WESLEY COLLEGE
By daring & by doing

**YEAR 12 MATHEMATICS SPECIALIST**
**SEMESTER ONE 2017**
**QUESTIONS OF REVIEW 1: Polynomials & Polars**

Name: _____

Friday 17h February  Time: 30 minutes  Mark  /30

Calculator free.

1. [4 marks – 2 each]

Convert:

a) $-2-2i$ to polars $(r,\theta^r)$

b) $\frac{1}{2}\text{cis}\left(\frac{2\pi}{3}\right)$ to rectangular co-ordinates

2. [4 marks – 1 each]

For $z=3-4i$, evaluate:

a) $|z|$

b) $z^2$

c) $z\times\bar{z}$

d) $\frac{\bar{z}}{z}$, with a real denominator

3. [6 marks – 1, 2, 1, 1, 1]

If $z = 4\,\mathrm{cis}\left(-\frac{\pi}{3}\right)$ and $\omega = 2\,\mathrm{cis}\left(\frac{5\pi}{6}\right)$, determine, in *cis* form:

a) $\omega z$

b) $\frac{z}{\omega}$

c) $\frac{z}{i}$

d) $\overline{z}$

e) $\frac{12}{z}$

4. [8 marks – 1, 1, 1, 1, 1, 2, 1]

Two complex numbers, $z$ and $\omega$ are shown on the Argand diagram. Add each of these to this diagram:

a) $2z$

b) $z^2$

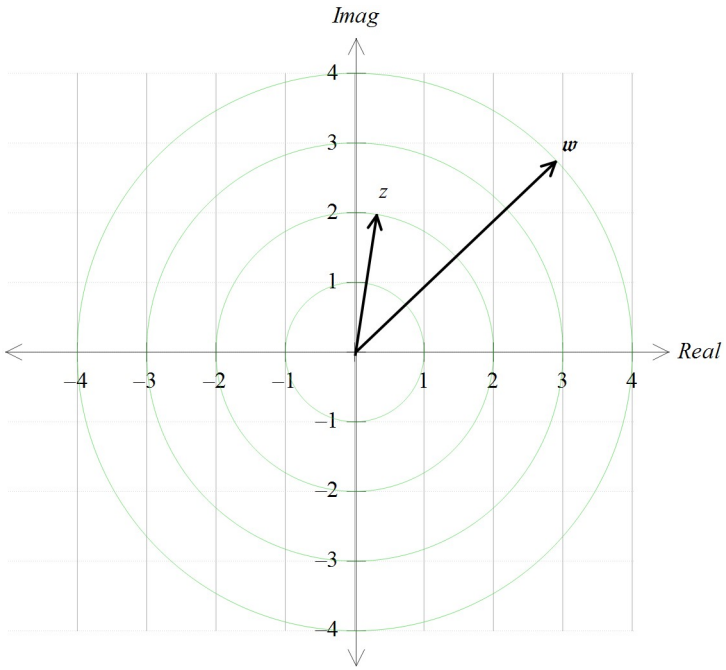
c) $\omega - z$

d) $\frac{\omega}{z}$

e) $\overline{\omega}$

f) $\frac{1}{z}$

g) $-i\omega$



5. [8 marks – 1, 1, 1, 2, 3]

For $P(z) = z^3 - 6z^2 + az - 10$

a) express $P(2)$ in terms of $a$

b) determine the remainder, in terms of $a$, when $P(z)$ is divided by $(z - 2)$

c) evaluate $a$ if $P(2) = 0$:

d) write a polynomial expression for $\frac{P(z)}{z - 2}$

e) find all the roots of $P(z)$