

No books and no notes. Be sure to set up each problem before evaluation. Show all work in the space provided for full credit.

1. Solve the following system of linear equations by elimination and give the solution set. Is the system consistent or inconsistent? Are the equations independent or dependent? (16 points)

$$\begin{aligned} & \begin{cases} 4x - y = 5 \\ -5x + 3y = -1 \end{cases} \\ & \begin{array}{r} 12x - 3y = 15 \\ -5x + 3y = -1 \\ \hline 7x = 14 \\ x = 2 \end{array} \\ & \begin{array}{r} 4(2) - y = 5 \\ 8 - y = 5 \\ -y = -3 \\ y = 3 \end{array} \\ & \text{Sol. Set } \{(x,y) | (2,3)\} \end{aligned}$$

Consistent independent

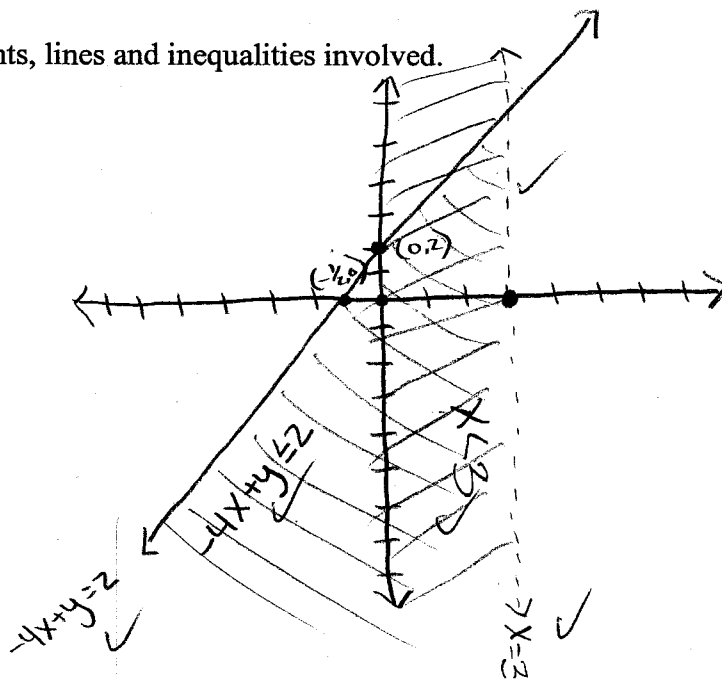
2. Solve the following system of linear equations and give the solution set. Are the equations independent or dependent? (14 points)

$$\begin{aligned} & \begin{cases} -2x + 3y = 4 \\ 8x - 12y = -16 \end{cases} \\ & \begin{array}{r} -8x + 12y = 16 \\ 8x - 12y = -16 \\ \hline 0 = 0 \end{array} \\ & \text{Independent } \times \\ & \text{Sol. Set } \{(x,y) | -2x + 3y = 4\} \end{aligned}$$

3. Graph the compound inequality. Label the points, lines and inequalities involved. Be sure to shade the compound inequality region. (12 points)

$$-4x + y \leq 2 \text{ or } x < 3$$

$-4x + y = 2$ where $x = 3$



Factor each polynomial.

4. a) $125x^3 - 27y^3$ (8 points)

$(5x)^3 - (3y)^3$
 $(5x-3y)(25x^2 + 15xy + 9y^2)$
 $(5x-3y)$ ✓

b) $4m^2 - 9$ (6 points)

$(2m+3)(2m-3)$
 $4m^2 - 6m + 6m - 9$ ✓

5. a) $3k^2 + 8k + 5$ (6 points)

$(3k+5)(k+1)$
 $3k^2 + 3k + 5k + 5$ ✓

b) $4a^2 - 4a + 1$ (6 points)

$(2a-1)(2a-1)$
 $4a^2 - 2a - 2a + 1$ ✓

6. $12p + 4q + 3pq^2 + q^3$ (10 points)

$(12p + 3pq^2)(4q + q^2)$
 $3p(4 + q^2) + q(4 + q^2)$ ✓
 $(3p + q)(4 + q^2)$ ✓

7. Solve the following equation and give the solution set: (12 points)

$3x^3 - 9x^2 + 6x = 0$

$(x-2)(x-1)$

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

$3x(x-2)(x-1) = 0$

$3x = 0$ $x-2 = 0$ $x-1 = 0$
 $x = 0$ $x = 2$ $x = 1$ ✓

Sol. Set $\{x \mid x = 0, 2, 1\}$

8. Evaluate the following:

a) $(2x-5)(x+4)$ (6 points)

$2x^2 + 8x - 5x - 20$

$2x^2 + 3x - 20$ ✓

b) $(3x-7)^2$ (6 points)

$(3x-7)(3x-7)$

$9x^2 - 21x - 21x + 49$

$9x^2 - 42x + 49$ ✓

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