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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **1a** |  | **B1****B1** | 7.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(2)** |  |  |
| **1b** |  | **B1****M1****A1** | 7.17.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(3)** |  |  |
| (5 marks) |

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| Notes**1a B1** Correct *r* **B1** Correct **1b B1** Correct *r* **M1** Use of arctan to find an angle **A1** Correct angle |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **2a** |  | **B1****B1** | 7.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(2)** |  |  |
| **2b** |  | **B1****B1** | 7.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(2)** |  |  |
| (4 marks) |
| Notes**2a B1** *x* correct **B1** *y* correct**2b B1** *x* correct **B1** *y* correct |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **3a** |  | **M1****M1****A1** | 7.17.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(3)** |  |  |
| **3b** |  | **M1****M1****A1\*** | 7.17.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(3)** |  |  |
| **3c** |  | **M1****M1****A1****A1\*** | 7.17.17.17.1 | 3rdBe able to convert between polar and Cartesian coordinates |
|  | **(4)** |  |  |
| (10 marks) |

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| Notes**3a M1** Attempts to substitute **M1** Makes *r* the subject **A1** Any correct form**3b M1** Attempts to substitute **M1** Use of double angle formula **A1\*** cao**3c M1** Attempts to substitute **M1** Use of compound angle formula **A1** Correctly simplified in terms of sine **A1\*** cao |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **4a** |  | **B1****B1** | 7.27.2 | 4thKnow how to sketch standard polar curves |
|  | **(2)** |  |  |
| **4b** |  | **B1****B1****B1** | 7.27.27.2 | 4thKnow how to sketch standard polar curves |
|  | **(3)** |  |  |
| (5 marks) |
| Notes**4a B1** Correct shape **B1** Correct *r* value shown**4b B1** Correct shape **B1** Correct value on initial line **B1** Correct value at dimple |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **5a** |  | **M1****A1****A1** | 7.37.37.3 | 6thKnow how to find simple areas enclosed by polar curves |
|  | **Alternate Method**Area (of triangle)=  | **M1****A1****A1** |  |  |
|  | **(3)** |  |  |
| **5b** |  | **B1****M1****A1****A1** | 7.37.37.37.3 | 6thKnow how to find simple areas enclosed by polar curves |
|  | **(4)** |  |  |
| (7 marks) |

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| Notes**5a M1** Correct use of formula **A1** Integrates correctly **A1** cao**Alternate Method** **M1** Realise the region is a triangle **A1** Correct unsimplifed expression **A1** cao**5b B1** Correct use of formula **M1** Deals with  correctly **A1** Integrates correctly **A1** cao |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **6a** |  | **B1****B1****B1** | 7.27.27.2 | 4thKnow how to sketch standard polar curves |
|  | **(3)** |  |  |
| **6b** | Coordinates   | **M1****A1****A1** | 7.37.37.3 | 7thKnow how to find compound areas enclosed by polar curves |
|  | **(3)** |  |  |

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| **6c** |  | **M1****M1****A1****A1****A1****A1** | 7.37.37.37.37.37.3 | 7thKnow how to find compound areas enclosed by polar curves |
|  | **(6)** |  |  |
| (12 marks) |
| Notes**6a B1** Correct shape for one curve **B1** Correct shape for both curves **B1** Two points of intersection (need not be labelled)**6b M1** Sets up equation **A1**  correct **A1** cao both coordinate pairs**6c M1** Attempts area under  **M1** Attempts area under  **A1** Correct integration for area under  **A1** Correct integration for area under  **A1** Substitutes limits (unsimplified) correctly **A1** cao |

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| Q | Scheme | Marks | AOs | Pearson Progression Step and Progress Descriptor |
| **7** |  [ignore presence of absence of  ]Points are Equations of tangents | **B1****M1****M1****A1****A1****B1****B1** | 7.37.37.37.37.37.37.3 | 6thKnow how to find tangents and lines perpendicular to the initial line |
| (7 marks) |

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| Notes**7 B1** Correct expression **M1** Differentiates **M1** Solves for a quadratic in to find  **A1** Correct value of **A1** Correct points **B2, 1** Each equation (any equivalent correct form) |