Work Sheet 2: Exam Preperation

C.2

By using the ABC method, we know that for there to be only one complex root;

$$\sqrt{b^2 - 4ac} = 0$$

this ~~means~~ can be manipulated to:

$$b^2 = 4ac$$

With $b = -t$, $a = 1$, $c = 1$:

$$t^2 = 4$$

$$\underline{\underline{t = \pm 2}}$$

In order for there to only one complex root, t must be equal to 2 or -2.

C.3 In Finding P and q ~~and~~ we Substitute z for a+bi.

$$(a + bi)^2 + Pa + Pbi + q = 0$$

$$2abi + a^2 + b^2 \cdot (-1) + Pa + Pbi + q = 0$$

In an attempt to get rid of the imaginary part we substitute p for -2a.

$$2abi - 2abi + a^2 - b^2 ~~~ - 2a^2 + q = 0$$

$$q = a^2 + b^2$$

When $P = -2a$ and $q = a^2 + b^2$, $z = a + bi$ is a viable solution.

C.3. Continued:

If i is a solution to z^2+pz+q then:

$$z^2+pz+q=0$$
$$i^2+pi+q=0$$
$$q+pi=1+0i$$

From this we can conclude:

$$q=1 \wedge p=0$$

When substituted into the polynomial then:

$$z^2+0\cdot z+1=0$$
$$z^2=-1$$
$$\underline{\underline{z=\pm i}}$$

$z=\pm i$ are the to solutions to our polynomial.