Complex Number: Homework

In this Homework, we are going to solve for some basic problems.

1. Recall $i^2 = -1$, compute:

   (a) $(3 + 5i) + (4 - 2i)$;

   (b) $(2 + 7i)(3 - 5i)$.

2. If there are real numbers a, b so that $a + b\sqrt{2} = \sqrt{3 - 2\sqrt{2}}$, find the value of a, b.

3. Rationalize the following:

   (a) $\frac{\sqrt{2}+\sqrt{3}}{\sqrt{3}-\sqrt{2}}$;

   (b) $\frac{\sqrt{3-2\sqrt{2}}}{1+\sqrt{2}+\sqrt{3}}$

4. Solve the following:

   (a) $\begin{cases} 3x - 4y = 0 \\ 7x - 8y = 10 \end{cases}$

   (b) $\begin{cases} x - y = 21 \\ \sqrt{x} + \sqrt{y} = 7 \end{cases}$

5. Make a the subject of the equation

$$1 + \frac{1 + a}{1 - a} = b.$$

   If $b > 0$, find also the range of value of a.