**MSQ Unit 83**

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| Title: | **Practical mathematics for marine engineers** |
| Level: | **2** |
| Credit value: | **4** |
| Learning outcomes*The learner will:* | Assessment criteria *The learner can:* |
| 1. Be able to define logarithms and their characteristics
 | * 1. Calculate the power form of a given number using logarithm expressions
	2. Define parts of the logarithmic equation
	3. Express numbers in standard form and find the characteristic
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| 1. Be able to use logarithms
 | * 1. Calculate the logarithm from a given number using tables, calculator of slide rule
	2. Calculate the antilogarithm from a given number using tables, calculator of slide rule
	3. Applies logarithms to the multiplication and division of numbers
	4. Calculate single and multiple numbers raised to a positive integral power using logarithms
	5. Calculate the single, multiple square and cube root of numbers using logarithms
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| 1. Be able to solve algebraic equations
 | * 1. Multiply binominal factors
	2. Divide quadratic function by a linear factor
	3. Identify a statement of equality as an equation
	4. Apply algebraic principles to solve equations
	5. Explain the rule that equal quantities, added, subtracted or multiplied to each side of an equal equation leaves the equation equal.
	6. Solve problems by transposing formulae
	7. Identify direct and inverse variation and their constants
	8. Form linear equations from data provided
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| 1. Be able to apply geometric concepts to problems
 | * 1. Describe the following geometric concepts;
* Circles
* Right angle triangles
* The three sides of a closed triangle
* Equilateral triangles and congruent triangles
* Isosceles triangles
* Similar triangles
* Scalene triangles
* A tangent to a circle at a given
	1. Construct a triangle to scale from the following given information;
* All sides
* Two sides and an included angle
* One side and two angles
	1. Use drawing equipment to bisect a line and erect a perpendicular
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| 1. Be able to use equations to find the area, volume and mass of different objects
 | * 1. Calculate the area of the following;
* A triangle – given the base and vertical height and two sides and the included angle
* A parallelogram
* The mean height of an object – given the area and length
* A circle and annulus
* Surface of a sphere
	1. Calculate the volume of the following;
* Cylinder
* Pyramid
* Sphere
	1. Calculate the area of an irregular object using the mid-ordinate rule
	2. Calculate the mass of a solid object using volume and density
	3. Calculate the mass of a object using the ratios of the volumes of similar objects
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| **Additional information about the unit** |  |
| Unit aim(s) | *To develop aspects of the learner’s skills in logarithms, algebra and graphical work and to apply these skills in an appropriate scientific/marine engineering context* |
| Unit expiry date |  |
| Details of the relationship between the unit and relevant national occupational standards (if appropriate) | MNTB NOS (Jan 2006) –  |
| Details of the relationship between the unit and other standards or curricula (if appropriate) | Maritime and Coastguard Agency Marine Guidance Notice regarding Certificates of Competency – Engine Department,  |
| Assessment requirements specified by a sector or regulatory body (if appropriate) | Maritime Skills Alliance Assessment Strategy and MCA certification requirements |
| Endorsement of the unit by a sector or other appropriate body (if required) | MCA |
| Location of the unit within the subject/sector classification system | Transportation |
| Name of the organisation submitting the unit | Scottish Qualifications Authority |
| Availability for use |  |
| Availability for delivery |  |
| Guided Learning Hours | 36 |