1. Following the order of operations rules, calculate

$$2+3\times 9$$

Solution: In the order of operation rules, multiplication is done before addition. Therefore, 2+3x9=2+27=**29**.

2. A grandfather has 3 children, each of which has 2 children. How many descendants does he have? (This does not include himself.)

Solution: Each of the 3 children of the grandfather has 2 children. This means the grandfather has 6 grandchildren. The total number of descendants is 3+6=**9**.

3. How many dots are there in the diagram?

Solution: There are 4 rows and 6 columns of dots. The total number of dots is therefore 4x6=**24**.

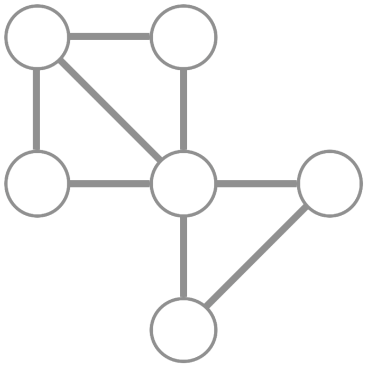
4. Alice has 5 boxes of candy, and each box has 20 pieces of candy in it. How many pieces of candy does Alice have in total?

Solution: There are 5 boxes of 20 pieces of candy, so there are 5x20=**100** pieces of candy in total.

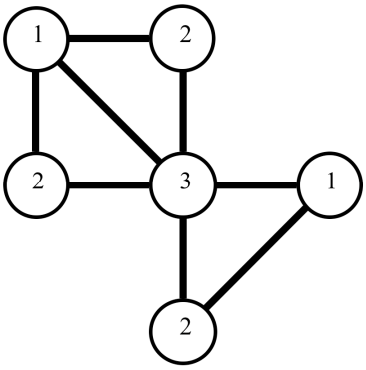
5. Bob's car weighs 1000 kilograms. When 6 people are in the car, it weighs 1360 kilograms. If the 6 people all weigh the same, how much does each of them weigh?

Solution: The 6 people together weigh 1360-1000=360 kilograms. Since they all weigh the same, they each weigh 360÷6=**60** kilograms.

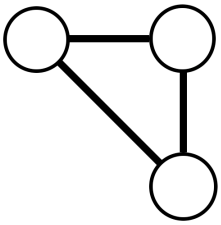
6. Charles wants to colour each circle in the diagram below such that no two circles connected by a line have the same colour. What's the smallest number of different colours he must use?



Solution: The diagram can be coloured with 3 colours, as shown below. We use "1", "2", and "3" to represent the 3 colours.




Note that no two circles of the same "colour" are connected by a line in the diagram above. Also, it is impossible to use only 2 colours – you can see this by looking at the triangle

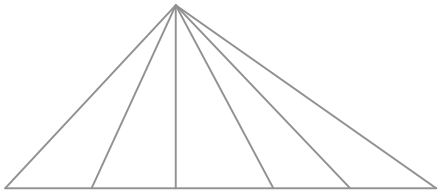


If the circles in this triangle were coloured by 2 colours, then two of them will have the same colour and will be connected by a line. This means 2 colours is impossible, but 3 colours is possible, so the answer is **3**.

7. A square has perimeter 24. What is its area?

Solution: The perimeter is 24, so the length of each side is 24÷4=6. This means that the area of the square is 6x6=**36**.

8. How many triangles (of all sizes) can be found in the figure below?



Solution: There are

- 5 small triangles
- 4 triangles made of 2 small triangles
- 3 triangles made of 3 small triangles
- 2 triangles made of 4 small triangles
- 1 triangle made of 5 small triangles.

Therefore, the total number of triangles is 1+2+3+4+5=**15**.