**Self-assessment answers: 1 Quadratic functions**

**1.** (a) *y* = *a*(*x* +3)(*x* – 1)

*y* = −9 when *x* = 0 ⇒ −9 = (3)(−1) ⇒ *a* = 3

∴ *y* = 3(*x* + 3)(*x* – 1) *[3 marks]*

(b) *y* = *a*(*x* + 3)2

*y* = −18 when *x* = 0 ⇒ −18 = *a*(3)2 ⇒ *a* = −2

∴ *y* = −2(*x* + 3)2 *[3 marks]*

**2.** (a) 2*x*2 – 12*x* + 25 = 2[*x*2 −6*x*] + 25

= 2[(*x* – 3)2 – 32] + 25

= 2(*x* – 3)2 + 7 *[4 marks]*

(b) (3, 7) *[1 mark]*

**3.** Ball 12 m above ground means it has travelled 48 m.

∴ 2*t* + 4.9*t*2 = 48

⇒ 4.9*t*2 + 2*t* – 48 = 0

∴ *t* = 

= 2.93 (3SF) *[4 marks]*

**4.** (a) The discriminant is zero: (−3)2 – 4(*k*)(6) = 0 ⇒ *k* =  *[3 marks]*

(b) *x* = − *[2 marks]*

**5.** (a) Perimeter of square = 4*a* and perimeter of rectangle = 2(*w* + 6).

∴ 4*a* + 2(*w* + 6) = 30

⇒ 2*a* + *w* – 9 = 0 ⋯ (∗)

Areas equal: *a*2 = 6*w*

Substituting into (∗): 2a +  − 9 = 0 ⇒ *a*2 + 12*a* – 54 = 0 *[7 marks]*

(b) *a* = 

So, *w* =  = 21 −  *[3 marks]*