Advanced Algebra
5.6 Day 2

Name: KEY
Date: _____

Solve the equation.

No "b" → Sq. Roots

1. $\sqrt{x^2} = \sqrt{-64}$

$x = \pm i\sqrt{64}$

$x = \pm 8i$

$x = 8i$
$x = -8i$

"b" Factor Set = 0

2. $x^2 + 7x - 18 = 0$

$(x+9)(x-2) = 0$

$x+9=0$ $\quad x-2=0$
$-9\ -9$ $\quad +2\ +2$

$x = -9$ $\quad x = 2$

No "b" → Sq. Roots

3. $x^2 + 5 = 14$
$-5\ \ -5$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

OR

$x^2 + 5 = 14$
$-14\ \ -14$

$x^2 - 9 = 0$ FACTOR

$(x+3)(x-3) = 0$

$x = -3$ $\quad x = 3$

No "b" → Sq. Roots

4. $\sqrt{x^2} = \sqrt{-12}$

$x = \pm i\sqrt{12}$

$\sqrt{12}$
$\sqrt{4}\cdot\sqrt{3}$
$2\sqrt{3}$

$x = \pm 2i\sqrt{3}$

"b" Factor Set = 0

5. $2x^2 - 6x = 15 - 5x$
$+5x\ \ +5x$

$2x^2 - x = 15$
$-15\ \ -15$

$2x^2 - x - 15 = 0$

$(2x+5)(x-3) = 0$

$2x+5=0$ $\quad x-3=0$
$-5\ -5$ $\quad +3\ +3$

$\frac{2x}{2} = \frac{-5}{2}$ $\quad x = 3$

$x = -\frac{5}{2}$ or -2.5

No "b" → Sq. Roots

6. $11x^2 + 1 = 2x^2$
$-2x^2\ \ -2x^2$

$9x^2 + 1 = 0$
$-1\ \ -1$

$\frac{9x^2}{9} = \frac{-1}{9}$

$\sqrt{x^2} = \sqrt{-\frac{1}{9}}$

$x = \pm i\sqrt{\frac{1}{9}} = i\frac{\sqrt{1}}{\sqrt{9}}$

$x = \pm \frac{1}{3}i$

"b" Factor Set = 0

7. $4x^2 - 7x + 5 = 3x^2 - 7$
$-3x^2\ \ +7\ \ -3x^2\ \ +7$

$x^2 - 7x + 12 = 0$

$(x-4)(x-3) = 0$

$x = 4$ $\quad x = 3$

No "b" → Sq. Roots

8. $x^2 - 16 = 5x^2$
$-x^2\ \ \ -x^2$

$\frac{-16}{4} = \frac{4x^2}{4}$

$\sqrt{-4} = \sqrt{x^2}$

$\pm 2i = x$

OR

$x^2 - 16 = 5x^2$
$-5x^2\ \ \ -5x^2$

FACTOR

$-4x^2 - 16 = 0$

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

$x^2 + 4 = 0$
$-4\ \ -4$

$\sqrt{x^2} = \sqrt{-4}$

$x = \pm 2i$

"b" Factor Set = 0

9. $27x^2 - 18x + 3 = 0$

FACTOR OUT A GCF

$3(9x^2 - 6x + 1) = 0$

$3(3x-1)(3x-1) = 0$

$3x-1=0$ $\quad 3x-1=0$
$+1\ +1$ $\quad \vdots$

$\frac{3x}{3} = \frac{1}{3}$ $\quad x = \frac{1}{3}$

$x = \frac{1}{3}$

Isolate the variable … Sq. Roots

10. $3(x+5)^2 + 147 = 0$
$-147\ \ -147$

$\frac{3(x+5)^2}{3} = \frac{-147}{3}$

$\sqrt{(x+5)^2} = \sqrt{-49}$

$x+5 = \pm 7i$
$-5\ \ -5$

$x = -5 \pm 7i$

Isolate the variable … Sq. Roots

11. $-2(x+1)^2 = 72$
$-2\ \ \ -2$

$\sqrt{(x+1)^2} = \sqrt{-36}$

$x+1 = \pm 6i$
$-1\ \ -1$

$x = -1 \pm 6i$

Isolate the variable … Sq. Roots

12. $3(x-4)^2 + 6 = 0$
$-6\ \ -6$

$\frac{3(x-4)^2}{3} = \frac{-6}{3}$

$\sqrt{(x-4)^2} = \sqrt{-2}$

$x-4 = \pm i\sqrt{2}$
$+4\ \ +4$

$x = 4 \pm i\sqrt{2}$

Write the expression as a complex number in standard form: a + bi

13. $(3+2i)+(-5+8i)$

ADD

$3+(-5) \;+\; 2i+8i$

$-2 + 10i$

14. $(-2-4i)+(3-6i)$

ADD

$-2+3 \;+\; -4i+-6i$

$1 + -10i$

OR

$1 - 10i$

15. $(5-8i)-(2+9i)$

Distribute the "-1"

$(5-8i)+(-2-9i)$ Now ADD

$5+-2 \;+\; -8i+-9i$

$3 + -17i$

OR

$3 - 17i$

★★★

$i = \sqrt{-1}$

$i^2 = -1$

16. $(5-4i)(3+6i)$

Multiply
Distribute

$15 + 30i - 12i - 24i^2$

$15 + 18i - 24(-1)$

$15 + 18i + 24$

$39 + 18i$

17. $(2+5i)^2$

Rewrite

$(2+5i)(2+5i)$

Multiply
Distribute

$4 + 10i + 10i + 25i^2$

$4 + 20i + 25(-1)$

$4 + 20i - 25$

$-21 + 20i$

18. $(4+8i)(4-8i)$

Multiply
Distribute

$16 - 32i + 32i - 64i^2$

$16 \qquad - 64(-1)$

$16 + 64$

80

19. $2(2+i)+(1-i)^2$

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

$4 + 2i + [1 - i - i + i^2]$

$4 + 2i + [1 - 2i + (-1)]$

$4 + 2i + [-2i]$

4

20. $(1-5i)(2+i)-i(3-4i)$

$2 + i - 10i - 5i^2 \quad - 3i + 4i^2$

$2 - 9i - 5(-1) \quad - 3i + 4(-1)$

$2 - 9i + 5 \quad - 3i - 4$

$7 - 9i$

$7 \;\; -9i \;\; -3i \;\; -4$

$3 - 12i$