**1** The equation  has roots of the form *p* and 3*p*. Find the values of *k* and *p*. **(4 marks)**

**2** The equation  where *m* and *n* are real constants, has roots *α* and *α*\*.

**a** Given that Re(*α*) = 4, find the value of *m*. **(2 marks)**

**b** Given that Im(*α*) ≠ 0, find the range of possible values of *n*. **(2 marks)**

**3** The cubic equation  has roots  and 

**a** Write down the values of ,  and  **(1 mark)**

**b** Given that  and find the value of  **(3 marks)**

**c** Find the value of *k*. **(2 marks)**

**4** 

Given that the roots of the cubic equation  are   and  find the

**a** roots of the equation  **(5 marks)**

**b** values of *m* and *n*. **(4 marks)**

**5** The equation  has roots  and . Given that  and 

**a** show that  and  **(3 marks)**

**b** hence find all the roots of the quartic equation **(4 marks)**

**c** find the value of *n*. **(2 marks)**

**6** The roots of the equation  are  and .

**a** Write down the values of ,  and . **(1 mark)**

**b** Hence find the exact value of

**i**  **(2 marks)**

**ii**  **(2 marks)**

**iii**  **(3 marks)**

**7** The cubic equation  has roots  and  Without solving the equation, find a cubic equation whose roots are   and  giving your answer in the form  where  and  are integers to be found.

 **(5 marks)**

**8** The quartic equation  has roots  and  Without solving the equation, find a quartic equation whose roots are  and  giving your answer in the form  where  and  are integers to be found.

 **(5 marks)**