1.3) Complex conjugation

Worked example

Write the complex conjugate for:

$z = 2 + 3i$

$z = -2 - 3i$

$z = 3i - 2$

Your turn

Write the complex conjugate for:

$z = -5 - 4i$

$z^* = -5 + 4i$

Worked example

Write in the form $a + bi$:

$$\frac{5 + 4i}{2 + 3i}$$

$$\frac{2 - 3i}{4 - 5i}$$

Your turn

Write in the form $a + bi$:

$$\frac{5 + 4i}{2 - 3i}$$

$$-\frac{2}{13} + \frac{23}{13}i$$

Worked example

Given that $z_1 = 2 + 3i$, $z_2 = \frac{5-12i}{z_1}$,

find z_2 in the form $a + ib$, where a and b are real

Your turn

Given that $z_1 = 3 + 2i$, $z_2 = \frac{12-5i}{z_1}$,

find z_2 in the form $a + ib$, where a and b are real

$2 - 3i$

Worked example

Given that $z_1 = p - 3i$, $z_2 = 2 - 5i$, and that p is an integer, find $\frac{z_1}{z_2}$ in the form $a + ib$, where a and b are rational and given in terms of p

Your turn

Given that $z_1 = p - 5i$, $z_2 = 2 + 3i$, and that p is an integer, find $\frac{z_1}{z_2}$ in the form $a + ib$, where a and b are rational and given in terms of p

$$\frac{2p - 15}{13} + \frac{-10 - 3p}{13}i$$

Worked example

$$z = \frac{p + 2i}{p - 5i}, p \in \mathbb{R}, p > 0$$

Given that the real part of z is $\frac{6}{41}$, find the value of p

Your turn

$$z = \frac{p + 3i}{p - 7i}, p \in \mathbb{R}, p > 0$$

Given that the real part of z is $\frac{2}{37}$, find the value of p

$$p = 5$$

Worked example

Given that $z = x + iy$, where $x, y \in \mathbb{R}$, find the value of x and y such that:

$$(3 - i)z^* + 2iz = -9 - 13i$$

where z^* is the complex conjugate of z

Your turn

Given that $z = x + iy$, where $x, y \in \mathbb{R}$, find the value of x and y such that:

$$(3 - i)z^* + 2iz = 9 - i$$

where z^* is the complex conjugate of z

$$x = 5, y = 2$$