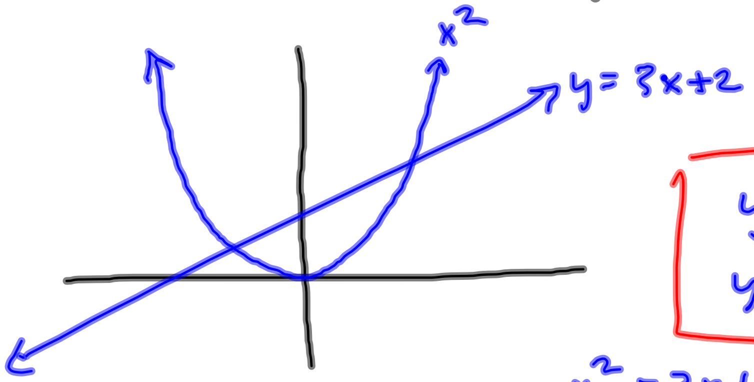
20 pt take-home on a 3x3 system
Old tests are a good indicator.



$$\boxed{\begin{aligned} y &= x^2 \\ y &= 3x+2 \end{aligned}}$$

$x^2 = 3x+2$

$a=1,\ b=-3,\ c=-2$

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

$b^2-4ac = (-3)^2 - 4(1)(-2)$

$= 9+8 = \underline{17}$

Doesn't Factor

Two REAL solutions

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

$$= \frac{3 \pm \sqrt{17}}{2(1)} = \frac{3 \pm \sqrt{17}}{2}$$

$x = \frac{3+\sqrt{17}}{2}$, $x = \frac{3-\sqrt{17}}{2}$

$y = 3x + 2$

$y = 3\left(\frac{3+\sqrt{17}}{2}\right) + 2$ or $y = 3\left(\frac{3-\sqrt{17}}{2}\right) + 2$

$= \frac{9+3\sqrt{17}}{2} + \frac{4}{2}$ $\quad = \frac{9-3\sqrt{17}}{2} + \frac{4}{2}$

$= \frac{13+3\sqrt{17}}{2}$ $\quad y = \frac{13-3\sqrt{17}}{2}$

$$\left\{\left(\frac{3+\sqrt{17}}{2}, \frac{13+3\sqrt{17}}{2}\right), \left(\frac{3-\sqrt{17}}{2}, \frac{13-3\sqrt{17}}{2}\right)\right\}$$

Check:

$$y = x^2 = \left(\frac{3+\sqrt{17}}{2}\right)^2 = \frac{(3+\sqrt{17})^2}{2^2} = \frac{3^2 + 2(3)\sqrt{17} + \sqrt{17}^2}{4}$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$= \frac{9 + 6\sqrt{17} + 17}{4}$$

$$= \frac{26 + 6\sqrt{17}}{4}$$

$$= \frac{\cancel{2}^{1}(13 + 3\sqrt{17})}{\cancel{4}_{2}}$$

$$= \frac{13+3\sqrt{17}}{2}$$

I'll post the take-home part of the test today or tomorrow.

$$\begin{bmatrix}1&2\\3&4\\5&6\end{bmatrix}\begin{bmatrix}1\\-1\end{bmatrix}=\begin{bmatrix}-1\\-1\\-1\end{bmatrix}$$

3×2 $\quad$ 2×1

$$\underset{1\times2}{\begin{bmatrix}1&-1\end{bmatrix}}\underset{3\times2}{\begin{bmatrix}1&2\\3&4\\5&6\end{bmatrix}}$$

$$\begin{bmatrix}1&-1\end{bmatrix}\begin{bmatrix}1\\-1\end{bmatrix}=\begin{bmatrix}2\end{bmatrix}$$

$$\begin{bmatrix}1\\-1\end{bmatrix}\begin{bmatrix}1&-1\end{bmatrix}=\begin{bmatrix}1&-1\\-1&1\end{bmatrix}$$

$$AB\neq BA$$

Ring of Matrices is not commutative with respect to multiplication.

$g(x) = -4 \cdot 3^{\boxed{-2x+4}}$

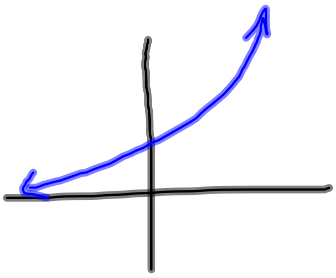
$(x,y) \to (-\frac{1}{2}x, y)$

$f(x) \to f(-2x) \to f(-2x+4)$

$= f(-2(x-2))$

Replaced x by x-2

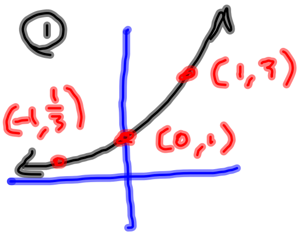
RIGHT 2

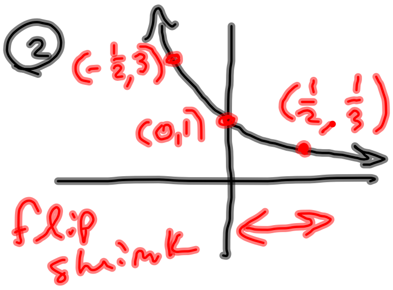


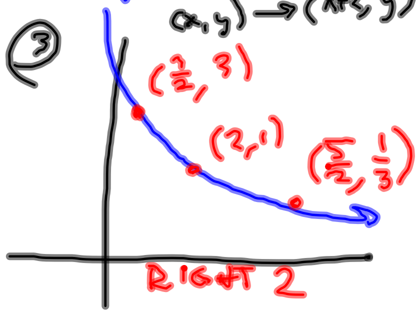
RIGHT 2

① $f(x) = 3^x \to$ ② $f(-2x) = 3^{-2x} \to f(-2(x-2))$

$(x,y) \to (x+2, y)$



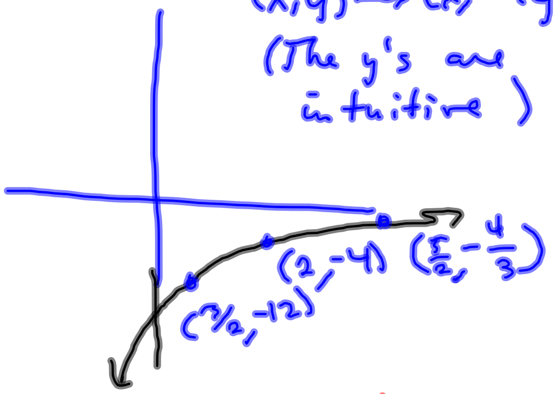




④ $-4f(-2(x-2)) = -4 \cdot 3^{-2(x-2)} \to$ ⑤ $-4 \cdot f(-2(x-2)) + 5$

$(x,y) \to (x, -4y)$

(The y's are intuitive)



$-\frac{4}{3} + 5$