

KEY

Section 1: Algebra

1.1 $-4 < a < 0$

1.2 c

1.3 a, c

1.4 b, c

1.5

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 2 & 3 \\ 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

1.6 4

1.7 a, c

1.8 a, c

1.9 a, b, c

1.10 $(p^2 - 1)(p^2 - p)$

Section 2: Analysis

2.1 $f(1) - f(0)$

2.2 (a) divergent; (b) absolutely convergent;
(c) conditionally convergent

2.3 b, c

2.4 (a) not differentiable; (b) continuously differentiable; (c) continuously differentiable

2.5 $-\frac{1.3.5}{2.4.6} \frac{1}{7}$

2.6 a, b, c

2.7 $\frac{1}{2}(4^{\frac{1}{3}} - 1)$

2.8 $-4 + 2\pi i$

2.9 order = 3; residue = $1/6$

2.10 $8\pi i$

Section 3: Geometry

3.1 $\frac{c}{\sqrt{a^2+b^2}}$

3.2 4

3.3 $8h^2 = 9ab$

3.4 $c^2 = a^2(1 + m^2)$

3.5 $\frac{a^2 y_1}{b^2 x_1}$

3.6 semi-major axis = 2; semi-minor axis = 1

3.7 4π

3.8 $(-3, 4, -1)$

3.9 7π

3.10 $\frac{2}{3}r$

Note: Please accept any answer which is correct, but expressed in an equivalent, though different, form, where applicable.