Worksheet ---- Complex Numbers

Definition: The **number i** is defined such that $i = \sqrt{-1}$ and $i^2 = -1$.

Definition: A **complex number** is any number that can be written in $a + bi$ form, where a and b are real numbers. (Note: a and b cannot both equal 0)

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1. Simplify:

   (a) $\sqrt{-49}$

   (b) $\sqrt{-80}$

2. Perform the indicated operation and simplify. Write each answer in the form $a + bi$.

   (a) $\sqrt{-25}\sqrt{-4}$

   (e) $(2 - 7i)(5 + 4i)$

   (b) $\sqrt{-28}\sqrt{35}$

   (f) $(\sqrt{7} - \sqrt{5}i)(\sqrt{7} + \sqrt{5}i)$

   (c) $-2i(4 - 5i)$

   (g) $3(12 - 3i) + (6 + 15i)$

   (d) $(3 - 11i)^2$

   (h) $(13 + 4i) - 6(11 - 5i)$

3. Divide the following complex numbers. Write each answer in $a + bi$ form.

   (a) $\dfrac{-2}{4i}$

   (c) $\dfrac{i^2 + 3i}{3 + 2i}$

   (b) $\dfrac{3 - 4i}{2 + 7i}$

   (d) $\dfrac{4 - i}{(4 + 2i)^2}$

4. Simplify:

   (a) i^{35}

   (c) $(7 + 3i)^2 (7 - 3i)$

   (b) $i^{81} - i^{63}$

   (d) $(1 - i^2)^3 (-2 + i^2)^2$

5. Solve for x:

   (a) $2x^2 - 5 = -55$

   (b) $3x^2 + \dfrac{16}{3} = 0$

   (c) $x^4 - 21x^2 - 100 = 0$