<div align="center">**KEY**</div>

<div align="center">**Section 1: Algebra**</div>

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 $= 0$

<div align="center">**Section 2: Analysis**</div>

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) $6\pi i z_0$; (b) 0

<div align="center">**Section 3: Geometry**</div>

3.1 A pair of rectangular hyperbolas

3.2 A semi-circle

3.3 a, b

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

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

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

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: $V = 6; E = 9; F = 5$; $V - E + F = 2$.