31.) $4x^2 - 56x + 9y^2 = -160$

$-9(4x^2 \quad + y^2 = 64)$

$4x^2 - 56x + 9y^2 = -160$

$-36x^2 \quad - 9y^2 = -576$

$-32x^2 - 56x + 736 = 0$

$-8(4x^2 + 7x - 92) = 0$

$-8(4x + 23)(x - 4) = 0 \quad x = 4, -\frac{23}{4}$

$(4, 0)$

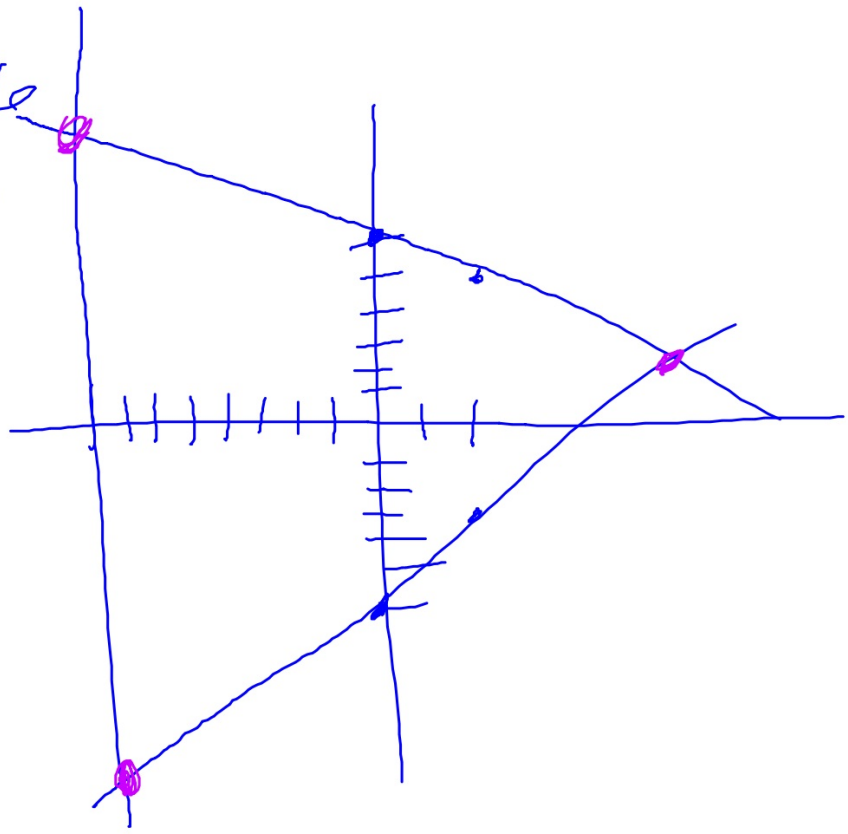
$(-\frac{23}{4}, X)$

$Y = -10$

$x \geq -8$

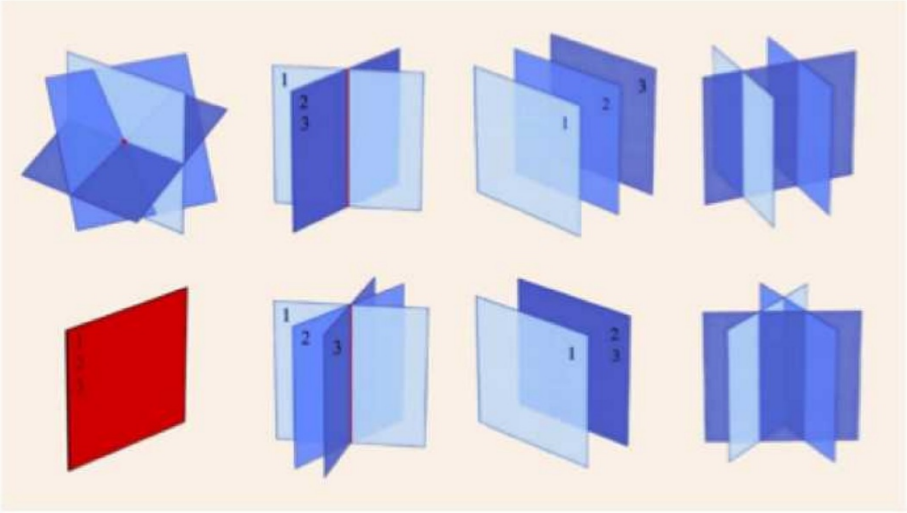
$y \leq -\frac{1}{2}x + 6$

$y \geq \frac{3}{2}x - 6$



3x3 System of Equations

Solution Types:



Algebraic Solving Methods:

- Substitution
- Elimination

*See printout.

Substitution

ex: Solve.

$2x - 4z = 20$ → $x = 2z + 10$

a) $-3x + y - 4z = 20$

$-4x + 2y + 3z = -15$

$-3(2z+10) + y - 4z = 20 \Rightarrow$ $-10z + y = 50$

$-4(2z+10) + 2y + 3z = -15 \Rightarrow$ $-5z + 2y = 25$

$-10z + y = 50$

$10z - 4y = -50$

$-3y = 0$

$y = 0$

$-10z + y = 50$

$-10z = 50$

$z = -5$

$x = 2z + 10$

$x = 0$

$(0, 0, -5)$

Elimination

ex: Solve.

① $3x-2y+4z=35$

b) ② $-4x+y-5z=-36$) 3

③ $5x-3y+3z=31$

① and ②

$3x-2y+4z=35$

$-8x+2y-10z=-72$

$-5x-6z=-37$

② and ③

$-12x+3y-15z=-108$

$5x-3y+3z=31$

$-7x-12z=-77$

$7x+12z=77$

2($-5x-6z=-37$) $-10x-12z=-74$

$7x+12z=77$

$-3x=3$

$x=-1$

$7(-1)+12z=77$

$z=7$

$y=-5$

$(-1,-5,7)$

ex: Solve.

c) $4x - y + 2z = 11$

$x + 2y - z = -1$

$2x + 2y - 3z = -1$

$(2, -1, 1)$

N D Q 375 pennies

ex: Sandy has nickels, dimes and quarters that amount to $3.75 in change. She has three more quarters than dimes but twice as many nickels as quarters. How many dimes, nickels and quarters does Sandy have?

$5N + 10D + 25Q = 375$

$Q = 3 + D$

$N = 2Q$

$5(2Q) + 10(Q-3) + 25Q = 375$

$45Q = 405$

$Q = 9$

$N = 18$

$D = 6$

ex: My friends and I went to the candy store on the weekend. One friend bought 4 gumballs, 3 lollipops, and 8 gummy rings, for a total of $3.25. Another friend bought 10 gumballs, 8 lollipops and 4 gummy rings, for a total of 5.90. I bought 3 gumballs, 2 lollipops, and 15 gummy rings, for a total of $3.70. How much did each of the candy items cost?

$4g + 3L + 8R = 3.25$

$10g + 8L + 4R = 5.90$

$3g + 2L + 15R = 3.70$

ex: SET UP ONLY - A bakery makes cookies, brownies, and muffins daily. Each batch of cookies requires 2 cups of flour, 2 eggs, and 1 cup of sugar. Each batch of brownies requires 1 cup of flour, 3 eggs and 2 cups of sugar. Each muffin requires 3 cups of flour, 2 eggs and 2 cups of sugar. There are 85 cups of flour, 70 eggs, and 60 cups of sugar available in stock. If all supplies are consumed, how many batches of brownies, cookies and muffins can the bakery make?

REVIEW

ex: Describe the transformations.

a) $f(x) = 5 - 3(x+1)^2$

b) $f(x) = \left[-\frac{x}{7}\right]$

REVIEW

ex: Write the equation of the function with the given characteristics.

- Parent: Square Root
- Reflection about the x-axis
- horizontal shrink by a factor of 2
- right 3
- up 9