Classwork 1 – ANSWERS

1. (i) $(x^2 - y^2) + 2ixy$ (ii) $x^2 - y^2$ (iii) $2xy$

   (iv) $\sqrt{x^2 + y^2}$ (v) $x^2 + y^2$

   $|w| = |z|^2$

2. $|w| = 4$ $|z| = 2$.

3. (i) $x^2 - y^2 = 2$ $xy = \sqrt{3}$

   (iii) 4 roots namely $x = \pm\sqrt{3}$ or $\pm i$ .....

   (iv) ... but *x* is real by definition so the meaningful roots are $x = \pm\sqrt{3}$ for which $y = \pm 1$. Notice that the other roots actually lead to exactly the same result for *z*.

   (v) Hence $z = \pm(\sqrt{3} + i)$. Note that $|z| = 2$ as it should be.

   (vii) $w = 4\boldsymbol{e}^{i\pi/3}$ and $z = 2\boldsymbol{e}^{i\pi/6}$ or $z = 2\boldsymbol{e}^{i7\pi/6} \equiv 2\boldsymbol{e}^{-i5\pi/6}$

   (viii) In this case, $z = \pm(1 + i\sqrt{3})$, $w = 4\boldsymbol{e}^{i2\pi/3}$ and $z = 2\boldsymbol{e}^{i\pi/3}$ or $z = 2\boldsymbol{e}^{i4\pi/3} \equiv 2\boldsymbol{e}^{-i2\pi/3}$