Express $\frac{6+2i}{2-3i}$ in the form $a+bi$.

Trick: multiply above and below by the conjugate of the denominator.

DOTS.

$$\frac{(6+2i)(2+3i)}{(2-3i)(2+3i)}$$

$$= \frac{6(2+3i)+2i(2+3i)}{2^2+3^2}$$

$$= \frac{12+18i+4i+6i^2}{4+9}$$

$$= \frac{6+22i}{13}$$

$a+bi$ form

$$= \frac{6}{13} + \frac{22}{13}i$$

4. Express each of the following in the form $a+bi$:

(i) $\frac{2}{3-2i}$ (ii) $\frac{5}{3-4i}$ (iii) $\frac{3}{6-i}$ (iv) $\frac{2+3i}{1-2i}$

(v) $\frac{4-3i}{3+2i}$ (vi) $\frac{-2+3i}{5-i}$ (vii) $\frac{6+5i}{2-3i}$ (viii) $\frac{6-2i}{i}$

4. Express each of the following in the form $a+bi$:

(i) $\frac{2}{3-2i}$ (ii) $\frac{5}{3-4i}$ (iii) $\frac{3}{6-i}$ (iv) $\frac{2+3i}{1-2i}$

(v) $\frac{4-3i}{3+2i}$ (vi) $\frac{-2+3i}{5-i}$ (vii) $\frac{6+5i}{2-3i}$ (viii) $\frac{6-2i}{i}$

(v) multiply above and below by conjugate of the denominator

DOTS

$$\frac{(4-3i)(3-2i)}{(3+2i)(3-2i)}$$

$$= \frac{4(3-2i)-3i(3-2i)}{3^2+2^2}$$

$$= \frac{12-8i-9i+6i^2}{9+4}$$

$$= \frac{6-17i}{13}$$

$a+bi$ form :

$$= \frac{6}{13} - \frac{17}{13}i$$

Evaluate each of these:

1. $|-3+4i|$ **2.** $|8+6i|$ **3.** $|2+3i|$ **4.** $|-1+2i|$

1. $z = -3+4i$

$|z| = |-3+4i|$

modulus formula

$|a+bi| = \sqrt{a^2+b^2}$

$|-3+4i| = \sqrt{3^2+4^2} = \sqrt{9+16} = \sqrt{25} = 5$

2. $|8+6i| = \sqrt{8^2+6^2} = \sqrt{64+36} = \sqrt{100} = 10$

3. $|3+2i| = \sqrt{3^2+2^2} = \sqrt{9+4} = \sqrt{13}$

4. $|-1+2i| = \sqrt{1^2+2^2} = \sqrt{1+4} = \sqrt{5}$

Find the values of x and y in numbers

2. $(2x+1) + i(1-y) = 5 - 3i$

Re = Re

Im = Im

Re = Re

$2x + 1 = 5$

$-1 \quad -1$

$\frac{2x}{2} = \frac{4}{2}$ (÷2)

$\Rightarrow \boxed{x = 2}$

Im = Im

$1 - y = -3$

-1

$-y = -4$

change signs

$\Rightarrow \boxed{y = 4}$

Find the values of x and y in numbers

3. $x + iy + 6 - 9i = 6 - 10i$

Re = Re

$x + 6 = 6$

-6

$x = 0$

Im = Im

$y - 9 = -10$

-9

$y = -1$