**CIRCLE GEOMETRY**

**Extended investigation Part 2:** **In-class validation**

**Solutions and marking key**

**Question 1 (a)**

|  |  |
| --- | --- |
| Angle in a Semicircle: An angle in a semicircle is a right angle. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 1 (b)**

|  |  |
| --- | --- |
| Central Angle Theorem: The size of the angle at the centre subtended by an arc of the circle is twice the size of the angle at the circumference subtended by the same arc. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 1 (c)**

|  |  |
| --- | --- |
| Angle in the Alternate Segment Theorem: An angle between a chord and a tangent is equal to any angle in the alternate segment. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 1 (d)**

|  |  |
| --- | --- |
| Length of Tangents Theorem: Tangents drawn to a circle from an external point are equal in length. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 1 (e)**

|  |  |
| --- | --- |
| Intersecting Chords Theorem: When two chords of a circle intersect, the product of the lengths of the intervals on one chord equals the product of the lengths of the intervals on the other chord. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 1 (f)**

|  |  |
| --- | --- |
| Angles at the circumference of a circle subtended by the same arc are equal. | |
| Marking key/mathematical behaviours | Marks |
| * Correct description | 1 |

**Question 2**

|  |  |
| --- | --- |
| Given: PQ is tangential to the circle at C, CA = CB, .  To Prove: PQ is parallel to AB.  Proof: | |
| Marking key/mathematical behaviours | Marks |
| * Establishes  is isosceles * Uses property of isosceles triangle to establish congruent angles * Applies angle in alternate segment theorem * Concludes alternate angles are congruent * Concludes PQ is parallel to AB | 1  1  1  1  1 |

**Question 3**

|  |  |
| --- | --- |
| Given: Circle centre O with chords AB and CD, .  To Prove: Chords AB and CD are equal in length.  Proof: | |
| Marking key/mathematical behaviours | Marks |
| * Establishes two pair of sides are congruent * Gives reason, radii * Establishes * Gives reason * Concludes chords equal in length | 1  1  1  1  1 |

**Question 4**

|  |  |
| --- | --- |
| Given: A, B, C and D are four points on a circle such that ABC form a minor arc of the circle. The tangents at A and C meet at P.  To Prove:  Extension to  the diagram: Draw chord BD  Proof: | |
| Marking key/mathematical behaviours | Marks |
| * Draws chord BD * Applies angle in alternate segment theorem to * Applies angle in alternate segment theorem to * Establishes | 1  1  1  1 |

**Question 5**

|  |  |
| --- | --- |
| Given: Circle centre O with chords AB and CD intersecting externally at X.  To Prove: XA.XB = XC.XD  Extension to  the diagram: Draw chords AD and BC  Proof: | |
| Marking key/mathematical behaviours | Marks |
| * Draws chords AD and BC * Establishes * Establishes * States reason for similar triangles * Equates ratios of corresponding sides * Establishes product | 1  1  1  1  1  1 |

**Question 6**

|  |  |
| --- | --- |
|  | |
| Marking key/mathematical behaviours | Marks |
| * Establishes size of * Applies central angle theorem to determine size of * Establishes is isosceles * Establishes size of * Establishes size of | 1  1  1  1  1 |

**Question 7**

|  |  |
| --- | --- |
|  | |
| Marking key/mathematical behaviours | Marks |
| * Applies angle in alternate segment theorem to establish size * Applies angle in alternate segment theorem to establish size * Applies length of tangents theorem to establish * Concludes * Determines size of * Uses straight angle to determine size of | 1  1  1  1  1  1 |