**1.** **METHOD 1**

*z* = (2 – i)(*z* + 2) M1  
 = 2*z* + 4 – i*z* – 2i  
*z*(1 – i) = – 4 + 2i  
*z* =  A1  
*z* =  M1  
= – 3 – i A1

**METHOD 2**

let *z* = *a* *+* i*b*  
 = 2 – i M1  
*a* *+* i*b* = (2 *–* i)((*a* *+* 2) *+* i*b*)  
*a* *+* i*b* = 2(*a* *+* 2) *+* 2*b*i *–* i(*a* *+* 2) *+* *b  
a* *+* i*b* = 2*a* *+* *b* *+* 4 *+* (2*b – a –* 2)i  
attempt to equate real and imaginary parts M1  
*a* = 2*a* *+* *b* *+* 4( *a* *+* *b* *+* 4 = 0)  
and *b* = 2*b – a –* 2( *– a* *+* *b –* 2 = 0) A1

**Note:** Award A1 for two correct equations.

*b* = *–*1*;a* = *–*3  
*z* = – 3 – i A1

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**2.** (a) │*z*│ =  and │*w*│=   
│*w*│ = 2│*z*│  
  
attempt to solve equation M1

**Note:** Award M0 if modulus is not used.

*a* = *±*4 A1A1 N0

(b) *zw* = (2 – 2*a*) + (4 + *a*)i A1  
forming equation 2 – 2*a* = 2 (4 + *a*) M1  
*a* =  A1 N0

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**3.** *a*2 + 2i*ab* *–* *b*2 = 3 + 4i  
Equate real and imaginary parts (M1)  
*a*2 – *b*2 = 3, 2*ab* = 4 A1  
Since *b* =   
 (M1)  
 *a*4 – 3*a*2 – 4 = 0 A1  
Using factorisation or the quadratic formula (M1)  
 *a* = ±2  
 *b* = ±1  
 = 2 + i, –2 – i A1A1

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