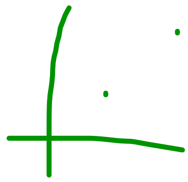
Give a linear combination of

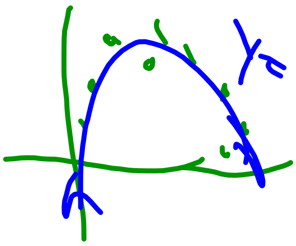
$$\begin{bmatrix} 1 \\ 0 \\ -4 \end{bmatrix}, \begin{bmatrix} 3 \\ 6 \\ -2 \end{bmatrix}, \begin{bmatrix} -4 \\ 1 \\ 2 \end{bmatrix} \text{ that equals } \begin{bmatrix} -17 \\ 17 \\ 18 \end{bmatrix}.$$

Try on your own before discussing.

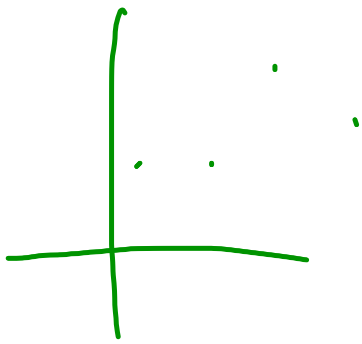
$$-3\begin{bmatrix}1\\0\\-4\end{bmatrix}+2\begin{bmatrix}3\\6\\-2\end{bmatrix}+5\begin{bmatrix}-4\\1\\2\end{bmatrix}$$



$y=mx+b$



$y=ax^2+bx+c$



137 points
HW, Q

$\frac{24}{137}$ $\frac{121}{137}$

450 Exams $85\% = \frac{384}{450}$ $\frac{384}{450}$

$86\% = \frac{384+24}{450+24}$ $\frac{384+121}{450+121} = 88\%$

$\begin{bmatrix} a \\ a^2 \end{bmatrix} \in \mathbb{R}^2$ includes $\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 6 \\ 36 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$

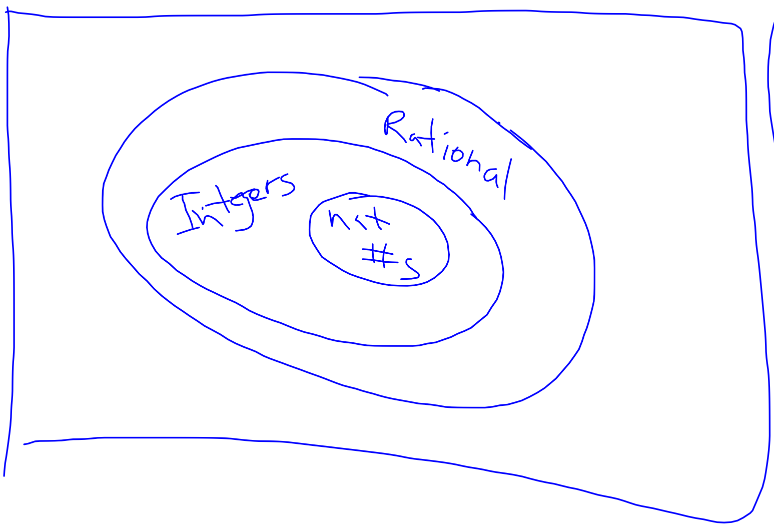
$\begin{bmatrix} 3 \\ -9 \end{bmatrix}$ is not one of these, because $3^2 \neq -9$.

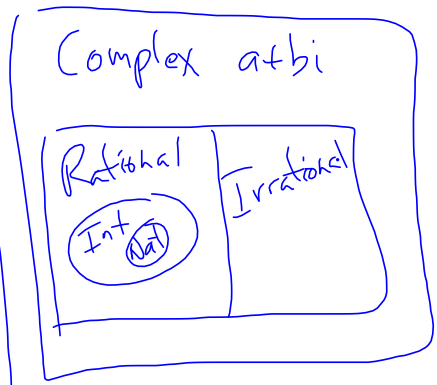
Natural numbers $1, 2, 3, 4, \ldots$ Closed under addition, but not under subtraction
(counting numbers)

Whole numbers $0, 1, 2, 3, \ldots$

Integers $\ldots, -2, -1, 0, 1, 2, 3, \ldots$ Closed under $+, -, \cdot$, but not $\div$

Rational $\frac{p}{q}$, p, q both integers


Rational
Integers
nat
#s


Complex a+bi
Rational
Irrational
Int
Nat

$$S_1 = \left\{ \begin{bmatrix} a \\ a^2 \end{bmatrix} \middle| \, a \in \mathbb{R} \right\}$$

in

$$\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 6 \\ 36 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$$

Closed under addition? No, because

$\begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 6 \\ 36 \end{bmatrix} \in S_1$ but $\begin{bmatrix} 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 6 \\ 36 \end{bmatrix} = \begin{bmatrix} 7 \\ 37 \end{bmatrix} \notin S_1$ because

$7^2 \neq 37$.

Is S_1 closed under scalar multiplication?

No, because $2 \in \mathbb{R}$ and $\begin{bmatrix} -3 \\ 9 \end{bmatrix} \in S_1$, but

$2\begin{bmatrix} -3 \\ 9 \end{bmatrix} = \begin{bmatrix} -6 \\ 18 \end{bmatrix} \notin S_1$ because $(-6)^2 \neq 18$

Turn In: 1.6: 1

Show enough work to convince me that you were thinking about.