SECTION 5-2 EXTRA PRACTICE

KEY

Fill in the i-chart --------->

$\sqrt{-1}$	=	i
i^2	=	-1
i^3	=	$-i$
i^4	=	1

Simplify the following. Factor-tree these bad boys! Don't forget to pop an "i" out for negative square roots.

1) $\sqrt{99}$

$= \sqrt{9}\sqrt{11}$

$= 3\sqrt{11}$

2) $\sqrt{-32}$

$= i\sqrt{16}\sqrt{2}$

$= 4i\sqrt{2}$

3) $\sqrt{-49a^2b^3}$

$= i\sqrt{49}\sqrt{a^2}\sqrt{b^3}$

$= 7abi\sqrt{b}$

4) $\sqrt{10} \cdot \sqrt{50}$

$= \sqrt{5}\sqrt{2} \cdot \sqrt{25}\sqrt{2}$

$= 2 \cdot 5\sqrt{5}$

$= 10\sqrt{5}$

5) $(3\sqrt{11})(2\sqrt{-11})$

$= 6i\sqrt{11}\sqrt{11}$

$= 6 \cdot 11i$

$= 66i$

6) $\sqrt{-4} \cdot \sqrt{-25}$

$= i \cdot i\sqrt{4}\sqrt{25}$

$= i^2 \cdot 2 \cdot 5$

$= -1(2)(5)$

$= -10$

Divide. Treat them like separate problems.

7) $\sqrt{\frac{6}{121}} = \frac{\sqrt{6}}{\sqrt{121}}$

$= \frac{\sqrt{6}}{11}$

Divide. Put them together as one square root, divide, then simplify!

8) $\frac{\sqrt{70}}{\sqrt{35}} = \sqrt{\frac{70}{35}} = \sqrt{2}$

Add or subtract the following complex numbers. Should you be multiplying at any point???? NO!!!! (for #9, 10)

9) $(6 + 12i) + (4 - 7i)$

$= 10 + 5i$

10) $(8 - 3i) - (i - 5)$

$= 8 - 3i - i + 5$

$= 13 - 4i$

11) $-4(1 + 2i) + 4$

$= -4 - 8i + 4$

$= -8i$

Multiply. Consult the "i"-chart after you do the multiplication. #14 IS a FOIL problem!

12) $(7i^3)(2i^5)$

$= 14i^8$

$= 14(1)$

$= 14$

13) $(5i^7)^2$

$= 25i^{14}$

$= 25i^2$

$= 25(-1)$

$= -25$

14) $(5 + 2i)(5 - 3i)$

$= 25 - 15i + 10i - 6i^2$

$= 25 - 5i + 6$

$= 31 - 5i$

Name the conjugate for each. There is no work to do, just write it in the blank, and DONE!

15) $17 - 12i$ $17+12i$

16) $-4 + 4i$ $-4-4i$

17) $8 + 6i\sqrt{11}$ $8-6i\sqrt{11}$

Simplify by eliminating the "i" from the denominator. One thing on the bottom – multiply by just "i". Two things on the bottom – multiply by the conjugate. #20 is the toughest one on the whole sheet.

18) $\frac{-5}{2i}$ (i) (i)

$= \frac{-5i}{2i^2}$

$= \frac{-5i}{-2}$

$= \frac{5i}{2}$

19) $\frac{3}{1+2i}$ $(1-2i)$ $(1-2i)$

$= \frac{3-6i}{1-4i^2}$

$= \frac{3-6i}{1+4}$

$= \frac{3-6i}{5}$

20) $\frac{2+3i}{3-2i}$ $(3+2i)$ $(3+2i)$ FOIL F/L

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

$= \frac{6+13i-6}{9+4}$

$= \frac{13i}{13} = i$

Solve the equations by moving everything to the other side, then taking a square root to get rid of the x^2. All answers to equations must include this symbol: $\pm$ Don't forget to pop any "i"s out!

21) $x^2 + 100 = 0$

$x^2 = -100$

$x = \pm\sqrt{-100}$

$x = \pm 10i$

22) $5y^2 - 40 = 0$

$5y^2 = 40$

$y^2 = 8$

$y = \pm\sqrt{8}$

$y = \pm\sqrt{4}\sqrt{2}$

$y = \pm 2\sqrt{2}$

23) $2x^2 + 19 = 1$

$2x^2 = -18$

$x^2 = -9$

$x = \pm\sqrt{-9}$

$x = \pm 3i$