

## **GENERAL EDUCATION AND TRAINING CERTIFICATE**

## **NQF LEVEL 1**

## **AET LEVEL 4 SITE-BASED ASSESSMENT**

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| **LEARNING AREA** | **:** | **MATHEMATICS AND MATHEMATICAL SCIENCES** |
| **CODE** | **:** | **MMSC4** |
| **TASK** | **:** | **WORKSHEET** |
| **DURATION** | **:** | **2 HOURS** |
| **MARKS** | **:** | **50** |

**This assessment task consists of 11 pages.**

**2**

**INSTRUCTIONS AND INFORMATION**

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| 1. | Answer ALL the questions on this WORKSHEET and hand in the completed task. |  |  |

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| 2. | Write the NAME of the CLC and your NAME in the spaces provided. |  |  |

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| 3. | Calculators may be used unless otherwise stated. |  |  |

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| 4. | Show ALL calculations. |  |  |

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| 5. | Write legibly and present your work clearly. |  |  |

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**ACTIVITY 1**

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| Two dimensional figures  These are figures that can be drawn on a flat paper and they are called plane figures. Of course all are limitlessly many such figures.  Closed shapes with all straight sides are called polygons. This means 'many sides'. A regular polygon is a shape in which all sides are equal in length and have all the internal angles equal.  Triangles are three–sided polygons and an equilateral triangle is a regular three-sided polygon. A square is a regular four-sided polygon. Pentagons have five sides just like our government buildings and hexagons have six sides. Heptagons have 7 and octagon, which we see every day on stop signs, has 8 sides.  [www.maths for fun.com.] |  |  |

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| **Examples of plat plane shapes**  4  3  6  1  2  5  10  8  12  13  14  15  7  11  9 |  |  |

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| 1.1 | 1.1.1 | How many of the following shapes given above are not polygons? |  |  |

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|  | 1.1.2 | Explain how a polygon is recognised. |  |  |

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|  | 1.1.3 | State ONE property that all of the above polygons have in common. |  |  |

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|  | 1.1.4 | Give the names of SHAPE 2 and SHAPE 8 given/shown from the examples of plat plane shapes in the diagram above. |  |  |

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|  | 1.1.5 | Indicate whether the following statement is TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.15) in the ANSWER BOOK.  All equilateral triangles no matter what size they are have angles that are equal to 60°. |  | (1) |

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| Measuring Volume and capacity  Volume of an object is a measure of the amount of space it occupies. The formula to calculate volume of regular objects is×× .  For example the volume of a rectangular object is equal to the product of the area of the base and the height of the rectangular object. |  |  |

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| 1.2 | Complete the table below by writing the formulae for calculating the area of the square and the volume of the cube: |  |  |

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|  | |  |  |  | | --- | --- | --- | | **LENGTH OF LINE** | **AREA OF SQUARE** | **VOLUME OF CUBE** | |  |  |  | | 3 *cm* | **…………………….** | **…………………….** | | 4,5 *cm* | **…………………….** | **…………………….** | | 25 *cm* | **…………………….** | **…………………….** | |  | (6) |
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**ACTIVITY 2**

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| Three-dimensional closed figures  If these shapes have sides made up of polygons, then they are called polyhedrals. A regular polyhedron has faces that are congruent (identical) regular polygons, with internal angles the same shape and size. We name right prism and according to the shape of the base, e.g. square prism, rectangular prism, triangular prism and circular prism (cylinder).  In contrast to polygons, there are only five regular polyhedral. They have been known since the time of Plato and the Greek mathematicians; this is why they are known as the five Platonic Solids. |  |  |

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|  | **Examples of Platonic Solids**  C:\Users\NGOBENI TA\Desktop\baba\platonic_solids.gif |  |  |

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| 2.1 | Copy and complete the table below. All values for Tetrahedron have been given and some values are filled for other platonic solids.  The platonic solid has edges, number of faces, number of sides per faces, the number of vertices and the number of edges which meet at each vertex. |  | (8) |

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|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **PLATONIC SOLIDS** | | *f* | *s* | *e* | *m* | *v* | | 1. | **TETRAHEDRON** | 4 | 3 | 6 | 3 | 4 | | 2. | **HEXAHEDRON** | 6 |  |  | 3 | 8 | | 3. | **OCTAHEDRON** | 8 |  | 12 |  | 6 | | 4. | **DODECAHEDRON** |  | 5 | 30 | 3 |  | | 5. | **ICOSAHEDRON** |  | 3 |  | 5 | 12 | |  |  |

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| 2.2 | Describe the *square prism* and *circular prism* (cylinder) using the shape of the base. |  |  |

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| 2.3 | **Total surface area**  To calculate the Total Surface Area (TSA) and the volume (V) of any right prism the following general formula: (Please note that H refers to the height.) Use these measurements to calculate the Surface Area of a cylinder.  **Cylinder**  A cylinder's Total Surface Area (TSA) is the following: 2 Base area + Sides  Total Surface Area of the cylinder the area of the two circular end facesthe area of the curved side  *TSA = (2 × + ( × H)*  TSA +  Hence when given a cylinder with and whereas  TSA +  TSA ××+  TSA |  |  |

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|  | Calculate the Total Surface Area of the cylinder below. |  |  |

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|  | 16,5 *cm*  18, 3 *cm* |  |  |

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| 2.4 | Calculate the volume and surface area of the triangular prism below. |  |  |

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|  | C:\Users\Trainer\Desktop\2016-05-27-10-22-37-1944035773.png  5,6  3 |  |  |

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**QUESTION 3**

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| The Theorem of Pythagoras  The importance of the Theorem of Pythagoras is that we use it in two ways. Firstly, if we know that a triangle is right angled, then we can say something very important about its sides. Secondly, if we know that the three sides of a triangle have a certain relationship with each other, then we also know that the triangle must be right-angled.  Refer to the diagram along side  B  *We label triangles as follows:*  c  a  b  C  A  *The Three vertices (corners) get capital letters (A, B and C). The sides can use lower letters, each corresponding to vertices opposite the side.(a, b and c)*  REMEMBER always to use a ruler for good sketches! |  |  |

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| Problem: PQR has a right angle at Q. PQ = 6 *cm* and QR = 8 *cm*  q  Q  P  R  r  p  has a right angle at Q. PQ = 6 *cm* and QR = 8 *cm*. Draw a sketch (not accurate) of the triangle and use the Theorem of Pythagoras to calculate the length of side PR.  Solution: In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.  Substitution PQ2 + QR2 = (6)2 + (8)2 = 36 +64 =100 *cm*2, then PR must be 10 *cm*.  The Theorem of Pythagoras state:   * In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides**.**   REMEMBER always to use a ruler for good sketches! |  |  |

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| 3.1 | Calculate the length of the hypotenuse of a triangle with both of the sides equal to (Label the triangle). |  |  |

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| 3.2 | Use the Pythagorean triples wherever possible to find the length of in the sketch below. (Round off your answer to one decimal place.)  A  13 *cm*  5 *cm*  B  C  D |  |  |

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**QUESTION 4**

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| Line of symmetry  If you can move an entire design in one of these ways, and that design appears unchanged, then the figure has reflection symmetry or line symmetry.  If you can reflect (or flip) a figure over a line and the figure appears unchanged, then the figure has reflection symmetry or line symmetry.  The line that reflect over is called the line of symmetry. A line of symmetry divides a figure into two mirror-image halves. The dashed lines below are the lines of symmetry.  The figure has line symmetry if it can be folded or reflected so that the two parts of the figure match. The line of reflection is the line of symmetry  Irregular figures do not have a line of symmetry. A shape has a rotational symmetry (point symmetry) if it can be rotated about a point and land in a position exactly matching the one in which it began. A square has rotational symmetry as does an equilateral triangle. |  |  |

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| 4.1 | Given the following figures, draw the line of symmetry of these polygons.  Equilateral Triangle  Square  Regular Hexagon  Regular Pentagon |  |  |

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| 4.2 | Devise a rule for the relationship between the line/s of symmetry and the vertices of the figures in QUESTION 4.1 |  |  |

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|  | **TOTAL:** |  | **50** |