

Name (Print) Key

Show your work on all problems, and leave your solutions in the simplest form possible.

Formulas that you may need to use:

$$(A+B)^2 = A^2 + 2AB + B^2$$

$$(A-B)^2 = A^2 - 2AB + B^2$$

$$(A-B)(A+B) = A^2 - B^2$$

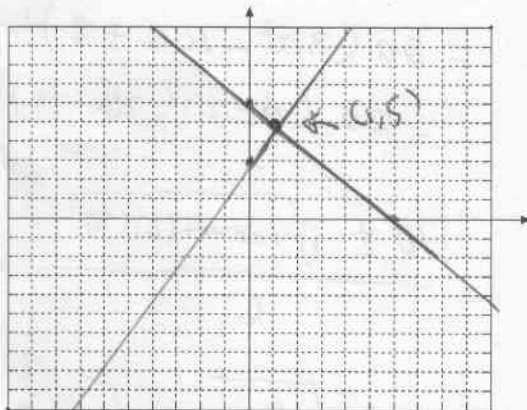
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. Solve this system

$$\begin{cases} 2x + 2y = 12 \\ 2x - y = -3 \end{cases}$$

by graphing (Note, you need to graph carefully to obtain the solution). [6 pts]

$$\begin{aligned} x &= 1 \\ y &= 5 \end{aligned}$$



2. Solve the following system by substitution. [8 pts]

$$\begin{cases} 6x - 2y = 4 & \text{I} \\ 3x - y = 1 & \text{II} \end{cases}$$

$$\text{II} \Rightarrow y = 3x - 1$$

$$6x - (3x - 1) = 4$$

$$6x - 3x + 1 = 4$$

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

$$y = 3(1) - 1 = 2$$

$$\boxed{y = 2}$$

3. Solve the following system by elimination. [8 pts]

$$\begin{cases} 6x - 2y = 4 \\ 3x - y = 1 \end{cases}$$

$$3x = 3 \Rightarrow x = 1$$

$$3(1) - y = 1$$

$$\Rightarrow 3 - y = 1$$

$$\boxed{y = 2}$$

Perform the following operations and simplify: [6 pts each]

$$4. (a^2 + 3b^2 - 4c^2) + (-5a^2 + 2b^2 + c^2)$$
$$= -4a^2 + 5b^2 - 3c^2$$

$$5. (-8x^2y + 3xy^2 - 4xy) - (2x^2y - xy^2 + xy)$$
$$= -10x^2y + 4xy^2 - 5xy$$

$$6. 5cd(4c^2d - 5cd^2)$$

$$= 20c^3d^2 - 25c^2d^3$$

$$7. (x^2 + 3x - 4)(x + 2)$$

$$= x^3 + 3x^2 - 4x + 2x^2 + 6x - 8$$

$$= x^3 + 5x^2 + 2x - 8$$

$$8. (2y^2 - 3z^2)^2 = (2y^2 - 3z^2)(2y^2 - 3z^2)$$

$$= 4y^4 - 12y^2z^2 + 9z^4$$

Factor each of the following expressions: [6 pts each]

$$9. -3y^2 + 15y^3 = -3y^2(1 - 5y)$$

$$10. y^2 - 4y - 32$$

$$= (y - 8)(y + 4)$$

$$\frac{-4 \pm \sqrt{16 - 4(-32)}}{2(1)}$$

$$11. 6a^3 - 20a^2 + 16a$$

$$= 2a(3a^2 - 10a + 8)$$

$$= 2a(a - 2)(3a - 4)$$

$$\frac{10 \pm \sqrt{100 - 4(3)(8)}}{6} =$$

$$\frac{10 \pm \sqrt{4}}{6} = \left\{ \begin{array}{l} \frac{8}{6} = \frac{4}{3} \\ \frac{12}{6} = 2 \end{array} \right.$$

$$12. 4x^2 + 16 - 16x$$

$$4x^2 - 16x + 16 = 4(x^2 - 4x + 4)$$

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

$$13. 4a^2 - 100$$

$$(2a-10)(2a+10)$$

$$= 4(a-5)(a+5)$$

Solve for the variable in each equation [6 pts each]

$$14. (y-1)(y-4) = 10$$

$$y^2 - 5y + 4 = 10$$

-10 -10

$$y^2 - 5y - 6 = 0$$

$$y = \frac{5 \pm \sqrt{25 - 4(1)(-6)}}{2}$$

$$= \frac{5 \pm \sqrt{25 + 24}}{2}$$

$$= \frac{5 \pm 7}{2}$$

6

-1

$$15. a^3 - 4a^2 = 21a$$

$$a^3 - 4a^2 - 21a = 0$$

$$a(a^2 - 4a - 21) = 0$$

$$\boxed{a=0}$$

$$a = \frac{4 \pm \sqrt{16 - 4(-21)}}{2}$$

$$= \frac{4 \pm 10}{2}$$

7

-3

$$16. 8y^2 = 14y$$

$$8y^2 - 14y = 0$$

$$2y(4y - 7) = 0$$

$$y = 0$$

$$y = \frac{7}{4}$$