Unit 2 Day 11 – Radicals and Complex Numbers – HOMEWORK

REMEMBER: $i^0 = \underline{1}$ $i^1 = \underline{i}$ $i^2 = \underline{-1}$ $i^3 = \underline{-i}$ So all powers of *i* simplify to i, -1, -i, or 1.

Find the simplest form of the given power of i:

1) $i^{23} = $ $-i$

2) $i^{13} = $ i

3) $i^{42} = $ -1

4) $i^{29} = $ i

5) $i^7 = $ $-i$

6) $i^{37} = $ i

Simplify:

$\sqrt{-4} = 2i$ $\sqrt{-25} = -5i$ $\sqrt{-169} = 13i$ $-\sqrt{-121} = -11i$ $\sqrt{-36} = 6i$

Add or Subtract the following imaginary numbers: (Write your answer in a + b*i* form)

7. $(2 + 3i) + (-6 – 4i) = $ $-4-i$

8. $(23 + 4i) – (-12 + i) = $ $35+3i$

9. $(-4 – 2i) + (28 – 13i) = $ $24-15i$

10. $(17 + 4i) – (-19 – 8i) = $ $36+12i$

Multiply the following imaginary numbers (Write your answer in a + b*i* form)

11. $3i (2 – 6i) = $ $18 + 6i$

12. $(2 + 4i) (-3 – 2i) = $ $2-16i$

13. $(-12 + i) (9 – 4i) = $ $-104 + 57i$

14. $(13 – i)(13 + i) = $ 170

Find the value of the following variables: (Hint: y is **only** the coefficient of *i*.)

15. $(3 – 2i) – (x + yi) = (2 – 3i)$

$3 - x = 2$ $-2 - y = -3$

x = 1 y = 1

16. $(2 + 4i) + (x + yi) = (7 – 5i)$

$2 + x = 7$ $4 + y = -5$

x = 5 y = -9

17. $(8 – 2i) – (x + yi) = (2 – 5i)$

x = 6 y = 3

18. $(4 + 2i) + (x + yi) = (5 – 7i)$

x = 1 y = -9

Complete page 2

USE ( ) for division of complex numbers!   Give your answer as a complex number a + bi.
Show all your work on the odd problems. ☺ Check with your calculator.

1) $\dfrac{3i}{2-i}$ $-\dfrac{3}{5} + \dfrac{6}{5}i$

2) $\dfrac{4}{6+2i}$ $\dfrac{3}{5} - \dfrac{1}{5}i$

3) $\dfrac{4-i}{-2+i}$ $-\dfrac{9}{5} - \dfrac{2}{5}i$

4) $\dfrac{3+i}{4-3i}$ $\dfrac{9}{25} + \dfrac{13}{25}i$

5) $\dfrac{2i}{9-12i}$ $\dfrac{-8}{75} + \dfrac{2}{25}i$

6) $\dfrac{-4}{i}$ $4i$

7) $\dfrac{5+2i}{3-4i}$ $\dfrac{7}{25} + \dfrac{26}{25}i$

8) $\dfrac{6+2i}{6+2i}$ 1

9) $\dfrac{13i}{4-2i}$ $-\dfrac{13}{10} + \dfrac{13}{5}i$

10) $\dfrac{4}{2-i}$ $\dfrac{8}{5} + \dfrac{4}{5}i$

11) $\dfrac{12i}{4}$ $3i$

12) $\dfrac{7-3i}{5+2i}$ $1 - i$

Simplifying Radicals – show your factors.

$\sqrt{24}$ = ___ 4 6 $2\sqrt{6}$	$\sqrt{50}$ = ___ $\sqrt{5 \cdot 5 \cdot 2}$ 5 10 5 2 $5\sqrt{2}$	$\sqrt{168}$ = ___ $2\sqrt{2 \cdot 3 \cdot 7}$ 2 84 2 42 2 21 3·7 $2\sqrt{42}$
$\sqrt{120}$ = ___ 2 60 $2\sqrt{15}$ 5 6 3	$\sqrt{46}$ = ___ 2 23 $\sqrt{46}$ prime	$\sqrt{124}$ = ___ 2 62 $2\sqrt{31}$ 2 31
$\sqrt{78}$ = ___ $\sqrt{78}$ 2 39 3 13	$\sqrt{52}$ = ___ 4 13 $2\sqrt{13}$ 2·2	$\sqrt{146}$ = ___ 2 73 $\sqrt{146}$

All done!