Bronze

1.
$$f(x) = 2x^3 - 5x^2 + px - 5,\ p \in \mathbb{R}$$

Given that $1 - 2i$ is a complex solution of f $(x) = 0$,

(a)   write down the other complex solution of f$(x) = 0$,

(1)

(b)   solve the equation f$(x) = 0$,

(6)

(c)   find the value of *p*.

(2)
(Total 9 marks)

 Silver
2.   The complex number *z* is defined by

$$z = \frac{a + 2i}{a - i},\ a \in \mathfrak{R},\ a > 0$$

Given that the real part of *z* is $\dfrac{1}{2}$, find

(a)   the value of *a*,

(4)

(Total 4 marks)

Gold

3.   The complex numbers *z* and *w* satisfy the simultaneous equations

$$2z + iw = -1,$$

$$z - w = 3 + 3i.$$

(a)   Use algebra to find *z*, giving your answer in the form $a + ib$, where *a* and *b* are real.

(4)

(Total 4 marks)