1.0 Numbers

1.1 Integers

- **Key Skills:**
  - Operations (+, -, ×, ÷) with negative numbers.
  - **Example:** Solve $(-5) \times 3 + 12$. *(Ans: \(-3\)*

1.2 Cubes & Cube Roots

- **Formulas:**
  - $a^3 = b \rightarrow \sqrt[3]{b} = a$.
  - **Example:** $\sqrt[3]{64} = 4$.

1.3 Indices & Logarithms

- **Laws of Indices:**
  - $a^m \times a^n = a^{m+n}$, $(a^m)^n = a^{mn}$.
- **Logarithm Basics:**
  - $\log_{10} 100 = 2$.

1.4 Compound Proportions & Rates of Work

- **Work Rate:**
  - If 3 workers finish a job in 6 days, 1 worker takes 18 days.

2.0 Algebra

2.1 Matrices

- **Addition/Subtraction:**
  - Same-order matrices only.
  - **Example:**

$$\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ 5 & 5 \end{bmatrix}$$

2.2 Equation of a Straight Line

- **Slope-Intercept Form:**
  - $y = mx + c$ (slope m, y-intercept \(c \).

2.3 Linear Inequalities

- **Example:**
  - $2x - 5 \leq 7 \rightarrow x \leq 6$.

3.0 Measurements

3.1 Area (Pentagon, Hexagon, Prisms, Circle Segments)

- **Regular Pentagon Area:**
  - $\text{Area} = \frac{5}{2} \times \text{side}^2 \times \cot(36^\circ)$.

3.2 Volume of Solids

- **Cone:** $\frac{1}{3} \pi r^2 h$.
- **Sphere:** $\frac{4}{3} \pi r^3$.

3.3 Mass, Volume, Weight, Density

- **Density Formula:**
  - $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$.

3.4 Time, Distance, Speed

- **Velocity:**
  - $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$.

3.5 Money (Currency Conversion, Taxes)

- **VAT Calculation:**
  - $\text{Price} \times \frac{\text{VAT\%}}{100}$.

3.6 Approximation & Errors

- **Absolute Error:**
  - $\text{Measured} - \text{Actual}$.

4.0 Geometry

4.1 Coordinate Geometry

- **Midpoint Formula:**
  - $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

4.2 Scale Bearing & Angles

- **Bearing Rule:**
  - Measured clockwise from North (e.g., 090° = East).

4.3 Similarity & Enlargement

- **Scale Factor:**
  - $\text{New Length} = \text{Original} \times \text{Scale Factor}$.

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4.4 Trigonometry

- **SOHCAHTOA:**
  - $\sin\theta = \frac{\text{Opp}}{\text{Hyp}}$.

5.0 Data Handling & Probability

5.1 Data Interpretation (Grouped Data)

- **Mean for Grouped Data:**
  - $\text{Mean} = \frac{\sum(f \times x)}{\sum f}$.

5.2 Probability (Tree Diagrams)

- **Independent Events:**
  - $P(A \text{ and } B) = P(A) \times P(B)$.