1 Complex Numbers

Let i be the imaginary unit, i.e., $i^2 = -1$. Please cast the following complex numbers into the format $z = x + iy$.

1. $(4 + 5i)(4 - 5i)$
2. $\frac{2+3i}{4+5i}$
3. $\sqrt{16b} + \sqrt{3a - 12a}$

Solution:

1. $(4 + 5i)(4 - 5i) = 4^2 - (5i)^2 = 16 + 25 = 41$
2. $\frac{2+3i}{4+5i} = \frac{(2+3i)(4-5i)}{41} = \frac{8-10i+12i-15i^2}{41} = \frac{23+2i}{41}$
3. $\sqrt{16b} + \sqrt{3a - 12a} = 4\sqrt{b} + \sqrt{-9a} = 4\sqrt{b} + i3\sqrt{a}$