Abuse of the Equal Sign

Do you see the flaws? You can probably guess what was *meant*, but that's not what is written. In mathematics, we need to use precise language and notation.

Train of thought.

- Solve 2x+1=7:

  Answer: 2x+1=7

  2x+1=7-1 (not true)

  2x=6

  2x=6/2=3 (not true)

- Find $\lim_{x\to 1}\frac{x^2-1}{x-1}$

  Answer: $\lim_{x\to 1}\frac{x^2-1}{x-1}=x+1=2$ (neither = is true)

- Given $f(x)=x^3+4x^2$, find $f'(x)$.

  Answer: $f'(x)=x^3+4x^2=3x^2+8x$ or $f(x)=x^3+4x^2$

  $=3x^2+8x$

- Given $f(x)=x^3$, find $f'(2)$.

  Answer $f'(x)=3x^2=12$ (second = is not true)

  $f'(2)=3x^2=12$ (neither = is true)

- Find a unit vector in the direction of $3\vec{i}+4\vec{j}$ (this is work from a 5C student)

  Answer: $3\vec{i}+4\vec{j}=\sqrt{3^2+4^2}=\sqrt{25}=4=\frac{3}{5}\vec{i}+\frac{4}{5}\vec{j}$

- Find the direction angle for the vector $-3\vec{i}+3\vec{j}$

  Answer: $\theta=\tan^{-1}\left(\frac{3}{-3}\right)=45^\circ=135^\circ$

Equals connected to nothing.

- Solve 3x+2(x+1)=5

  Answer: = 3x+2x+2=5

  =5x+2=5

  =5x=3

  =x=3/5

- Given $f(x)=x^2$ and $g(x)=3x+1$, find $f(g(x))$.

  Answer: $=(3x+1)^2=9x^2+6x+1$

Nonsense in the middle of equations

- Given $f(x)=\frac{2}{x-3}$, find $f(3)$.

  Answer: $f(3)=\frac{2}{3-3}=\frac{2}{0}=$ *undefined* (f(3) is undefined so none of the equals make sense.)

- Find $\lim_{x\to\infty}\frac{3}{x+1}$

  Answer: $\lim_{x\to\infty}\frac{3}{x+1}=\frac{3}{\infty}=0$ (Note: writing $\frac{3}{\infty}$ off to the side is helpful, it just does not belong with the equals sign)