

Section 1: Algebra

- 1.1 36
 1.2 2
 1.3 b,c
 1.4 b. The multiplicative group $\{+1, -1\}$.
 c. The multiplicative group $\mathbb{C} \setminus \{0\}$.
 1.5 a,c
 1.6 b
 1.7 a,b
 1.8 b,c
 1.9 a,b,c
 1.10 c

Section 2: Analysis

- 2.1 b,c
 2.2 b,c
 2.3 $-2 \leq x \leq 0$
 2.4 a,c
 2.5 a,c
 2.6 a,b
 2.7

$$\frac{ne^{(n+2)x} - (n+1)e^{(n+1)x} + e^x}{(e^x - 1)^2}$$

- 2.8 $>$
 2.9 $\frac{1.3.5}{2.4.6} \cdot \frac{1}{7}$
 2.10 $\frac{1}{\sqrt{2}} \log(\sqrt{2} + 1)$

3.1 $E \Delta F = (E \setminus F) \cup (F \setminus E)$

3.2 c

3.3 $\frac{2^n}{n+1}$

3.4 $D = \bigcup_{\varepsilon > 0} \bigcap_{n=1}^{\infty} \bigcup_{k=n}^{\infty} E_k(\varepsilon)$

3.5 2^{14}

3.6 π

3.7 $x^2 + y = 2$

3.8 $x + 2y - 3z = 3$

3.9 498

3.10

$$\binom{n}{m} \binom{m}{k} = \binom{n}{k} \binom{n-k}{\ell}$$

Note: k and ℓ can be interchanged on either side.

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