

5-4 Complex Numbers

Alg 2 standards
5.0 and 6.0

i is the imaginary unit $i = \sqrt{-1}$

$$i^2 = -1$$

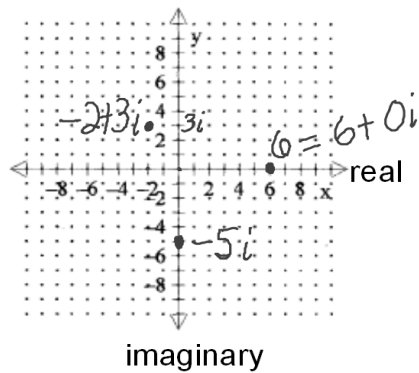
$a + bi$ is a **complex number** in standard form

a is the real part and bi is the imaginary part

complex numbers $2 + 5i$

real #s	imag. #s
$5 = 5 + 0i$	$0 - 2i = -2i$
$\pi = \pi + 0i$	

ex. 1 graph $-2 + 3i$ and $-5i$ in the complex plane



Simplify:

ex. 2 $2i - (3+4i) + (8-9i) = 5 - 11i$
 $2i - 3 - 4i + 8 - 9i$

ex. 3 $\sqrt{-32} = \sqrt{-1} \sqrt{32} = 4i\sqrt{2}$ or $\sqrt[4]{2}i$
 $i\sqrt{32}$

ex. 4 $\sqrt{-20} \cdot \sqrt{-3} = i\sqrt{20} \cdot i\sqrt{3} = i^2 \sqrt{60} = -2\sqrt{15}$
 $(-1)2\sqrt{15}$

ex. 5 $\sqrt{\frac{-3}{8}} = \frac{i\sqrt{3}}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{i\sqrt{6}}{4}$
 $\sqrt{16}$

ex. 6 $i^{14} = (i^2)^7 = (-1)^7 = -1$

ex. 7 $i^{77} = (i^2)^{38} \cdot i = (-1)^{38} \cdot i = i$

Solve for x over the complex numbers:

ex. 8 $5(x-3)^2 = -20$ $x-3 = \pm 2i$
 $x = 3 \pm 2i$
 $\sqrt{\frac{5}{(x-3)^2}} = \sqrt{\frac{-4}{i\sqrt{4}}}$