 + b + c + b + 7 = b + c + b + 14 = b + b + c + 14$.
    If b is greater than 0, then $b + b$ is greater than or equal to 2 and the sum exceeds 15. Thus, $b = 0$.
    It then follows that $c = 1$.
    The largest five-digit palindrome whose digits have a sum of 15 is 70 107.

ANSWER: 70 107

11. If the outer square has an area of 144 cm^2, then the side length of the outer square is 12 cm. Similarly, if the inner square has an area of 16 cm^2, then the side length of the inner square is 4 cm. Let w be the width of each of the four identical rectangles, in centimetres, as shown in the diagram.



    The side length of the outer square is equal to the width of two rectangles plus the side length of the inner square. Thus, $2w + 4 = 12$. Then $2w = 12 - 4 = 8$, and so $w = 4$.

    The length of each rectangle is equal to the length of the inner square plus the width of one rectangle, which is $4 + w = 4 + 4 = 8$ cm.

    Thus, the perimeter of one of the rectangles is $2 \times 4 + 2 \times 8 = 8 + 16 = 24$ cm.

ANSWER: 24 cm

12. Since there are 30 green marbles and half of them are sparkly, it follows that there are 15 sparkly green marbles. In total there are $30 \times 3 = 90$ marbles. Thus, the probability that Vanessa draws a sparkly green marble is $\frac{15}{90} = \frac{1}{6}$.

ANSWER: $\frac{15}{90}$ or $\frac{1}{6}$

13. Each triomino contains 3 squares. We will call these *unit squares*. If a pattern is made by placing trominoes side by side without overlapping them, then the total number of unit squares in the pattern must be a multiple of 3. The total number of unit squares in each pattern is shown in the table.

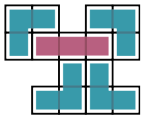
Pattern	A	B	C	D	E	F
Total Number of Unit Squares	9	15	10	12	11	15

Thus, since the total number of unit squares in patterns C and E are not multiples of 3, it is not possible to make these patterns using trominoes.

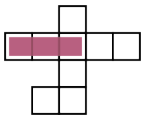
We now attempt to make the other four patterns. Patterns B and F can be made as shown, where the trominoes are represented by  and  .

B

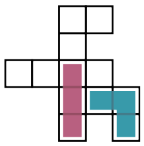
F



It is not possible to make pattern A using trominoes. In order to create the two leftmost unit squares in the second row from the top, a triomino must be placed as shown. However, this blocks the unit square in the top row and makes it impossible to create this pattern.



It is not possible to make pattern D using trominoes. In order to create the rightmost unit square in the bottom row, a  must be placed as shown. Then in order to create the remaining unit square in the bottom row, a  must be placed as shown. However, this blocks the rightmost unit square in the third row from the top and makes it impossible to create this pattern.



Thus, only patterns B and F can be made.

ANSWER: B and F

14. Since at least 1 point must be from each row, Julie must choose 2 points from one row and 1 point from the other row. There are 2 ways she can do this.

Case 1: Julie chooses 2 *points from the top row and* 1 *point from the bottom row.*
Since there are 3 points in the top row, Julie can choose either the first and the second, the first and the third, or the second and the third points. Thus she has 3 choices. For each of these 3 choices, there are 4 different choices for the point in the bottom row. Thus, in total there are $3 \times 4 = 12$ different triangles that Julie can form using 2 points from the top row and 1 point from the bottom row.

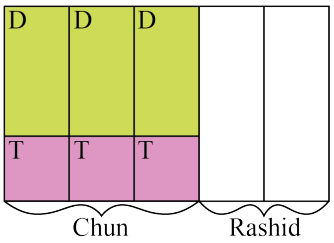
Case 2: Julie chooses 2 *points from the bottom row and* 1 *point from the top row.*
Since there are 4 points in the bottom row, Julie can choose either the first and the second, the first and the third, the first and the fourth, the second and the third, the second and the fourth, or the third and the fourth points. Thus she has 6 choices. For each of these 6 choices, there are 3 different choices for the point in the top row. Thus, in total there are $6 \times 3 = 18$ different triangles that Julie can form using 2 points from the bottom row and 1 point from the top row.

Therefore, the total number of triangles that Julie can form is $12 + 18 = 30$.

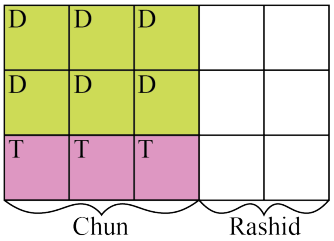
ANSWER: 30

15. *Solution 1*

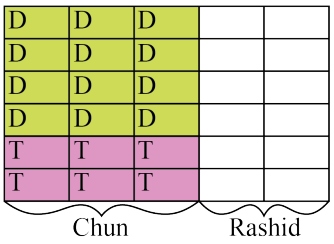
The ratio of the area of Chun's portion to the area of Rashid's portion is 3 : 2, and so we can divide the area of the whole garden into 5 strips of equal area where Chun's portion is 3 of these strips (and each strip is planted with both daisies and tulips), and Rashid's portion is 2 strips, as shown.



On Chun's portion of the garden the ratio of the area covered by daisies to the area covered by tulips is 2 : 1. Since each of the 3 strips on Chun's portion has the same width, on each strip, the length of the area covered by daisies is twice the length of the area covered by tulips. By dividing each daisy region in half, as shown, the result is 9 regions of equal area on Chun's portion of the garden. Rashid's portion is divided in the same way, resulting in the whole garden being divided into 15 regions of equal area.

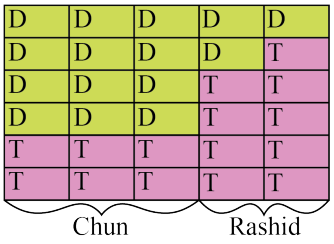


We know that half of the area of the entire garden is covered by daisies and half is covered by tulips. Since 15 is odd, and not divisible by 2, we further divide each region in half. The garden is now divided into 30 regions of equal area.



Looking at Chun's portion of the garden, there are 12 regions covered in daisies and 6 regions covered in tulips. In order for the area of the garden to be half daisies and half tulips, Rashid's portion must have 3 regions covered in daisies and 9 regions covered in tulips.

Therefore, the ratio of the area covered by daisies to the area covered by tulips on Rashid's portion is $3 : 9 = 1 : 3$.



Solution 2

Since the ratio of the area of Chun's portion to the area of Rashid's portion is $3 : 2$, it follows that $\frac{3}{5}$ of the entire garden is Chun's portion and $\frac{2}{5}$ is Rashid's portion.

Looking at Chun's portion, $\frac{2}{3}$ of the area is covered by daisies and $\frac{1}{3}$ is covered by tulips.

The fraction of the entire garden covered by Chun's daisies is $\frac{2}{3}$ of $\frac{3}{5}$ or $\frac{2}{3} \times \frac{3}{5} = \frac{2}{5}$. Since $\frac{1}{2}$ of the area of the entire garden is covered by daisies, it follows that the fraction of the entire garden covered by Rashid's daisies is $\frac{1}{2} - \frac{2}{5} = \frac{5}{10} - \frac{4}{10} = \frac{1}{10}$.

Similarly, the fraction of the entire garden covered by Chun's tulips is $\frac{1}{3}$ of $\frac{3}{5}$ or $\frac{1}{3} \times \frac{3}{5} = \frac{1}{5}$. Since $\frac{1}{2}$ of the area of the entire garden is covered by tulips, it follows that the fraction of the entire garden covered by Rashid's tulips is $\frac{1}{2} - \frac{1}{5} = \frac{5}{10} - \frac{2}{10} = \frac{3}{10}$.

Notice, that $\frac{1}{10} \times 3 = \frac{3}{10}$, which means that the area covered by Rashid's tulips is three times the area covered by Rashid's daisies. Therefore, the ratio of the area covered by daisies to the area covered by tulips on Rashid's portion is $1 : 3$.

ANSWER: $1 : 3$

Crossnumber Puzzle

8	■	7	1	■	4	2	6	■
8	■	■	5	8	5	■	6	4
5	1	0	■	7	■	■	1	0
■	3	■	8	6	4	■	■	3
6	2	2	6	■	1	3	2	0
4	■	■	1	3	5	■	3	■
1	1	■	■	3	■	3	1	2
5	9	■	7	5	3	■	■	9
■	6	7	8	■	9	7	■	2

Across

2. From the grid, the ones digit is 1. Since $1 + 7 = 8$, the tens digit must be 7. The number is 71.

4. From the grid, the hundreds digit is 4 and the ones digit is 6. The only multiple of $\boxed{71}$ with these digits is $71 \times 6 = 426$. The number is 426.

6. The area of the triangle is $\frac{1}{2} \times \boxed{15} \times \boxed{78} = 585$.

8. From the grid, the ones digit of this number is 4. We know that $8 \times 8 = 64$. In fact, the only two-digit number with a ones digit of 4 that is a product of two equal integers is 64.

10. The mean is $\dfrac{\boxed{885} + \boxed{135}}{2} = 510$.

12. Deca is a prefix that means ten. In a decade there are 10 years.

13. From the grid, the hundreds digit is 8 and the ones digit is 4. The mean of these two digits is $\frac{8+4}{2} = 6$. The tens digit is 6 and the number is 864.

15. From the grid the thousands digit of this number is 6. If follows that the ones digit is 6. From the grid, the hundreds digit is 2. It follows that the tens digit is 2.
Thus, the number is 6226.

16. From the grid, the thousands digit is 1. Testing values, $10 \times 11 \times 12 = 1320$ and $11 \times 12 \times 13 = 1716$ are the only products of three consecutive integers with a thousands digit of 1. From the grid, the tens digit is 2. The answer is 1320.

18. The sum is $11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19$, which can be calculated directly or rearranged to give $9 \times 10 + (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9)$. Since the sum of the digits from 1 to 9 is 45, the sum is equal to $90 + 45 = 135$.

20. The positive factors of $\boxed{231}$ are 1, 3, 7, 11, 21, 33, 77, and 231. From the grid, this is a two-digit number with a tens digit of 1. The number is 11.

22. Since $\boxed{78}$ is not divisible by 8, we consider the next few multiples of 78. We have that $\boxed{78} \times 2 = 156$ is not divisible by 8 and $\boxed{78} \times 3 = 234$ is not divisible by 8. Next, we find that $\boxed{78} \times 4 = 312$ is divisible by 8. The number is 312.

24. The perimeter is equal to $13 + 21 + 25 = 59$.

25. The positive difference is $987 - 234 = 753$.

27. From the grid, the hundreds digit is 6 and the ones digit is 8. For the three digits to be consecutive, the tens digit must be 7. The number is 678.

28. From the grid, the tens digit is 9. The only prime number with tens digit 9 is 97.

Down

1. The area of the rectangle is $\boxed{59} \times \boxed{15} = 885$.

3. The number 165 is divisible by whole numbers 1, 3, 5, 11, 15, 33, 55, and 165. Trying numbers from this list, the largest number that also divides 120 is 15.

4. From the grid the ones digit is 5. The only two-digit number with a ones digit of 5 that is a multiple of 9 is 45.

5. From the grid, the tens digit is 6 and the ones digit is 1. Their product is $6 \times 1 = 6$. If the three digits multiply to 36, then the remaining digit must be $36 \div 6 = 6$. The number is 661.

7. The digits in $\boxed{678}$ are 6, 7, and 8. From the grid, the hundreds digit of this number is 8 and the ones digit is 6. Thus, the tens digit must be 7. The number is 876.

9. The thousands digit must be 4 and the hundreds digit 0. From the grid, the ones digit is 0, and so to lie between 4025 and 4035 on the number line, the tens digit must be 3. The number is 4030.

11. A dozen is a set of 12. So 11 dozen is $11 \times 12 = 132$.

13. From the grid, the tens digit is 6 and the ones digit is 1. Since $\dfrac{8+6+1}{3} = 5$, the hundreds digit must be 8. The number is 861.

14. From the grid, the ones digit is 5. The first four numbers in the sequence starting with 61 where each team after is $\boxed{59}$ more than the previous term are 120, 179, 238, and 297. If we continue this sequence then we will see the only three-digit number with ones digit 5 is 415.

15. The result is $\boxed{426} \times \boxed{15} + 25 = 6390 + 25 = 6415$.

17. 50% of $462 = 0.5 \times 462 = 231$.

19. From the grid, the hundreds digit is 3 and the ones digit is 5. Since the mode of the digits is 3, the remaining digit must be a 3. Thus, the number is 335.

21. The sum of the digits in $\boxed{6226}$ is $6 + 2 + 2 + 6 = 16$. From the grid, the hundreds digit of this number is 1 and the tens digit is 9. Since $16 - 1 - 9 = 6$, the ones digit must be 6. The number is 196.

23. The value is $7 + \boxed{585} - 1.5 \times 200 = 7 + \boxed{585} - 300 = 292$.

25. The number of quarters is $\$19.50 \div \$0.25 = 78$.

26. From the grid, the tens digit is 3. Since $9 - 3 = 6$, the ones digit must be 9. The number is 39.

Logic Puzzle

We start by considering clues (3) and (5):

(3) Mijo left at 1:15 p.m. and was going on vacation. He was *not* the person going to Halifax.

(5) Two people were traveling for business. They left five hours apart and went to Vancouver and Paris, in some order.

From clue (5) we can conclude that the two people traveling for business could have left at 12:15 p.m. and 5.15 p.m. or 1:15 p.m. and 6:15 p.m., since they are the only pairs of departure times that are five hours apart. However, from clue (3) we know that Mijo left at 1:15 p.m. and was going on vacation. Thus, the two people traveling for business must have left at 12:15 p.m. and 5.15 p.m.

The following partially-completed table contains the information we know so far.

Departure Time	Passenger's Name	Destination	Purpose
12:15 p.m.		Vancouver or Paris	business
1:15 p.m.	Mijo	*not* Halifax	vacation
4:15 p.m.			
5:15 p.m.		Vancouver or Paris	business
6:15 p.m.			

Next we consider clue (2):

(2) Tuur left one hour after the person going to Rome, who was travelling for school.

From our partially-completed table, the person travelling to Rome for school could have left at 4:15 p.m. or 6:15 p.m. However, since Tuur left one hour after this person, we can conclude that the person travelling to Rome for school must have left at 4:15 p.m., and then Tuur left at 5:15 pm.

The following partially-completed table contains the information we know so far.

Departure Time	Passenger's Name	Destination	Purpose
12:15 p.m.		Vancouver or Paris	business
1:15 p.m.	Mijo	*not* Halifax	vacation
4:15 p.m.		Rome	school
5:15 p.m.	Tuur	Vancouver or Paris	business
6:15 p.m.			

Next we consider clue (1):

(1) The five people are Helenka, Iveta, the person visiting family, the person going to Tokyo, and the person leaving at 5:15 p.m.

From our partially-completed table, the person visiting family must have left at 6:15 p.m. Then, since the person going to Tokyo was not the person visiting family, we can conclude that Mijo must have been the person going to Tokyo. Since neither Helenka nor Iveta was the person visiting family, we can conclude that Helenka and Iveta left at 12:15 p.m. and 4:15 p.m., in some order.

Also, from our partially-completed table we can conclude that the person going to Halifax must have left at 6:15 p.m.

The following partially-completed table contains the information we know so far.

Departure Time	Passenger's Name	Destination	Purpose
12:15 p.m.	Helenka or Iveta	Vancouver or Paris	business
1:15 p.m.	Mijo	Tokyo	vacation
4:15 p.m.	Helenka or Iveta	Rome	school
5:15 p.m.	Tuur	Vancouver or Paris	business
6:15 p.m.		Halifax	family

Finally we consider clue (4):

(4) Gaurav and Helenka were two of the passengers. Only one of them went to Vancouver.

From our partially-completed table, the person going to Vancouver could be Helenka, Iveta, or Tuur. From clue (4) we can conclude that it must have been Helenka. Thus, Iveta was going to Rome, and Tuur was going to Paris. Finally, we know that Gaurav must have been going to Halifax.

This completes the logic puzzle.

Departure Time	Passenger's Name	Destination	Purpose
12:15 p.m.	Helenka	Vancouver	business
1:15 p.m.	Mijo	Tokyo	vacation
4:15 p.m.	Iveta	Rome	school
5:15 p.m.	Tuur	Paris	business
6:15 p.m.	Gaurav	Halifax	family

Relay

(Note: Where possible, the solutions are written as if the value of N is not initially known, and then N is substituted at the end.)

Practice Relay

P1: From the graph, the total number of schools is $2 + 3 + 2 = 7$.

P2: In total, $5 \times N$ slices of ham are needed to make the pizzas.
Since the answer to the previous question is 7, then $N = 7$, and so $5 \times 7 = 35$ slices of ham are needed.

P3: The sum of the three angles in a triangle is always $180°$. So $25 + N + x = 180$, which simplifies to $x = 155 - N$.
Since the answer to the previous question is 35, then $N = 35$, and so $x = 155 - 35 = 120$.

P4: On Monday Yusuf delivers $\frac{1}{2} \times 400 = 200$ flyers, and on Tuesday he delivers N flyers. Thus, after Tuesday there are $400 - 200 - N = 200 - N$ flyers left to deliver.
Since the answer to the previous question is 120, then $N = 120$, and so there are $200 - 120 = 80$ flyers left to deliver.

Answer: 7, 35, 120, 80

Relay A

P1: If B is halfway between A and C, then the distance from A to B is equal to the distance from B to C. Since A is at 5 and B is at 9, then the distance from A to B is $9 - 5 = 4$. Then the distance from B to C is also 4, and so $C = 9 + 4 = 13$.

P2: After substituting $x = 10$ into the equation we obtain $\frac{7 \times 10}{2} - N = \frac{70}{2} - N = 35 - N$.
Since the answer to the previous question is 13, then $N = 13$, and so the value of the expression is $35 - 13 = 22$.

P3: Evie has 60 marbles, Prakash has $\frac{3}{4} \times 60 = 45$ marbles, and Gloria has $45 + N$ marbles. Thus, in total they have $60 + 45 + 45 + N = 150 + N$ marbles.
Since the answer to the previous question is 22, then $N = 22$, and so they have $150 + 22 = 172$ marbles in total.

P4: The area of the square is $9 \times 9 = 81$. The length of the rectangle is $20 - 9 = 11$, so the area of the rectangle $11 \times 6 = 66$. Thus, the area of the triangle is $N - 81 - 66 = N - 147$.
Since the answer to the previous question is 172, then $N = 172$, and so the area of the triangle is $172 - 147 = 25$.

Answer: 13, 22, 172, 25

Relay B

P1: Since $2 - 8 = -6$, it follows that the number must be 8.

P2: The only two consecutive numbers that add to 13 are 6 and 7. Thus, the 4^{th} number in the sequence is 6 and the 5^{th} number is 7. It follows that the value of a number in the sequence will always be 2 more than its position number. In other words, the N^{th} number in the sequence will be $N + 2$.
Since the answer to the previous question is 8, then $N = 8$, and so we are looking for the 8^{th} number, which is $8 + 2 = 10$.

P3: Let a be the original number. Then $a \times N + 14 = 134$. It follows that $a \times N = 134 - 14 = 120$. Then $a = 120 \div N$.
Since the answer to the previous question is 10, then $N = 10$, and so $a = 120 \div 10 = 12$.
Thus, the original number is 12.

P4: The box contains N pears, 9 apples, and $\frac{1}{3} \times 9 = 3$ oranges. Thus the box contains $N + 9 + 3 = N + 12$ pieces of fruit in total. The probability that a randomly-chosen fruit is an apple is equal to $\frac{9}{N+12}$.
Since the answer to the previous question is 12, then $N = 12$, and so the probability is $\frac{9}{12+12} = \frac{9}{24} = \frac{3}{8}$.

ANSWER: 8, 10, 12, $\frac{9}{24}$ or $\frac{3}{8}$

Relay C

P1: The number of bills is $360 \div 20 = 18$.

P2: The side length of each of the smaller squares is equal to $\frac{N}{4}$. Thus, the perimeter of the larger square is $8 \times \frac{N}{4} = 2N$.
Since the answer to the previous question is 18, then $N = 18$, and so the perimeter of the larger square is $2 \times 18 = 36$.

P3: The given shape has 2 sides of length N, 5 sides of length 7, and one side of length $7 \times 3 = 21$. Thus, its perimeter is $2 \times N + 5 \times 7 + 21 = 2N + 56$.
Since the answer to the previous question is 36, then $N = 36$, and so the perimeter of the shape is $2 \times 36 + 56 = 128$.

P4: Converting to minutes, Marjatta spent $2 \times 60 + 15 = 135$ minutes cleaning the stables. Thus, the total number of minutes Marjatta spent working is $135 + 93 = 228$. In total, Sevil spent $(N + 55)$ minutes working. Thus, Sevil finished working $228 - (N + 55) = (173 - N)$ minutes before Marjatta.
Since the answer to the previous question is 128, then $N = 128$, and so Sevil finished working $173 - 128 = 45$ minutes before Marjatta.

ANSWER: 18, 36, 128, 45