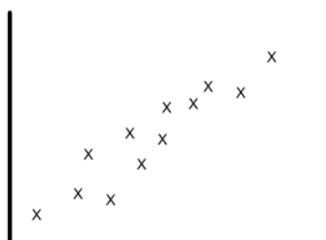


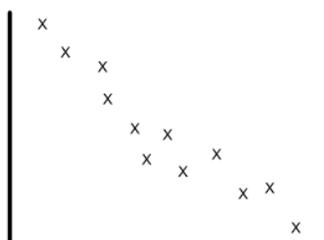
Key Language

1	enlargement	A transformation which makes a shape larger or smaller
2	scale factor	A number telling us how many times longer each side becomes
3	centre of enlargement	The co-ordinate point which determines the final position of an enlargement
4	surface area	The total of the areas of all of the faces of a 3D solid
5	volume	The total amount of space taken up by a 3D solid
6	similar	Similar shapes are the same shape but different sizes – one is an <i>enlargement</i> of the other
7	cross-section	A prism or cylinder has the same shape running all the way through the middle. This shape is called the <i>cross-section</i> .
8	term	One of the numbers (or patterns) in a sequence
9	position to term rule / nth term / general term	An expression that allows us to work out the term in any position of a sequence by substituting. e.g. $5n - 4$
10	ascending	Going upwards e.g. the sequence 1, 3, 5, 7, ...
11	descending	Going downwards e.g. the sequence 15, 13, 11, 9, ...
12	linear / arithmetic sequence	A sequence where terms have the same amount <i>added</i> or <i>subtracted</i> each time e.g. 5, 8, 11, 14, ... (add 3)
13	geometric sequence	A sequence where terms are <i>multiplied</i> or <i>divided</i> by the same amount each time e.g. 80, 40, 20, 10, ... (divide by 2)
14	Fibonacci-type sequence	A sequence where each term is found by adding the previous two terms. e.g. 4, 6, 10, 16, 26, ... ($4 + 6 = 10$, $6 + 10 = 16$ etc.)
15	outlier	Information that doesn't fit the pattern of the rest of the data
16	anomaly	A piece of data that is a mistake (e.g. typed in wrong)

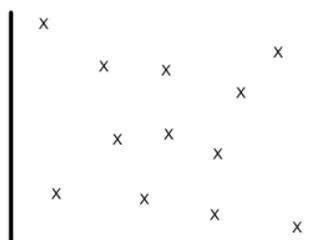
Correlation: types and strength



Positive Correlation
(upwards pattern)



Negative Correlation
(downwards pattern)



No Correlation
(no diagonal pattern)

Know

If the points are close to being in a perfect line, this is a **strong** correlation.

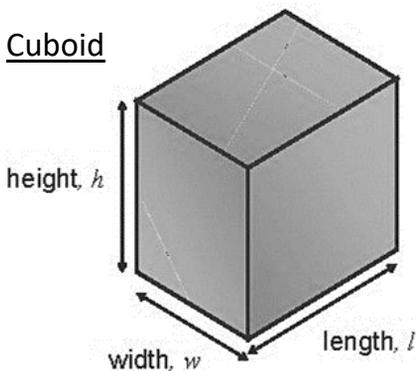
If points are more spread out, this is a **weak** correlation.



Volume

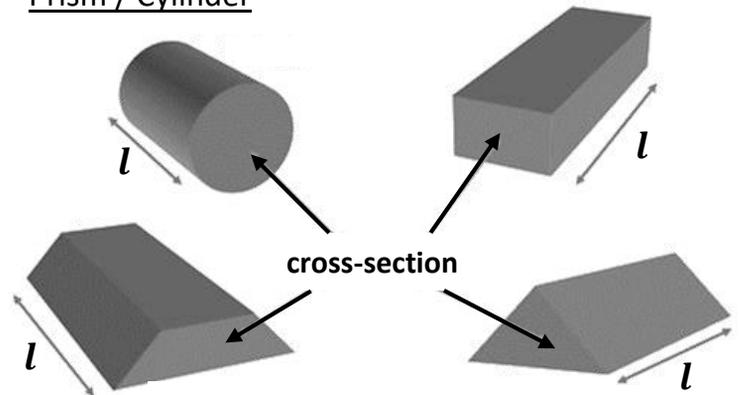
The volume of a 3D solid is the amount of space it takes up.

Cuboid



$$\text{Volume} = h \times w \times l$$

Prism / Cylinder



$$\text{Volume} = \text{area of cross section} \times \text{length}$$

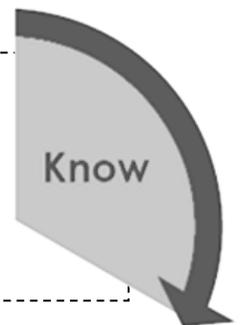
Generating terms of a sequence

The *position to term rule* can be used to generate the terms of a sequence
e.g. for the sequence $5n + 9$

$$\mathbf{1^{\text{st}} \text{ term}} = 5 \times \mathbf{1} + 9 = 14$$

$$\mathbf{2^{\text{nd}} \text{ term}} = 5 \times \mathbf{2} + 9 = 19$$

$$\mathbf{10^{\text{th}} \text{ term}} = 5 \times \mathbf{10} + 9 = 59$$



Scale factors for area and volume

The scale factor for lengths is *squared* to get the scale factor for area (or surface area).

The scale factor for lengths is *cubed* to get the scale factor for volume.

e.g. Scale factor for lengths: 5

Scale factor for areas: 25 (5^2)

Scale factor for volumes: 125 (5^3)

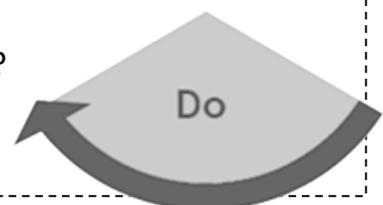
PRACTICE QUESTIONS

Ten of these questions will be chosen, with very little change, to make the Knowledge Test.

If you can confidently answer all of these, you will pass easily.

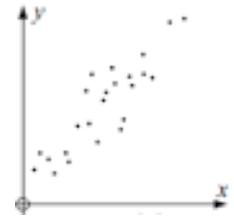
Use pages 1 and 2 to research and *learn* anything that you don't know yet.

1. What type of transformation makes a shape larger or smaller?
2. What is *surface area*?
3. Describe what is meant by two shapes being *similar*.



PRACTICE QUESTIONS (continued)

4. What name is given to the shape that goes all the way through the middle of a prism?
5. Write a formula for the volume of a cuboid which has height h , width w and length l .
6. What type of correlation is shown in the graph on the right?
7. Which of these is an *ascending* sequence?
A: 2, -4, 8, -16,... B: 2, 3, 5, 8, 13,... C: 20, 18, 16, 14,...
8. Which of the sequences in Q7 is a *linear* sequence?
9. Which of the sequences in Q7 is a *Fibonacci-type* sequence?
10. Circle the outlier in this data: 3, 6, 4, 2, 68, 1
11. What is the difference between an *outlier* and an *anomaly*?
12. Find the 5th term of the sequence with position to term rule $4n - 3$
13. A *geometric* sequence starts 5, 10, ... What is the next term?
14. A *Fibonacci-type* sequence starts 5, 6, ... What is the next term?
15. Explain why this is not a linear sequence: 5, 8, 10, 15, ...
16. The scale factor linking *lengths* in two shapes is 3. What scale factor links their *areas*?
17. The scale factor linking *lengths* in two solids is 2. What scale factor links their *volumes*?
18. What do we call the co-ordinate point which determines the final position of an enlargement?
19. What word do we use for two shapes that are the same shape but different sizes, so that one is an enlargement of the other?



ANSWERS

- | | |
|---|---|
| 1. enlargement | 11. An outlier is (genuine) information which doesn't fit the pattern of the rest of the data. An anomaly is a piece of data that is a mistake. |
| 2. e.g. Surface area is the total of the areas of all of the faces of a 3D solid | 12. $4 \times 5 - 3 = \underline{17}$ |
| 3. Two shapes are similar if one is an enlargement of the other (or: they are the same shape but different sizes) | 13. 20 (Note that 5, 10, 15 would be a <i>linear</i> sequence) |
| 4. cross-section | 14. 11 (from $5 + 6$) |
| 5. e.g. $V = h \times w \times l$ | 15. E.g. The terms are not increasing by the same amount each time |
| 6. positive correlation (upwards diagonal pattern) | 16. 9 (from 3^2) |
| 7. B: 2, 3, 5, 8, 13, ... | 17. 8 (from 2^3) |
| 8. C: 20, 18, 16, 14, ... | 18. centre of enlargement |
| 9. B: 2, 3, 5, 8, 13, ... | 19. similar (or mathematically similar) |
| 10. 68 is the outlier | |