Section 1: Algebra
1.1 a,c
$1.2(187)(354)$
1.3 (12)(3 4), (13)(24) and (14)(23)
1.4 a,b,c
$1.5 \mathrm{a}, \mathrm{b}$
1.6 Any two linearly independent matrices with trace zero and the entries of the first row adding up to zero
$1.7(n-1)^{2}$
1.8

$$
\left[\begin{array}{llll}
5 & 0 & 0 & 0 \\
0 & 2 & 3 & 0 \\
0 & 3 & 2 & 0 \\
0 & 0 & 0 & 5
\end{array}\right]
$$

$1.9 \pm \sqrt{3}$
$1.100,-3 i$

## Section 2: Analysis

2.12
2.2 a,b
$2.3 k \pi, k \in \mathbb{Z}$
$2.4 e^{\frac{a f^{\prime}(a)}{f(a)}}$
2.5 b, c
2.6 a,b,c
$2.7 \frac{9}{16}$
$2.8 h=2 r$
2.9

$$
\sum_{n=1}^{\infty}(-1)^{n-1} \frac{x^{2 n}}{2 n}
$$

$2.10 \frac{1}{2}\left(a+\frac{1}{a}\right)$
$3.1(1,2)$
$3.2 \frac{\pi}{2}$
$3.3(1,1)$
$3.4 a=\frac{l}{2}, b=\frac{\sqrt{l^{2}-d^{2}}}{2}$
$3.5 \mathrm{~b}, \mathrm{c}$
$3.6|\operatorname{det}(A)| a$
$3.72 \pi$
$3.8 x^{2}+y^{2}+z^{2}-a x-b y-c z=0$
$3.9 a(x-a)+b(y-b)+c(z-c)=0$
$3.102 \sqrt{2}$
Note: 1. Please accept any answer which is correct, but expressed in an equivalent, though different, form, where applicable.
2. In Question 1.3, if (12)(34) is omitted, it may be excused.

