

Review: Standard 4D Complex Numbers and 4E Systems of Equations

Name: KEY Hr: _____

Write each expression in simplest form.

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

$$\boxed{6+i}$$

2. $(2-i) - (4+5i)$

$$\boxed{-2-6i}$$

3. $(2-i)(6+5i)$

$$12 + 10i - 6i - 5i^2$$

$$12 + 4i + 5$$

$$\boxed{17+4i}$$

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

$$16 + 20i - 20i - 25i^2$$

$$= 16 + 25$$

$$\boxed{= 41}$$

Write each expression in simplest form.

5. $\sqrt{-100}$

$$10i$$

6. $\sqrt{-192}$

$$\sqrt{-192} = \sqrt{-64 \cdot 3} = 8i\sqrt{3}$$

$$\boxed{8i\sqrt{3}}$$

Solve. Circle your solutions as well as show all work.

7. $x^2 - 7x = 8$

$$x^2 - 7x - 8 = 0$$

$$(x+1)(x-8) = 0$$

$$\boxed{x = -1, x = 8}$$

8. $2x^2 - x + 4 = 0$

$$1 \pm \frac{\sqrt{1^2 - 4(2)(4)}}{2(2)}$$

$$= \frac{1 \pm \sqrt{1-32}}{4} = \frac{1 \pm \sqrt{-31}}{4} = \boxed{\frac{1 \pm i\sqrt{31}}{4}}$$

9. $x^2 + 5 = -3x$

$$x^2 + 3x + 5 = 0$$

$$-3 \pm \frac{\sqrt{9 - 4(1)(5)}}{2(1)}$$

$$-3 \pm \frac{\sqrt{9-20}}{2}$$

$$= \frac{-3 \pm \sqrt{-11}}{2}$$

$$= \boxed{\frac{-3 \pm i\sqrt{11}}{2}}$$

10. $3x^2 - 16 = -7$

$$3x^2 = 9$$

$$\frac{3x^2}{3} = \frac{9}{3}$$

$$x^2 = 3$$

$$\boxed{x = \pm\sqrt{3}}$$

11. $2x^2 + 10 = -18$

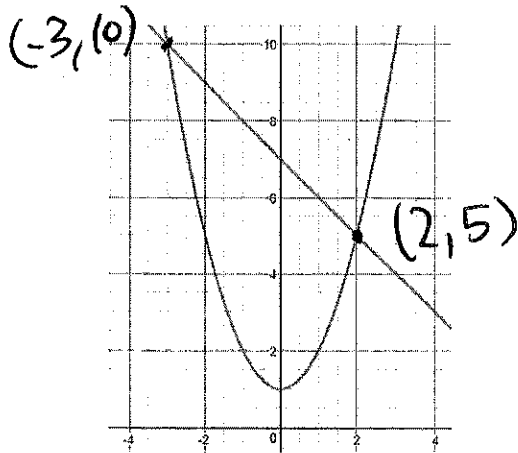
$$2x^2 = -28$$

$$x^2 = -14$$

$$\boxed{x = \pm i\sqrt{14}}$$

Solve each system of equations.

12. $\begin{cases} y = -x + 7 \\ y = x^2 + 1 \end{cases}$



13. $\begin{cases} y = x^2 + 3x + 2 \\ -3x + y = 3 \end{cases}$

$$y = x^2 + 3x + 2$$

$$y = 3x + 3$$

$$x^2 + 3x + 2 = 3x + 3$$

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

$$x^2 - 1 = 0$$

$$x^2 = 1$$

$$x = \pm 1$$

$$y = 1^2 + 3(1) + 2 = 6$$

$$y = (-1)^2 + 3(-1) + 2 = 0$$

$$(1, 6) \quad (-1, 0)$$

14. $\begin{cases} y = x^2 \\ y - 8 = -x^2 \end{cases}$

$$x^2 - 8 = -x^2$$

$$-x^2 \quad -x^2$$

$$-8 = -2x^2$$

$$\frac{-8}{-2} \quad \frac{-2x^2}{-2}$$

$$y = 2^2$$

$$y = (-2)^2$$

$$\sqrt{4} = \sqrt{x^2} \quad x = \pm 2$$

$$(2, 4)$$

$$(-2, 4)$$

15. $\begin{cases} y = 12 - 6x \\ x^2 + y = 4 \end{cases}$

$$x^2 + 12 - 6x = 4$$

$$-4 \quad -4$$

$$x^2 - 6x + 8 = 0$$

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

$$x = 2, 4$$

$$(2, 0)$$

$$(4, -12)$$

$$8$$

$$-2 \wedge -4$$

$$12 - 6(2) =$$

$$12 - 6(4) =$$

16. $\begin{cases} x^2 + y^2 = 25 \\ x + y = 7 - x \end{cases}$

$$(7-x)(7-x)$$

$$49 - 7x - 7x + x^2$$

$$x^2 + (7-x)^2 = 25$$

$$x^2 + 49 - 14x + x^2 = 25$$

$$-25 \quad -3 \wedge -4$$

$$2x^2 - 14x + 24 = 0$$

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

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

$$x = 3, 4$$

$$(3, 4) \quad (4, 3)$$

$$y = 7 - x$$

$$y = 7 - 3 = 4$$

$$y = 7 - 4 = 3$$