# Revision answers: Algebra, functions and equations (Topics 1 & 2)

**Coursebook chapters: 1–7**

**1.** 2*x* + 1 = 32 = 9 ∴ *x* = 4 *[4 marks]*

**2. ** *[5 marks]*

**3.** (a) ℝ

(b) *f* −1(*x*) = e2*x*

(c) *f* −1(5) = e10 *[5 marks]*

**4.** 8*a* – *b* = −13, *[5 marks]*

**5.** (a) 

(b) *x*2 – 3*x* + ≥, ∴ 0 < *f*(*x*) ≤  *[5 marks]*

**6.** The discriminant = 16 – 4*k*(*k* + 1) = 0, so *k*2 + *k* – 4 = 0 ∴ *k* =  *[5 marks]*

**7.** (a) Arithmetic series, *u*1 = 500, *d* = 25, *S*20 = 14750

(b) Geometric, *u*1 = 500, *r* = 1.05, *un* = 500 × 1.05*n* − 1 > 1000 ⇒ *n* = 16 (from GDC)

(c) (1000 + 25(*n* – 1)) = 5000 gives *n* = 27 days *[9 marks]*

**8.** (a) *g*(*x*) > 1

(b) 3(4e*x* + 1)2 = 75 ⇒ 4e*x* + 1 = 5 ⇒ *x* = 0 *[8 marks]*

**9.** (a) *p*(3) = 0

(b) *p*(*x*) = (*x* – 3)(2*x*2 + *x* – 3) = (*x* – 3)(2*x* + 3)(*x* – 1)

(c) Cubic graph with *x*-intercepts −1.5, 1, 3 and *y*-intercept 9. *[9 marks]*

**10.** (a) Reflection in the *y*-axis and vertical stretch with scale factor 3; zeros (2, 0), (0, 0), (−4, 0); turning points (1, −6), (−2, 18).

(b) Horizontal stretch with scale factor  and a vertical translation by 1 unit; *y*-intercept (0, 1); turning points, (1, 7). *[6 marks]*

**11.** 2*x* −  = 3 ⇒ 22*x* – 4 = 3 × 2*x* ⇒ 22*x* – 3 × 2*x* – 4 = 0 ⇒ (2*x* – 4)(2*x*+ 1) = 0

∴ 2*x* = 4, *x* = 2 *[5 marks]*

**12.** (a) *x* =

(b) *f*(*x*) = *f* −1 is equivalent to *f*(*x*) = *x* (because the two graphs cross on the line *y* = *x.*

 = *x* ⇒ *x* = −0.436 or 3.44 *[5 marks]*