

## KEY

## Section 3: Geometry

### Section 1: Algebra

- 1.1  $-2$
- 1.2  $4$
- 1.3 a, b
- 1.4 a, b, c
- 1.5  $a^2 - 3b^2 = \pm 1$
- 1.6 a, b
- 1.7  $6$
- 1.8  $\alpha = \frac{1}{6}; \beta = -1; \gamma = \frac{11}{6}$
- 1.9 2, 3
- 1.10 determinant =  $-1$ ; trace =  $0$

### Section 2: Analysis

- 2.1  $e^{-\frac{1}{2}}$
- 2.2  $\frac{1}{6}$
- 2.3 (a) absolutely convergent; (b) divergent; (c) conditionally convergent
- 2.4 a, c
- 2.5 a, b
- 2.6 a, b, c
- 2.7 b, c
- 2.8  $x^4 + x^3 + x^2 + x + 1 = 0$
- 2.9  $e + \frac{1}{e}$
- 2.10 (a)  $6\pi iz_0$ ; (b)  $0$

- 3.1 A pair of rectangular hyperbolas

- 3.2 A semi-circle

- 3.3 a, b

- 3.4  $(\frac{2}{3}, 0)$

- 3.5  $(-\frac{1}{2}, \frac{1}{2})$

- 3.6  $(\frac{x_1}{R}, \frac{x_2}{R}, \frac{x_3}{R})$

- 3.7 a, c

- 3.8  $\sqrt{7}$

- 3.9

Semi-major axis =  $\frac{1}{\sqrt{\lambda_2}}$

Semi-minor axis =  $\frac{1}{\sqrt{\lambda_1}}$

- 3.10

(a) Tetrahedron:  $V = 4; E = 6; F = 4;$   
 $V - E + F = 2.$

(b) Pyramid:  $V = 5; E = 8; F = 5;$   
 $V - E + F = 2.$

(c) Prism:  $V = 6; E = 9; F = 5;$   
 $V - E + F = 2.$