**Self-assessment answers: 3 Algebraic structures**

**1.** Let *y* = *x*2

*y*2 – 5*y* + 4 = 0

⇒ (*y* – 1)(*y* – 4) = 0

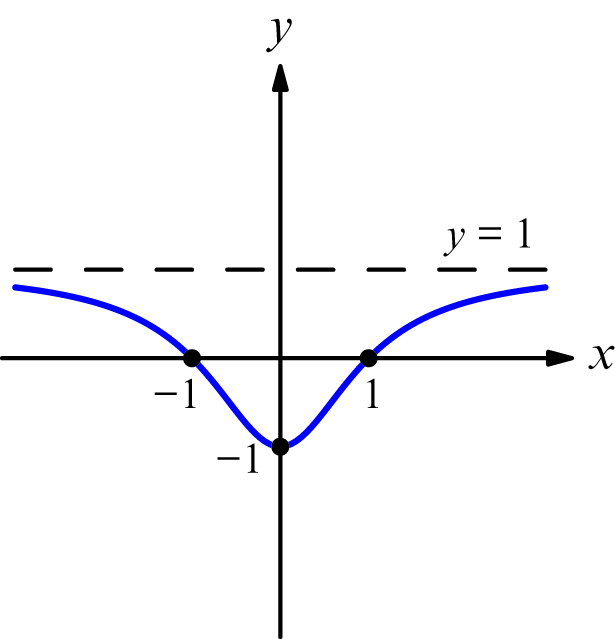
⇒ *y* = 1, 4

So, *x*2 = 1, 4

⇒ *x* = ±1, ±2 *[5 marks]*

**2.** Using a GDC, *x* = 0.241 (3SF) *[4 marks]*

**3.**

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*[4 marks]*

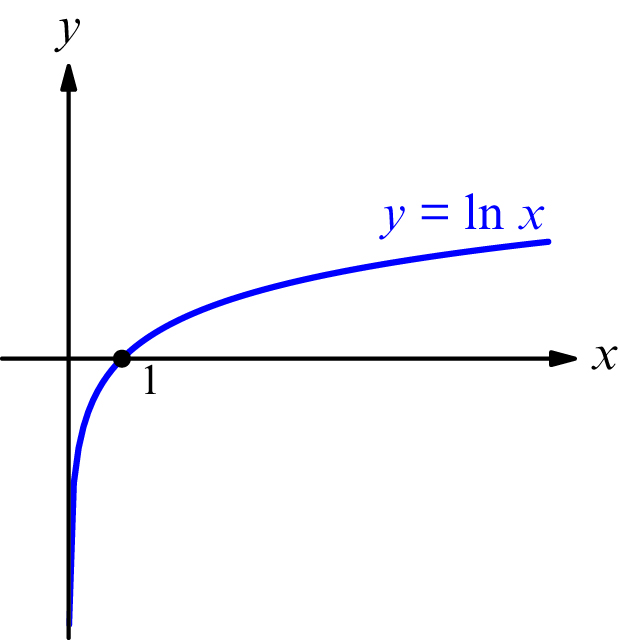
**4.** e2*x* **+** 2e*x* – 15 = 0

⇒ (e*x* + 5)(e*x* – 3) = 0

⇒ e*x* = −5 or 3. Reject the negative solution.

⇒ *x* = ln 3*[5 marks]*

**5.** (a)



*[3 marks]*

(b) log3(9*x*2) – log3(6*x*) = log3

= log3

= log3 3*x* – log3 2

= log3 *x* + log3 3 – log3 2

= log3 *x* – log3 2 + 1 *[5 marks]*

(c) log3(9*x*2) – log3(6*x*) = 2*x* log3 *x* − log3 2 + 1

⇒ log3 *x* – log3 2 + 1 = 2*x* log3 *x* − log3 2 + 1

⇒ (1 – 2*x*) log3 *x* = 0

⇒ 1 – 2*x* = 0 or log3 *x* = 0

⇒ *x* = , 1 *[4 marks]*