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| **Topic/Skill** | **Definition/Tips** | **Example**  **Topic: Growth and Decay** |
| 1. Exponential Growth | When we **multiply** a number **repeatedly** by the **same number** (, resulting in the number **increasing by the same proportion** each time.  The original amount can grow very quickly in exponential growth. | is an example of exponential growth, because the numbers are being multiplied by 2 each time. |
| 2. Exponential Decay | When we **multiply** a number **repeatedly** by the **same number** (, resulting in the number **decreasing by the same proportion** each time.  The original amount can decrease very quickly in exponential decay. | is an example of exponential decay, because the numbers are being multiplied by each time. |
| 3. Compound Interest | Interest paid on the **original amount and the accumulated interest**. | A bank pays 5% compound interest a year. Bob invests £3000. How much will he have after 7 years. |
| 4. Exponential Graph | The equation is of the form **,** where is a number called the **base**.  If the graph **increases**.  If , the graph **decreases**.  The graph has an **asymptote** which is the **x-axis**.  The **y-intercept** of the graph is **s** | Image result for exponential function definition math |

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| **Topic/Skill** | **Definition/Tips** | **Example**  **Topic: Compound Measures** |
| 1. Metric System | A system of measures based on:   * the metre for length * the kilogram for mass * the second for time   **Length: mm, cm, m, km**  **Mass: mg, g, kg**  **Volume: ml, cl, l** |  |
| 2. Imperial System | A system of weights and measures originally developed in England, usually based on human quantities  **Length: inch, foot, yard, miles**  **Mass: lb, ounce, stone**  **Volume: pint, gallon** |  |
| 3. Metric and Imperial Units | Use the **unitary method** to convert between metric and imperial units. |  |
| 4. Speed, Distance, Time | **Speed = Distance ÷ Time**  **Distance = Speed x Time**  **Time = Distance ÷ Speed**  Image result for speed distance time triangle  Remember the correct units. | Speed = 4mph  Time = 2 hours  Find the Distance. |
| 5. Density, Mass, Volume | **Density = Mass ÷ Volume**  **Mass = Density x Volume**  **Volume = Mass ÷ Density**  Image result for dmv triangle  Remember the correct units. | Density = 8kg/m³  Mass = 2000g  Find the Volume. |
| 6. Pressure, Force, Area | **Pressure = Force ÷ Area**  **Force = Pressure x Area**  **Area = Force ÷ Pressure**  Image result for pressure triangle  Remember the correct units. | Pressure = 10 Pascals  Area = 6cm²  Find the Force |
| 7. Distance-Time Graphs | You can find the **speed** from the **gradient** of the line (Distance ÷ Time)  The steeper the line, the quicker the speed.  A **horizontal** line means the object is not moving (**stationary**). |  |

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| **Topic/Skill** | **Definition/Tips** | **Example**  **Topic: Proportion** |
| 1. Direct Proportion | If two quantities are in direct proportion, **as one increases**, the **other increases** by the **same percentage**.  If is directly proportional to , this can be written as  An equation of the form represents direct proportion, where  **is the constant of proportionality**. |  |
| 2. Inverse Proportion | If two quantities are inversely proportional, **as one increases**, the **other decreases** by the **same percentage**.  If is inversely proportional to , this can be written as  An equation of the form represents inverse proportion. |  |
| 3. Using proportionality formulae | **Direct**: **y = kx** or **yx**  **Inverse**: **y =**  or **y**  1. **Solve to find k** using the pair of values in the question.  2. **Rewrite the equation** using the k you have just found.  3. **Substitute the other given value** from the question in to the equation to **find the missing value**. | p is directly proportional to q.  When p = 12, q = 4.  Find p when q = 20.  1. p = kq  12 = k x 4  so k = 3  2. p = 3q  3. p = 3 x 20 = 60, so p = 60 |
| 4. Direct Proportion with powers | Graphs showing **direct proportion** can be written in the form  Direct proportion graphs will always start at the origin. |  |
| 5. Inverse Proportion with powers | Graphs showing **inverse proportion** can be written in the form  Inverse proportion graphs will never start at the origin. |  |

**Knowledge Organiser**