

SECONDARY MATH II // MODULE 3

SOLVING QUADRATICS & OTHER EQUATIONS - 3.12H

3.12H

READY, SET, GO!

Name

Period

Date

READY

Topic: Solving systems of linear equations

Solve each system of equations using substitution.

1.

$$\begin{cases} y = 3x \\ y = -2x - 15 \end{cases}$$

$$3x = -2x - 15$$

2.

$$\begin{cases} 3x + y = 21 \\ y = -2x - 15 \end{cases}$$

3.

$$\begin{cases} 3x + 2y = 7 \\ x - 2y = -3 \end{cases}$$

$$3(-3 + 2y) + 2y = 7$$

$$-9 + 6y + 2y = 7 + 9$$

$$8y = 16$$

$$y = 2$$

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

$$x = 1$$

(1, 2)

Solve each system of equations using elimination.

4.

$$\begin{array}{r} \begin{array}{ccc} 5 & -1 & 13 \\ -2 & 1 & -1 \end{array} \\ + \\ \hline \begin{array}{ccc} 5x - y = 13 \\ -2x + y = -1 \end{array} \\ \hline 3x = 12 \\ x = 4 \\ y = \end{array}$$

5.

$$\begin{cases} 3x + y = 21 \\ -3x + 5y = -3 \end{cases}$$

6.

$$\begin{cases} 3x + 2y = 7 \\ x + y = 2 \end{cases}$$

$$-2(x + y = 2)$$

$$3x + 2y = 7$$

$$-2x - 2y = -4$$

$$x = 3$$

$$\frac{3}{-3} + y = \frac{2}{-3}$$

$$y = -1$$

(3, -1)

A5 notes

Create an augmented matrix for each system of equations and then use row reductions to solve the system.

7.

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

$$\begin{array}{cc|c} 2 & 1 & 7 \\ -2 & 1 & -1 \end{array}$$

$x + x \rightarrow x^2$

$$\begin{array}{cc|c} 1 & 0 & 7 \\ 0 & 2 & 6 \end{array}$$

$\frac{1}{2}x^2 \rightarrow x^2$

$$\begin{array}{cc|c} 2 & 1 & 7 \\ 0 & 2 & 6 \end{array}$$

$x^2 \rightarrow x^1$

$$\begin{array}{cc|c} 2 & 1 & 7 \\ 0 & 1 & 3 \end{array}$$

$\frac{1}{2}x^1 \rightarrow x^1$

$$\begin{array}{cc|c} 1 & 0 & 4 \\ 0 & 1 & 3 \end{array}$$

$x^1 \rightarrow x^1$

$$\begin{array}{cc|c} 1 & 0 & 4 \\ 0 & 1 & 3 \end{array}$$

8.

$$\begin{cases} 3x - 4y = 11 \\ -3x + 5y = -3 \end{cases}$$

$$\begin{array}{cc|c} 3 & -4 & 11 \\ -3 & 5 & -3 \end{array}$$

$$\begin{array}{cc|c} 3 & -4 & 11 \\ 0 & 1 & 8 \end{array}$$

$$\begin{array}{cc|c} 3 & -4 & 11 \\ +0 & 4 & 32 \end{array}$$

$$\begin{array}{ccc} 3 & 0 & 43 \rightarrow 3x = 43 \rightarrow x = 14\frac{1}{3} \\ 0 & 1 & 8 \rightarrow y = 8 \end{array}$$

$$\begin{array}{cc|c} 1 & 0 & 14\frac{1}{3} \\ 0 & 1 & 8 \end{array}$$

9.

$$\begin{cases} 5x - y = 13 \\ -2x + y = -1 \end{cases}$$

A7 notes

Create an augmented matrix for each system of equations and then use row reductions to solve the system.

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ goal

7.

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

$$\begin{array}{cc|c} 2 & 1 & 7 \\ + & -2 & 1 & -1 \end{array}$$

$$2y = 6 \quad \div 2 \quad \begin{array}{cc|c} 2 & 1 & 7 \\ 0 & 2 & 6 \end{array}$$

$$y = 3 \quad \begin{array}{cc|c} 2 & 1 & 7 \\ 0 & 1 & 3 \end{array}$$

8.

$$\begin{cases} 3x - 4y = 11 \\ -3x + 5y = -3 \end{cases}$$

$$\begin{array}{cc|c} 2 & 1 & 7 \\ - & 0 & 1 & 3 \end{array} \quad \begin{array}{cc|c} 3 & -4 & 11 \\ + & -3 & 5 & -3 \end{array} \leftarrow$$

$$\div 2 \quad \begin{array}{cc|c} 2 & 0 & 4 \\ 0 & 1 & 3 \end{array} \quad \begin{array}{cc|c} 3 & -4 & 11 \\ 0 & 1 & 8 \end{array} \checkmark$$

$$\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & 3 \end{array} \quad \begin{array}{cc|c} 3 & -4 & 11 \\ + & 0 & 4 & 32 \end{array} \leftarrow$$

$$\begin{array}{l} x = 2 \\ y = 3 \end{array}$$

$$\div 3 \quad \begin{array}{cc|c} 1 & 0 & 4 \\ 0 & 1 & 8 \end{array}$$

$$\begin{array}{cc|c} 1 & 0 & 14 \\ 0 & 1 & 8 \end{array} \frac{1}{3}$$

$$\begin{array}{l} x = 14 \\ y = 8 \end{array}$$

9.

$$\begin{cases} 5x - y = 13 \\ -2x + y = -1 \end{cases}$$

SET

Topic: Operations with imaginary numbers

Perform the indicated operations on the complex numbers.

10. $(3 + 4i) + (2 - 5i)$

11. $(6 - 4i) - (7 + 2i)$
 $\underline{6 - 4i - 7 - 2i}$
 $\underline{-1 - 6i}$

12. $3(5 + 2i)$

13. $(9 - 2i)(1 + 3i)$

14. $4(3 - 2i) - (5 + 3i)$

15. $(2 - 5i)(2 + 5i)$
 $\underline{4 + 10i - 10i + 25}$
 $\underline{29}$

$i^2 = \sqrt{-1}$
 $i^2 = -1$

Use the **conjugate** of each denominator to rationalize the denominators and write an equivalent fraction.

$\sqrt{4} = \pm 2$ $2, -2$ $\sqrt{-4} = \pm 2i$ $2i, -2i$ → $\boxed{29}$

16. $\frac{3 - 5i}{2 + 5i} \cdot \frac{2 - 5i}{2 - 5i} = 29$

17. $\frac{6 + 7i}{4 - 3i}$

18. $\frac{2 - 3i}{1 - 6i}$

$\frac{6 - 15i - 10i - 25}{29}$
 $\underline{-25i - 19}$
 $\underline{29}$

Skip, next time.
Find the modulus for each complex number.

19.

$3 - 5i$

20.

$4 - 3i$

21.

$-4 + 3i$

22. If the graphical representation of the operations between two complex numbers results in a value along the y-axis or imaginary axis, what must be true about the two complex numbers?

23. If the graphical representation of the operations between two complex numbers results in a value along the x-axis or real number axis, what must be true about the two complex numbers?

GO

Topic: Solving Quadratics

24. List the strategies that can be used to solve quadratic equations. Explain when each of the strategies would be most efficient. Give an example of a quadratic that would be most efficiently solved for each.

Solve the quadratics below using an appropriate method.

25.

$$x^2 + 9x + 18 = 0$$

26.

$$x^2 - 2x - 3 = 0$$

27.

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

28.

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

$$x = 2, -3$$

29.

$$10x^2 - 1x + 9 = 0 \quad a=10, b=-1, c=9$$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(10)(9)}}{2(10)}$$

$$\frac{1 \pm \sqrt{-359}}{20}$$

$$\frac{1 \pm \sqrt{359}i}{20}$$

30.

$$(x - 2)^2 = 20$$