**P3 syllabus**

**Numeration**
Number notation and place values, including decimals and money
Number Patterns
2-step word problems involving 4 operations

**Fractions**
Equivalent fractions
Addition, Subtraction of related fractions
Comparing and ordering unlike fractions with denominators (up to 12)
Interpretation of fraction as a part of a whole
Solving word problems

**Measurement**
Length (km), Volume (ml), length/mass/volume (of liquid) in compound units
Converting km to m, m to cm, kg to g, l to ml (and vice versa)
Time in years, months, weeks, days, hours, minutes and seconds
Area and Perimeter of composite figures

**Geometry**
Right, acute and obtuse angles
Parallel, perpendicular lines
Draw on square grid

**Data Analysis**
Interpreting data from tables, bar graphs and line graphs

**Logic**
Inferring and deducing relationships between objects given a set of clues

| | | Topics | Total marks | Question Numbers |
|---|---|---|---|---|
| 1 to 10 | 2 marks | Numeration | 28 | 24, 22, 20, 11, 2, 1 |
| 11 to 20 | 4 marks | Logic | 20 | 25, 9, 13, 7, 3 |
| 21 | 6 marks | Fractions | 16 | 17, 18, 19, 8, 6 |
| 22 | 7 marks | Measurement | 16 | 23, 14, 10, 5 |
| 23 | 8 marks | Data Analysis | 10 | 15, 16, 4 |
| 24 | 9 marks | Geometry | 10 | 21, 12 |
| 25 | 10 marks | | | |

**P3:**

1. Study the number pattern below:

8,   13,   21,   34,   55,   ?

What is the next number?

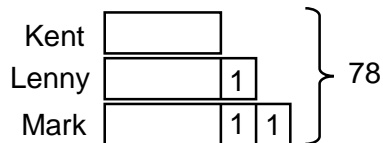<span style="color:red">Each number is the sum of the previous 2 numbers.
21 = 13 + 8
34 = 21 + 13
55 = 34 + 21
The next number is 34 + 55 = <u>89</u></span>

2. The sum of money that Kent, Lenny and Mark have is $78.
   Lenny has $1 more than Kent and Mark has $1 more than Lenny.
   I have $1 less than Kent. How much money do I have?

| Kent | | | |
|------|---|---|---|
| Lenny | | 1 | |
| Mark | | 1 | 1 |

} 78

<span style="color:red">78 – 3 = 75
75 ÷ 3 = 25
Kent has $25.
I have 25 – 1 = $<u>24</u></span>

3. Alya, Bim, Paul, and Queenie were comparing how many star stickers they had received from their teacher. Bim had more star stickers than Paul, and Queenie had fewer than Alya. Queenie did not have the smallest number of star stickers. Which of the children had the least number of star stickers?

<span style="color:red">Paul had fewer stickers than Bim.
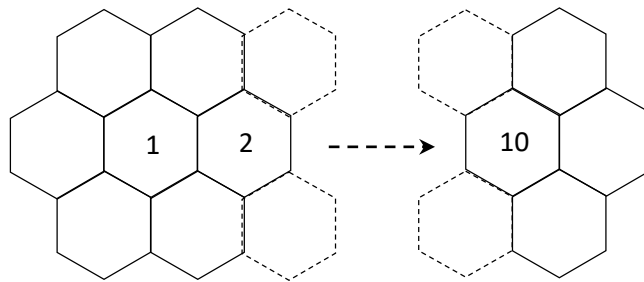Queenie had fewer than Alya.
Since Queenie did not have the least, then <u>Paul</u> must be the one with the least.</span>

4.  Each of the shapes in the figure below is called a hexagon. Hexagon 1 is surrounded by 6 other hexagons. Together, Hexagons 1 and 2 are surrounded by 8 other hexagons.
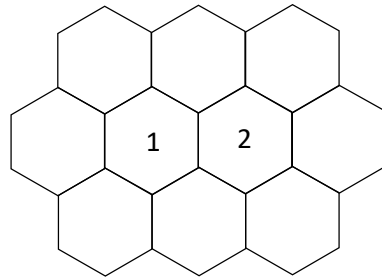


How many hexagons surround a row of 10 hexagons?



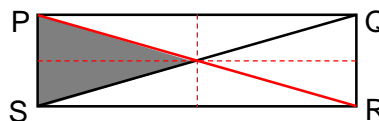(10 + 1) × 2 + 2 = 24
24 hexagons surround a row of 10 hexagons.

5.  How many hours are there altogether in the first 6 months of 2017?

(31 + 28 + 31 + 30 + 31 + 30) days × 24 hours = 4 344 hours

6.  PQRS is a rectangle. The line SQ joins one corner to its opposite corner.
    Draw ONE more line inside the rectangle so that the rectangle is divided into 4 quarters.
    Shade $\frac{1}{4}$ of the rectangle.
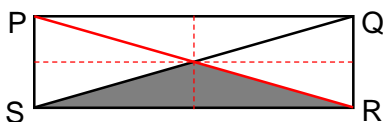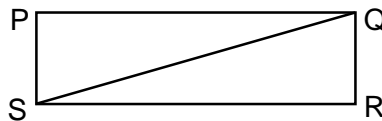


  or  

7. A large-size man and two medium-size women wanted to get across a river. There was a small canoe by the river which they could use. It could take either only the large-size man or up to two medium-size women. What is the minimum number of times the canoe had to go across the river to bring these three people across?

8. Betty ate $\frac{3}{11}$ of an apple pie. Bernie ate half of the remainder. What fraction of the apple pie was left?

9. Five friends, Nani, Sani, Tani, Yani and Zani, live in the same two-storey building. Two of them live on the first floor and three live on the second floor. Yani lives on a different floor from Tani and Zani. Sani lives on a different floor from Nani and Tani. Who live on the first floor?

10. Halim stacked some cubes into a square-based pyramid as shown in the figure below. The top layer had 1 cube, the 2nd layer had 4 cubes, the 3rd layer had 9 cubes, and so on.
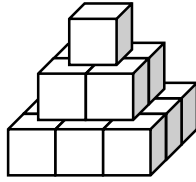


If the pyramid was 9 layers high, how many cubes would there be in the 9th layer?

There were 9 × 9 = 81 cubes in the 9th layer.

11. Jane is 12 years old. Mary is thrice as old as Jane. In how many years will Mary be twice as old as Jane?

Mary is 36 years old now and Jane is 24 years younger.
For Mary to be twice as old, Jane has to be 24 years old.
24 − 12 = 12
Mary will be twice as old as Jane in 12 years' time.

12. Study the figure on the right.

a) How many pairs of parallel lines are there?

b) How many pairs of perpendicular lines are there?
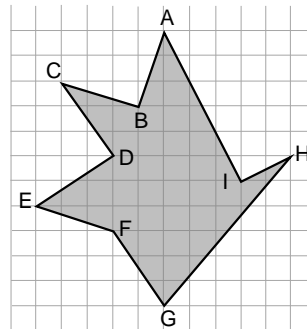


a) 2 pairs of parallel lines (CB and EF; CD and FG)
b) 5 pairs of perpendicular lines (AB and BC; AB and EF; CD and DE; DE and FG, HI and IA)

Gradient of AB = $\frac{3}{1}$

Gradient of BC = $-\frac{1}{3}$

Gradient of CD = $-\frac{3}{2}$

Gradient of DE = $\frac{2}{3}$

Gradient of EF = $-\frac{1}{3}$
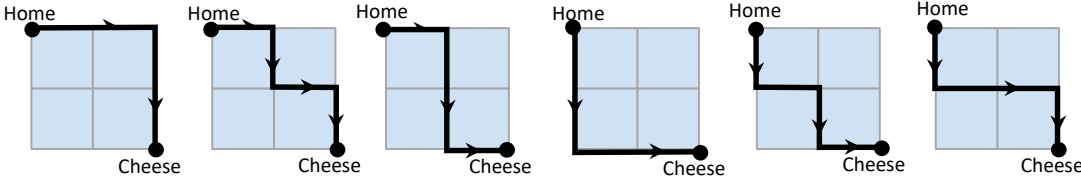
Gradient of FG = $-\frac{3}{2}$

Gradient of GH = $\frac{6}{5}$

Gradient of HI = $\frac{1}{2}$
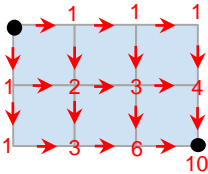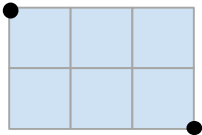
Gradient of IA = $-\frac{2}{1}$

13. Diagram A shows the paths Ricky the rat could take to get from his home to the cheese. Ricky will only move to the right and/or down. Therefore, he has 6 possible pathways to take.

Diagram A



How many possible pathways does Ricky have in Diagram B?

Diagram B



There are <u>10 ways</u>.

14. Two large containers had 40 litres of water between them. Ada poured 5 litres of water from the first container into the second one. Then Ada poured enough water from the second container into the first to double the amount of water in it. At that point, both containers held the same amount of water. How much water was in the first container at the beginning?

Working backwards:
At the end:      Container 1 has 2 units; Container 2 has 2 units
Back a step:     Container 1 has 1 units; Container 2 has 3 units
At first:        Container 1 has I units + 5 litres; Container 2 has 3 units – 5 litres
Total: 4 units = 40 litres
        1 unit = 10 litres
Container 1 at first: 10 + 5 = <u>15 litres</u>

15. Customers at Candy Dynasty can pay for mixture of different candies by weight according to the table below:

| Up to first 200 g | $5.00 per 200 g |
|---|---|
| Every additional 100g or part thereof | $1.10 |

How much will a pack weighing 2065 g cost?

2065 g – 200 g = 1865 g
1865 g → 18 × 100 + remaining 65 → 19 × $1.10 = $20.90
Total = $5 + $20.90 = <u>$25.90</u>

16. James is taking a test on three topics: Fractions, Decimals and Graphs. All except 21 questions are on Fractions. All except 23 questions are on Decimals. All except 26 questions are on Graphs. How many questions are about Graphs?

Decimals and Graphs: 21 questions
Fractions and Graphs: 23 questions
Fractions and Decimals: 26 questions
Total questions in the test = (21 + 23 + 26) ÷ 2 = 35
35 – 26 = 9
<u>9 questions</u> were set on Graphs

17. There were some chocolates candies in a box. Matthias ate 6 of them, his brother ate 5 of them and his sister ate 4 of them. If their cousin ate $\frac{1}{3}$ of the remaining and there were still 4 chocolate candies left, how many chocolate candies were there in the box at first?

Matthias → 6 chocolates
Brother → 5 candies
Sister → 4 candies
Cousin → $\frac{1}{3}$ of remainder = 2 candies
2 × 3 = 6
6 + 5 + 4 + 6 = 21
There were <u>21 candies</u> in the box at first.

18. Chocolate muffins and blueberry muffins were served at a party. After an equal number of chocolate muffins and blueberry muffins were eaten, there were $\frac{3}{5}$ of the chocolate muffins and $\frac{1}{7}$ of the blueberry muffins left. What fraction of all the muffins were eaten?

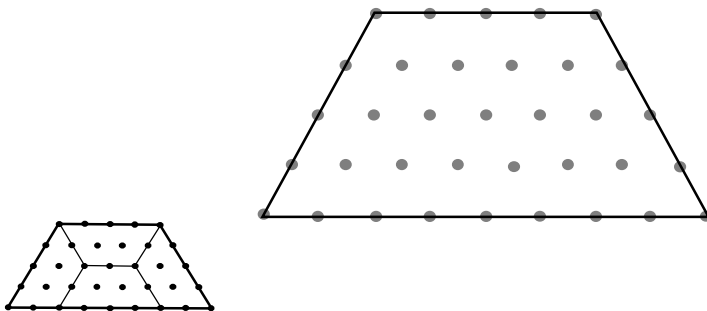$\frac{2}{5}$ of the chocolate muffins $= \frac{6}{7}$ of the blueberry muffins

$= \frac{6}{15}$ of the chocolate muffins $= \frac{6}{7}$ of the blueberry muffins

Total served = 15 + 7 = 22 units of muffin

Total eaten = 6 + 6 = 12 units of muffin
Fraction eaten $= \frac{12}{22} = \frac{6}{11}$

19. Divide the figure below into 4 equal-shaped parts.

20. In the figure below, (not drawn to scale), A, B, C, and D are points on a line. The distance between A and C is 10 cm, between B and D is 15 cm, and between A and D is 22 cm. What is the distance between B and C?
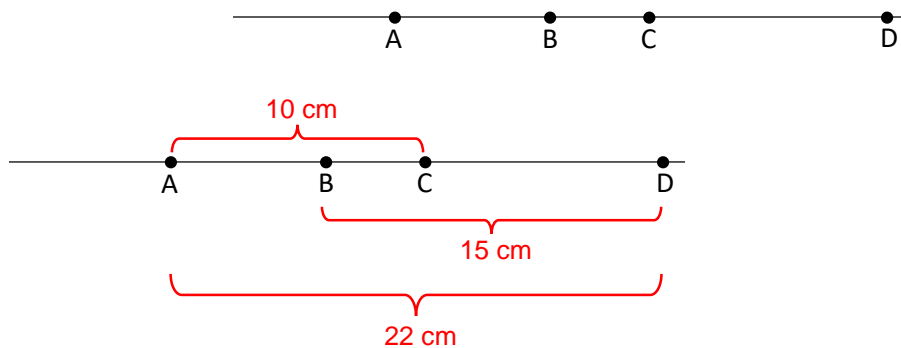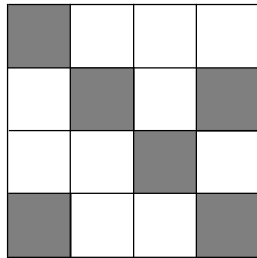
BC = (10 + 15) − 22 = <u>3 cm</u>

21.  Damien and Evan were each given the same 9-digit number.
     Damien wrote a 1 in front of the number. Evan wrote a 1 at the end of the number.
     The new numbers created by Damien and Evan are equal.
     What is the sum of the digits of the original 9-digit number?

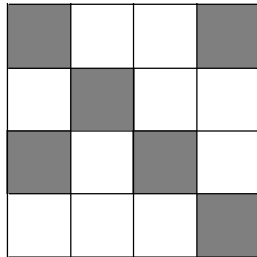The original number is 111111111.
The sum of the digits is 9.


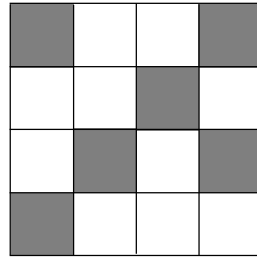22.  Study the pattern of tiles below carefully.

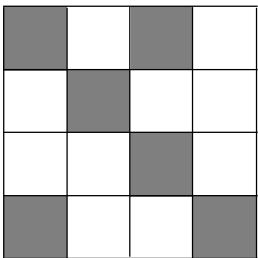Which 3 of the patterns below are not rotations of the same tile?
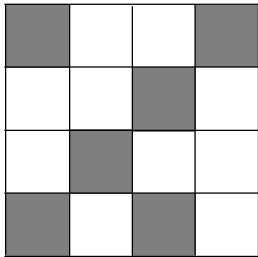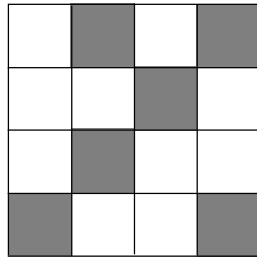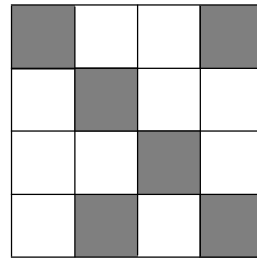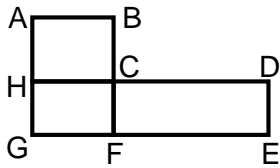
(A)  (B)  (C)

(D)  (E)  (F)

Ans: C, D and F

23. The diagram (not drawn to scale) and the table below show the paths of 4 buses. What is the distance of the path of Bus B4?

| Bus Number | The Path | Total Distance in km |
|---|---|---|
| B1 | C → D → E → F → G → H → C | 17 |
| B2 | A → B → C → F → G → H → A | 12 |
| B3 | A → B → C → D → E → F → G → H → A | 20 |
| B4 | C → F → G → H → C | ? |

From   A → B → C → F → G → H → A = 12 km, we get A → B → F = 12 ÷ 2 = 6 km
From A → B → C → D → E → F → G → H → A = 20 km, we get C → D = (20 − 12) ÷ 2 = 4 km
C → F → G → H → C = 17 − 4 − 4 = <u>9 km</u>

24. The magic square shown below is an arrangement of numbers from 1 to 16 such that the numbers in each row, and in each column, and in the two diagonals, all add up to the same total. What is the missing number at the top left corner?

| | 3 | | |
|---|---|---|---|
| | 10 | | 8 |
| 9 | 6 | 7 | |
| 4 | | | |

| | | | |
|---|---|---|---|
| X | 3 | | |
| A | 10 | B | 8 |
| 9 | 6 | 7 | |
| 4 | | | |

Of the numbers 1 to 16, the numbers left to be used are 1, 2, 5, 11, 12, 13, 14, 15, 16

X + 9 + 4 = 10 + B + 8
X + 13 = 18 + B
X = 5 + B

B can only be 11 and X can only be <u>16</u>.

25. In a 4-by-4 KenKen puzzle, the digits 1, 2, 3 and 4, are used to fill the spaces in the grid so that **no digit appears more than once in any row or any column**, and the digits inside the cells (marked by darker lines) add up to the number given inside the cell.

Example:

| 8 1 | 4 | 3 | 9 2 |
|---|---|---|---|
| 6 2 | 3 3 | 3 1 | 4 |
| 4 | 6 1 | 2 | 3 |
| 3 | 2 | 5 4 | 1 |

For the puzzle below, one of the spaces has been filled for you. Fill in all the remaining spaces.

| 4 | | 4 4 | 7 |
|---|---|---|---|
| 9 | | | |
| | 7 | | 4 |
| 5 | | | |

| 4 3 | 1 | 4 4 | 7 2 |
|---|---|---|---|
| 9 2 | 3 | 1 | 4 |
| 4 | 7 2 | 3 | 4 1 |
| 5 1 | 4 | 2 | 3 |