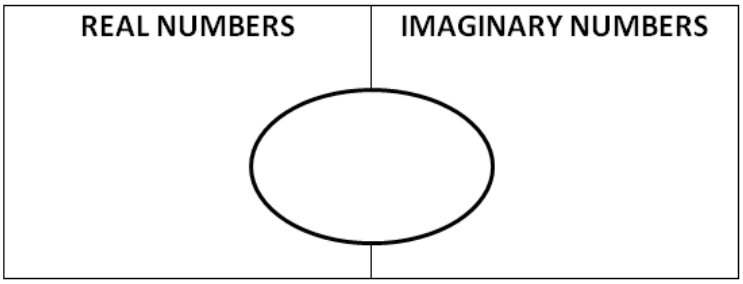
6.2 Complex Numbers

NOTES

ALGEBRA 2

Write your questions here!

$x^2 - 4 = 0$ | $x^2 + 4 = 0$ | $(x + 2)^2 + 4 = 0$



COMPLEX NUMBER

ADD and SUBTRACT

$(4 - 3i) + (7 + 9i)$ | | $4i + (5 - 12i)$

MULTIPLY

$4(3 + 5i)$ | | $(3 - 2i)(3 + 7i)$

FACTOR

$x^2 - 4$ | $x^2 + 4$ | $x^2 + 36$

DIVIDE

$\frac{4-3i}{3}$

$(3y-1)^2+1=-26$

CONJUGATES

$\frac{4-3i}{2i}$

$\frac{4-3i}{3+2i}$

TRY IT!

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

$(3y-4)^2+48=3$

$(5-3i)(4+i)$

$\frac{6-3i}{5-2i}$

SUMMARY:

Now, summarize your notes here!

PRACTICE

Perform the indicated operation. Express complex numbers in standard form $a + bi$.

1. $(4 - 3i) + (12 - 9i)$	2. $(15 + 7i) - (4 - 3i)$	3. $5i + (6 - 8i)$
4. $4i(5 - 3i)$	5. $(3 - 4i)(5 + 6i)$	6. $(8 - 4i)(5 - 3i)$
7. $\frac{9-5i}{3}$	8. $\frac{5+7i}{2}$	9. $\frac{5+4i}{2i}$
10. $\frac{2-4i}{3i}$	11. $\frac{3+5i}{6-2i}$	12. $\frac{2-7i}{4+5i}$

Solve. Express your radical solutions in the simplest form.

13. $(4m + 3)^2 + 33 = 3$

14. $(3y)^2 = -18$

15. $77 = 5 - 2(2h - 4)^2$

16. $(2x - 4)^2 = -20$

17. $(5p - 2)^2 - 48 = 0$

18. $12 = 100 + (7d - 14)^2$

Perform the indicated operation. Express complex numbers in standard form $a + bi$.

19. $4(3 - 2i) + (2 + 3i)^2$

Perform the indicated operation.

Polynomials

20. $(2x^2 - 3)(4x^2 + 2x - 1)$

Rational Expression

21. $\frac{3x}{x+1} \cdot \frac{x^2-1}{x}$

Radicals

22. $\sqrt{5}\left(4 + 3\sqrt{10}\right)$

WRAP UP

Perform the indicated operation. Express complex numbers in standard form $a + bi$.

1. $(3 - 4i)(-2 + 3i)$

2. $\frac{3-5i}{2-i}$

3. Which of the following is equivalent to $3(5 + 2i) - 2(3 - 6i)$?

   A. $9 + 18i$

   B. $21 + 8i$

   C. $9 - 6i$

   D. $21 - 2i$

   E. None of the above

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4. If $(4 + 2i) - (a + 5i) = 9 - 3i$, find the value of a.

   A. 9

   B. 5

   C. -5

   D. 4

   E. -4

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5. Which expressions are equal to a real number?
   Select **ALL** that apply.

   A. $(-4i)^{11}$

   B. $(-3i)^{12}$

   C. $(2 + 3i)^2$

   D. $(4 + 5i)(4 - 5i)$

   E. $(6 + 8i)(8 + 6i)$

6. The table shows several complex numbers where *i* is the imaginary unit.
   Select **ALL** appropriate cells in the table where the product of the two numbers is a real number.

	$8-2i$	3	i
$8+2i$	☐	☐	☐
$5i$	☐	☐	☐
-4	☐	☐	☐

EXIT TICKET –

Show that the product of $a+bi$ and $a-bi$ is the purely real number a^2+b^2