

**Question 6 (Total 8 marks)**

| Part | Working or answer an examiner might expect to see                                                                  | Mark | Notes                                                                                             |
|------|--------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------|
| (a)  | $9 \sin 2\theta = 16 \tan \theta \Rightarrow$<br>$18 \sin \theta \cos \theta = 16 \frac{\sin \theta}{\cos \theta}$ | M1   | This mark is given for a method to substitute terms to form an equation in terms of $\cos \theta$ |
|      | $2 \sin \theta (9 \cos^2 \theta - 8) = 0$                                                                          | M1   | This mark is given for a correct factorised equation                                              |
|      | $\theta = \arccos \pm \sqrt{\frac{8}{9}}$                                                                          | M1   | This mark is given for finding a value for $\theta$ in terms of arccos                            |
|      | $\theta = \pm 19.5^\circ, \pm 160.5^\circ$                                                                         | A1   | This mark is given for any one value of $\pm 19.5^\circ$ or $\pm 160.5^\circ$ found.              |
|      |                                                                                                                    | A1   | This mark is given for four values of $\theta$ found correctly                                    |
|      | $\sin \theta = 0 \Rightarrow \theta = 0^\circ, \pm 180^\circ$                                                      | B1   | This mark is given for the deduction of the three other solutions for $\theta$                    |
| (b)  | $x - 30^\circ = \theta$                                                                                            | M1   | This mark is given for finding an equation to solve for $x$                                       |
|      | $x = 10.5^\circ$ when $\theta = -19.5^\circ$                                                                       | A1   | This mark is given for correctly finding the smallest positive solution to the equation           |