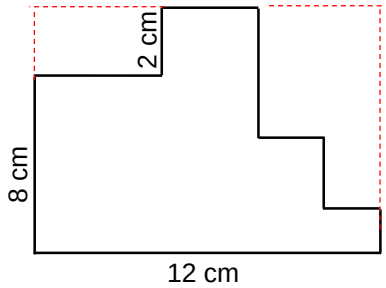
P4

1. For a number to be divisible by 5 and 4, the last digit has to be 0.
For a number to be divisible by 3 the sum of all the digits has to be a multiple of 3.
For a number to be divisible by 4 the last two digits have to form a multiple of 4.
So far, four out of the six digits add up to 2 + 8 + 9 + 0 = 19
Since the number is to be as small as possible, the next multiple of 3 is 21, and since 21 – 19 = 2, the digit 2 has to occupy the Tens place, and 0 has to occupy the Hundreds place. The last two digits (20) is a multiple of 4.
Hence the 6-digit number is <u>289 020</u>.

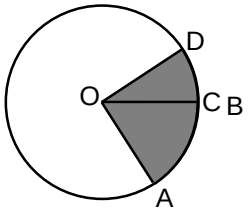
2. Since the largest common factor is 12, then A and B are multiples of 12.
Since 180 = 12 × 15, and 15 = 1 × 15 or 3 × 5, then the two numbers could be
either A = 12 × 1 and B = 12 × 15
or A = 12 × 3 and B = 12 × 5
However, since the larger number is not a multiple of the smaller, then the two numbers must be 12 × 3 = <u>36</u> and 12 × 5 = <u>60</u>.

3. The original figure has the same perimeter as the rectangle with the dotted lines.
Length of rectangle = 12 cm
Breadth of rectangle = 2 + 8 = 10 cm
Perimeter = 2 × (10 + 12) = <u>44 cm</u>



4. The shorter programme is <u>News</u>.
The longer programme is <u>Discovery Science</u>.

5. Combining the two shaded parts will make a quadrant.
Hence $\frac{1}{4}$ of the circle is shaded.

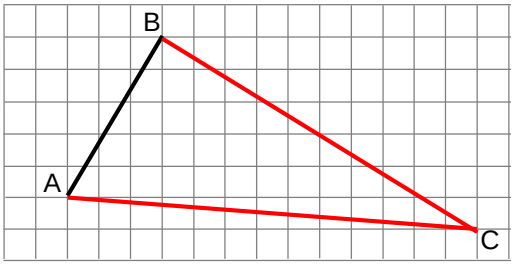


6. Change $\frac{a}{b} = \frac{3}{4}$ and $\frac{b}{c} = \frac{5}{6}$ to $\frac{a}{b} = \frac{15}{20}$ and $\frac{b}{c} = \frac{20}{24}$, then $\boldsymbol{b}$ = 20, $\boldsymbol{a}$ = 15 and $\boldsymbol{c}$ = 24,

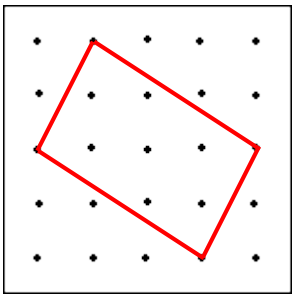
Therefore, $\frac{a}{c} = \frac{15}{24} = \frac{5}{8}$

7. From Fig. A and B, balls 1, 2, 7 and 8 are not the lighter ones. According to Fig C then, one of the lighter balls must be 4 and the other must be either 3 or 5. However, if the lighter balls are 3 and 4, as in Fig A, then balls 7, 8 and 5, 6 (in Fig B) should be been balanced and not tilted. Hence, ball 3 is not the lighter ball. Therefore, ball 5 must be the other lighter ball. The two lighter balls are balls <u>4 and 5</u>.

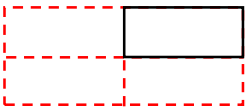
8.



9.



10. Statement C:
The area is 4 times the original area
and the perimeter is doubled.



11. To form the largest possible answer, the first four blanks must form the largest number while the last four blanks must form the smallest number.

The first four numbers must form the largest number: [☐ ÷ ☐ × (☐ + ☐)]

The first 2 blanks should form the largest number; the 3rd and 4th blanks should also be the next largest possible.

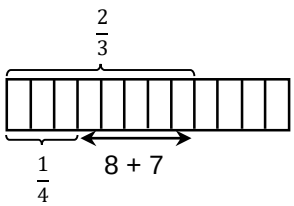
The 1st blank should be the largest and the 2nd blank should be the smallest → so 9 and 1.
The 3rd and 4th blanks should be the next largest numbers → so 8 and 7.

The last four numbers must form the smallest number: (☐ × ☐ + ☐ − ☐)
The 5th, 6th and 7th blanks should be the next smallest possible → so 2, 3 and 4.
The last blank should the next largest → so 6.

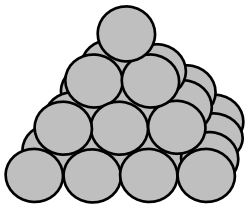
Therefore, the blanks should be filled thus:

[9 ÷ 1 × (8 + 7)] − (2 × 3 + 4 - 6)

12. 5 units = 15
12 units = (15 ÷ 5) × 12
= 36
The number is <u>36</u>.



13. 1st layer has 1 orange
2nd layer has 4 oranges
3rd layer has 9 oranges
4th layer has 16 oranges
5th layer has 25 oranges
6th layer has 36 oranges
Thus total is 1 + 4 + 9 + 16 + 25 + 36 = <u>91 oranges</u>



14. (1) <u>Rainbow</u> (2) <u>Umbrella</u> (3) <u>Coat</u> (4) <u>Hat</u>

15.

Property	Number of pieces
Exactly 1 line of symmetry	3
Exactly 2 line of symmetry	6
Exactly 3 line of symmetry	8

16.

		True	False
2.	None of the angles drawn are more than 90°.		✓
3.	All of the triangles could have sides of different lengths.	✓	
4.	All of the triangles could have 2 equal sides.	✓	
5	All of the triangles could have 3 equal sides.		✓

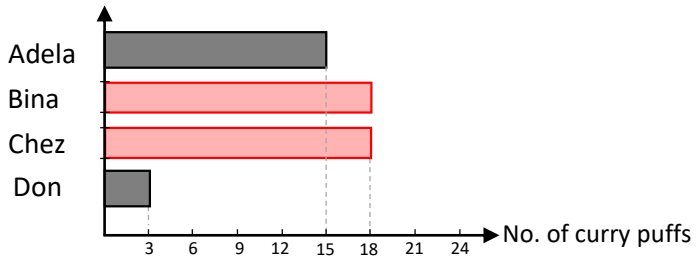
17. On a 365-days year, a date will fall on the next day of the week for the next year. In a leap year (366 days), the date will fall on the following day of the week for the next year.
From 3 Feb 1999 to 3 Feb 2020, there are (21 × 365) days + 5 extra days due to the leap years. 21 is a multiple of 7 and so, if it had not been for the extra 5 days, 3 Feb 2020 would have been on a Wednesday as well. As it is, 5 days from Wednesday is Monday.
Hence 3 Feb 2020 falls on a <u>Monday</u>.

18. Concept: $\frac{1}{3}$ of every part of the whole = $\frac{1}{3}$ of the whole
After $\frac{1}{3}$ of the pupils left to go to the hall, there were $\frac{2}{3}$ of them left.
After $\frac{1}{2}$ of these $\frac{2}{3}$ remaining pupils went off, there were $\frac{1}{3}$ of them left.
If $\frac{1}{3}$ of the class pupils is 7 pupils, then the whole class has 7 × 3 = 21 pupils
There were <u>21 pupils</u> at the beginning.

19. Let S, M and L represent the number of small, medium and large marbles respectively.
For 1M +1L = 5S,
then 1M has to equal to 2S and 1L has to equal to 3S
Since 5L = 9S + 3M
then 5L = 9S + 6S = 15S
5 large marbles weigh as much as <u>15 small marbles</u>.

20. Since the answer starts with 2 it is clear that a can only be 2 or 3 since the answer ranges between 207 and 297.
79 287 is not divisible by 221 whereas dividing 79 287 by 321 gives 247.
Hence, a = 3 and b = 4. The value of $a + b$ is <u>7</u>.

21.



22. Make a table of possible lengths and breadths of rectangles whose perimeter is 118 cm:

Breadth	Length
1	58
2	57
3	56
:	:
:	:
29	30

There are 29 possible different rectangles.

23. $\frac{1}{8}$ of the number of sheep = $\frac{1}{4}$ of the number of goats = $\frac{2}{5}$ of the number of horses

$\frac{2}{16}$ of the number of sheep = $\frac{2}{8}$ of the number of goats = $\frac{2}{5}$ of the number of horses

There were 16 units of sheep, 8 units of goats and 5 units of horses
16 + 8 + 5 = 29 units
29 units = 1450 animals
1 unit = 50 animals
16 units = 800 sheep
8 units = 400 goats
5 units = 250 horses

24. The numbers guessed are

Kenneth's number:	1	5	3	4
Leonard's number:	4	0	5	8
Mike's number:	9	7	8	0

If the digit which is correct is in the 2nd place, then the other correct digit can only be in the 4th place. Similarly, if the digit which is correct is in the 3rd place, then the other correct digit can only be in the 1st place.

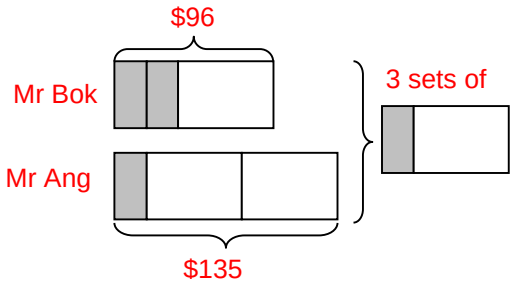
Hence, if 5 is correct, then 4 must be correct and 1 and 3 are wrong (from Kenneth's number); 0 and 8 are wrong (from Leonard's number). However, the remaining two possible digits, which are 9 and 7 are next to each other (from Mike's number), so 5 is not correct.

If 3 is correct, then 1 must be correct, and 5 and 4 are wrong (from Kenneth's number), and 0 and 8 are correct (from Leonard's number). However, 8 and 0 are next to each other (from Mike's number), so 3 is not correct.

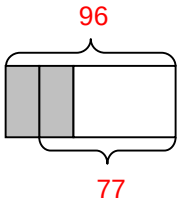
This leaves 1 and 4 correct, and 5 and 3 are wrong (from Kenneth's number); 8 is correct (from Leonard's number); and 9 is correct (from Mike's number).

Therefore, the four digits making up James' secret code are 1, 4, 8 and 9.

25.



Value of 3 sets = 135 + 96 = $231
Value of 1 set = 231 ÷ 3 = $77



96 – 77 = 19

 = 19

Mr Ang spent $19.