

What is the general expression for writing numbers in **standard form**?

1

The general expression for **standard form** is  $A \times 10^n$ , where  $1 \leq A < 10$  and  $n$  is an integer.

1

What is the **product rule** for counting?

2

The **product rule** for counting states: if there are  $A$  ways of doing Task 1 and  $B$  ways of doing Task 2, there are  $A \times B$  ways of doing both Task 1 and Task 2.

2

Which **cube roots** result in 2, 3, 4, 5 and 10?

3

The **cube roots** that result in 2, 3, 4, 5 and 10 are:

$$\sqrt[3]{8} = 2$$

$$\sqrt[3]{27} = 3$$

$$\sqrt[3]{64} = 4$$

$$\sqrt[3]{125} = 5$$

$$\sqrt[3]{1000} = 10$$

3

Are  $x$ ,  $x^2$  and  $x^3$  **like terms**?

4

No,  $x$ ,  $x^2$  and  $x^3$  are not **like terms**. When simplifying expressions, different powers of  $x$  should be collected together separately, e.g.  $2x$  and  $5x$  are like terms, and  $x^2$  and  $3x^2$  are like terms.

4

What is **factorisation**?

5

**Factorisation** is when brackets are used to write an expression as a product of two or more factors.

5

What is a **binomial**?

6

A **binomial** is an expression that contains two terms, e.g.  $4x + 13$  or  $6xy - x^2$ .

6

What does it mean if you are asked to change the **subject** of a **formula**?

7

The **subject** of a **formula** is the variable that appears on its own (usually on the left-hand side). To change the subject, you rearrange the formula so that a different variable appears on its own.

7

Describe the graph that will be produced by two variables that are in **direct proportion**.

8

When two variables are in **direct proportion**, the graph produced will be a straight line that passes through the origin (0, 0).

8

What is the formula for calculating how a financial investment earning **compound interest** grows over time?

9

The formula for calculating how a financial investment earning **compound interest** grows over time is:

$$A = \text{Original Amount} \times \left(1 + \frac{\text{Rate}}{100}\right)^{\text{Time}}$$

9

What is the formula for calculating **pressure**?

10

The formula for calculating **pressure** is:

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

10

Name two types of angles, produced by a straight line crossing a set of **parallel lines**, which are equal.

11

When a straight line crosses a set of **parallel lines**, the **alternate angles** produced are equal and the **corresponding angles** produced are equal. (Vertically opposite angles at each point of intersection are also equal).

11

What formula can be used to calculate the size of each **exterior angle** of a **regular polygon**?

12

The formula that can be used to calculate the size of each **exterior angle** of a **regular polygon** is:

Exterior Angle =  $360^\circ \div n$ ,  
where  $n$  is the number of sides.

12

What is the **reciprocal** of 5?

13

The **reciprocal** of 5 is  $\frac{1}{5}$ .

13

If a quantity is increased by 5%, what is the decimal **multiplier** that you would use to find the new amount?

14

If a quantity is increased by 5%, the new amount is 105%, so the decimal **multiplier** used is 1.05

14

What does it mean if two outcomes are **mutually exclusive**?

15

If two outcomes are **mutually exclusive**, they cannot happen at the same time.

15

If A and B are **independent events**, what is the probability of A and B occurring?

16

If A and B are **independent events**, the probability of A and B occurring is:

$$P(A \text{ and } B) = P(A) \times P(B)$$

16

What is the difference between an **arithmetic sequence** of numbers and a **geometric sequence**?

17

An **arithmetic sequence** is generated by adding or subtracting a constant (the same number) each time. A **geometric sequence** is generated by multiplying by a constant each time.

17

Which of these expressions for the  $n$ th term of a sequence will produce a **quadratic sequence**?

- a)  $24 - 4n$
- b)  $n^2 + 4$
- c)  $\frac{n}{4} + 24$

18

Expression **b)**  $n^2 + 4$  will produce a **quadratic sequence** because it contains an  $n^2$  term.

18

Describe the **transformation** that sees a shape on a coordinate grid moved six squares to the left and one square up.

19

The **transformation** that sees a shape on a coordinate grid moved six squares to the left and one square up is:

A translation through  $\begin{pmatrix} -6 \\ 1 \end{pmatrix}$

19

What is a **bisector**?

20

A **bisector** is a line that divides a line, angle or shape exactly in half.

20

In the equation of a **linear graph**,  $y = mx + c$ , which variables represent the **gradient** and the **intercept**?

21

In the equation of a **linear graph**,  $y = mx + c$ ,  $m$  is the **gradient** and  $c$  is the **intercept**.

21

How can knowing the **roots** of a **quadratic graph** help you to work out the  $x$ -coordinate of the **turning point**?

22

A **quadratic graph** is symmetrical, so the  $x$ -coordinate of the **turning point** is exactly halfway between the two **roots**.

22

What is a **surd**?

23

A **surd** is a square root that is not an integer or fraction. It is, therefore, irrational. Written in square root form, a surd is an exact number.

23

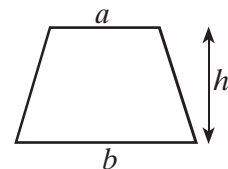
What is the formula for calculating the **area of a trapezium**?

24

The formula for calculating the **area of a trapezium** is:

$$A = \frac{1}{2}(a + b)h$$

where  $a$  and  $b$  are the parallel sides and  $h$  is the perpendicular height.



24

What is a **frustum**?

25

A **frustum** is the 3D shape that remains when a cone or pyramid is cut parallel to its base and the upper part of the shape is removed.

25

What is the formula for calculating the **volume of a sphere**?

26

The formula for calculating the **volume of a sphere** is:

$$V = \frac{4}{3}\pi r^3$$

26

If a line has a gradient of  $m$ , what is the gradient of any line **perpendicular** to it?

27

If a line has a gradient of  $m$ , the gradient of any line **perpendicular** to it is  $-\frac{1}{m}$ .

27

How do you work out the total distance travelled from a **velocity–time** graph?

28

The total distance travelled is equal to the area under a **velocity–time** graph. So, to work out the total distance, you break down the area under the graph into shapes and calculate the sum of all their areas.

28

How do you find the **gradient** of a curve at a given point?

29

To find the **gradient** of a curve at a given point, you draw a tangent at that point and work out its gradient.

29

When looking at graphical inequalities, what is a **region**?

30

A **region** is the area on the graph that satisfies one or more inequalities.

30

What are the four criteria which can be used to prove that two triangles are **congruent**?

31

The four criteria, which can be used to prove that two triangles are **congruent**, are:

SSS (side, side, side)

SAS (side, angle, side)

ASA (angle, side, angle)

RHS (right-angle, hypotenuse, side).

31

How are the three **trigonometric ratios** calculated?

32

The three **trigonometric ratios** are calculated as:

$$\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$$

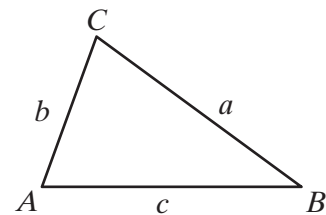
32

What is the formula that uses **sine** to calculate the area of any triangle?

33

The formula that uses **sine** to calculate the area of any triangle is:

$$\text{Area} = \frac{1}{2}ab \sin C$$



33

How do you work out the width and height of each bar of a **histogram**?

34

The width of each bar of a **histogram** is equal to the width of the class that it represents. The height of each bar is equal to the frequency density for that class.

$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Class Width}}$$

34

A rectangular field is 150m by 60m to the nearest metre. What are the **lower** and **upper bounds** of these measurements?

35

The **lower bounds** of the measurements are 149.5m and 59.5m. The **upper bounds** of the measurements are 150.5m and 60.5m.

35

What is the **quadratic formula**?

36

The **quadratic formula** can be used to solve quadratic equations in the form  $ax^2 + bx + c = 0$ . It is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

36

Where on a graph can the approximate solutions to two **simultaneous equations** be found?

37

The approximate solutions to two **simultaneous equations** are given by the coordinates of the point(s) of intersection (where the two graphs cross).

37

What is an **identity**?

38

An **identity** is an equation that is always true, no matter what values the variables take.

38

What is the **alternate segment theorem**?

39

The **alternate segment theorem** states: in a circle, the angle between a tangent and a chord is equal to the angle subtended (produced) by the chord in the alternate (opposite) segment.

39

How do you write the **magnitude** of vector  $a$ ?

40

The **magnitude** of vector  $a$  is written as  $|a|$ .

40