|  |  |  |  |
| --- | --- | --- | --- |
| *School Name*  *Mathematics Test 2017* | | | |
| Year 7 | | *2D and 3D Shapes* | Non Calculator  Test |
| **Skills and Knowledge Assessed:**   * Name and list properties of common two dimensional shapes. * Connect three­ dimensional objects with their nets and other two­dimensional representations  (ACMMG111) * Construct simple prisms and pyramids (ACMMG140) * Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165) | | | Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Answer all questions in the spaces provided on this test paper by:  *Writing the answer in the box provided.*  or  *Shading in the bubble for the correct answer from the four choices provided.*  Show any working out on the test paper.Calculators are **not** allowed.  **Geometric Instruments would be useful.** | | | |
|  | What name could describe the figure shown?    A kite  A parallelogram  A rhombus  A trapezium | | |
|  | Which of these is a parallelogram? | | |
|  | How many axes of symmetry does the rectangle shown have? | | |
|  | Which is an accurate description of the shape shown?    An acute scalene triangle An equilateral triangle  A right isosceles triangle A right scalene triangle | | |
|  | Draw in all the axes of line symmetry in this shape. | | |
|  | On the 1 cm isometric grid, draw a regular hexagon with sides 2 cm and show all its axes of symmetry. | | |
|  | Mark which sides are equal and which sides are parallel on this diagram of a pentagon.  You can use a ruler. | | |
|  | Which diagram shows an acute scalene triangle? (The diagrams are not to scale.) | | |
|  | Which shape below is **not** an example of a quadrilateral? | | |
|  | Which of these solids is a sphere? | | |
|  | How many faces are there on this solid? | | |
|  | How many vertices are there on this solid?    6 8 12 18 | | |
|  | What name could describe the triangle shown?  Equilateral triangle  Isosceles triangle  Right triangle  Scalene Triangle | | |
|  | Which shape below is a non-convex quadrilateral? | | |
|  | Which of these properties does **not** apply to all squares?  The diagonals bisect one another.  The diagonals are equal  The diagonals meet at right angles.  There are two axes of symmetry. | | |
|  | Describe the types of symmetry that the shape shown below displays.  You may draw on the diagram to illustrate your answer.    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
|  | Which shape below has rotational symmetry of order 3? | | |
|  | How many diagonals can be drawn on the shape shown? | | |
|  | Sketch a pentagonal pyramid in the space below. | | |
|  | Which of the following solids has exactly 4 faces and 4 vertices?  A rectangular prism A rectangular pyramid.  A triangular prism. A triangular pyramid. | | |
|  | When a sphere is viewed from different angles.  Which is true?  Only the front view and top view are the same.  Only the front view and side view are the same.  Only the side view and top view are the same.  The side view, front view and top view are all the same. | | |
|  | Draw a 3D sketch of the solid which could be formed from the net below. | | |
|  | Draw the front view (elevation) of the solid shown. | | |
|  | What is the name of the solid shown below? | | |
|  | Charlie draws two line segments which are both 12 cm in length and which bisect one another at an acute angle of 45o. Then she joins the endpoints of the two line segments to create a quadrilateral.  What name could describe the quadrilateral?  A kite A rectangle. A rhombus. A square. | | |
|  | Which property is not common to a rhombus and a square?  There are four equal sides.  The diagonals bisect one another at right angles.  The diagonals are equal in length.  The diagonals bisect the angles of the quadrilateral. | | |
|  | The diagram shows two identical right scalene triangles being joined together along a corresponding side to make a rectangle.  Which shape **cannot** be formed when these two triangles are joined along corresponding sides?  An equilateral triangle  An isosceles triangle.  A parallelogram  A kite. | | |
|  | Sketch a polygon which has no axes of line symmetry but does have rotational symmetry of order 3. You can use the isometric grid, to help if you wish. | | |
|  | How many faces and edges are there on this solid?    7 faces and 10 edges.  7 faces and 15 edges.  10 faces and 10 edges.  10 faces and 15 edges. | | |
|  | A tiling pattern made up of rhombuses with a 60o angle included, is shown below.    By shading sections of the pattern, create an equilateral triangle and an obtuse isosceles triangle. | | |
|  | Jonas has started to fill in a table that summarises the properties of the rectangle shown.  Complete the table.     |  |  | | --- | --- | | Property |  | | Are any angles equal? | Yes, all angles are equal to 90o | | Are the diagonals equal? | Yes | | Are opposite sides equal? |  | | Are adjacent sides equal? |  | | Do the diagonals intersect at right angles? |  | | Do the diagonals bisect one another? |  | | | |
|  | Draw a 3D sketch of the solid from the views shown below. | | |
|  | What name would be given to the solid formed from the net shown? | | |
|  | A rectangular pyramid is shown below with a point *A* marked on one of its edges.  A cut is made through the pyramid, parallel to the base and passing through the point *A*.  Draw and describe the shape and size of the cut face so formed. | | |
|  | Sketch a net that could be folded to form the 3D shape shown. | | |
|  | Count the number of faces, edges and vertices for the solid shown.   |  |  | | --- | --- | | Number of Faces |  | | Number of Edges |  | | Number of Vertices |  |   Find the value of the expression below, for the solid.  Faces + Vertices – Edges = | | |

|  |  |  |
| --- | --- | --- |
| *School Name*  *Mathematics Test 2017* | | |
| Year 7 | *2D and 3D Shapes* | Non Calculator Section |

ANSWERS

| Question | Working and Answer |
| --- | --- |
|  | It is a trapezium  4th Answer |
|  | The first figure has opposite sides equal, so it is a parallelogram.  1st Answer |
|  | 2 axes |
|  | As all angles are different, the sides will all be different, and as there is a right angle, it is a right scalene triangle.  4th Answer |
|  | There are two axes as shown    Diagram |
|  | Diagram |
|  | Markings on the diagram. |
|  | Only the 1st and 2nd are acute and of these anly the 1st is scalene.  1st Answer |
|  | The 4th shape has 5 sides, so is not a quadrilateral  4th answer |
|  | 4th answer |
|  | There are 2 triangles and 3 rectangles, so 5 faces.  5 faces |
|  | There are 6 vertices on each end, so 12 in total  3rd Answer |
|  | Since it has a 60o angle and two equal sides surrounding it, the base angles are equal, call them x  2x + 60 = 180  2x = 120  x = 60  So all angles are 60o so it is equilateral.  1st Answer |
|  | Only these two are non-convex and of them the 2nd is a quadrilateral.  3rd Answer |
|  | The first 3 answers are correct, but there are 4 axes of symmetry.  4th Answer |
|  | It can be rotated through 90o so that each corner moves to the next one as shown. This can be repeated 4 times so it has rotational symmetry of order 4.  It has no line symmetry. |
|  | Only the equilateral triangle  2nd Answer |
|  | There are 14 diagonals. |
|  | Diagram |
|  | 4th Answer |
|  | When a sphere is viewed from any angle, its shape is a circle.  4th Answer |
|  | Diagram |
|  | Diagram |
|  | Two ends which are hexagons, and rectangular faces joining these so it is a hexagonal prism.  Hexagonal prism. |
|  | The result is a rectangle.  2nd Answer |
|  | In a rhombus the diagonals are not necessarily equal in length.    3rd answer |
|  | 1st Answer |
|  | One example  is shown, any  other polygon  with order  3 rotational  symmetry is  correct.  Diagram |
|  | There are 7 faces, the two ends and 5 rectangular faces.  There are 15 edges, 5 bordering each end and 5 joining the ends.  2nd Answer |
|  | Examples are shown, many others are possible. |
|  | |  |  | | --- | --- | | Property |  | | Are any angles equal? | Yes, all angles are equal to 90o | | Are the diagonals equal? | Yes | | Are opposite sides equal? | Yes | | Are adjacent sides equal? | No | | Do the diagonals intersect at right angles? | No | | Do the diagonals bisect one another? | Yes | |
|  | Diagram |
|  | Has two triangular ends which are congruent and three rectangular faces joining them, so it is a  Triangular Prism |
|  | It is a rectangle which is smaller than the base of the pyramid. |
|  | Diagram |
|  | |  |  | | --- | --- | | Number of Faces | **12** | | Number of Edges | **20** | | Number of Vertices | **10** |   Find the value of the expression below, for the solid.    Faces + Vertices – Edges = 12 + 10 - 20 = **2** |