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Discrete Mathematics
Midterm Redux
You said we didn't need to do everything, so I focused on my weaknesses.

1. (a) $p \to q$ is *false*.
   True statements:
   p = it is raining, q = i have an umbrella
   Result:
   if it is raining then i wont have an umbrella
   (b) $r \to s$ is *true*, but s is *false*.
   True statements:
   r = there is no homework, s = will play video games
   Result:
   if there is homework i will not play video games

2. (a) $\forall \mathbb{R}, \mathbb{R} > 0$
   This is gobbeldy gook. It has to be in the form, Quantifier(variable) is in defined_set for a formula
   (b) $\forall x \in \mathbb{Z}, \exists y \in \mathbb{R}, (y \notin \mathbb{Z}) \wedge (x = \lfloor y \rfloor)$
   For all the x's are in the set of integers. There exists a y that is in the set of real numbers. There exists a y that is not in the set z, AND that x are the floor of that y.
   True x = 3 and y = 3.2
   (c) $\forall x, \exists (y = x)$
   This I haven't seen before? So I am assuming this is the gobbeldy gook.
   (d) $\forall x = \forall y$
   GOBBELDY GOOK
   (e) $\forall x \in \mathbb{R}, \exists y \in \mathbb{R}, x^2 = \neg y$
   true x = 2^2 and y = 487.91247
   (f) $\forall x \in \mathbb{R}, \exists y \in \mathbb{Z}, \forall t \in \mathbb{R}, \forall s \in \mathbb{R}, (2 + 2 = 4)$
   This doesn't make sense to me since there is no letters in the math at the end. My assumption is that it is true since there is nothing to actually compare or look at...?
   (g) All of what?
   (h) again gobbeldy gook

3. True, if x is positive then x^3 is positive.

4. (a) 24/7 is a word according to oxforddictionaries.com if this is true then the statement is true. But depending on what we consider an english word, it may be false.
   (b) There exists a letter in the alphabet and there exists a word in the set of all English words. Also all the letters in the alphabet, where there is a word with a letter of the alphabet then there is a word with some letter of the alphabet... True
   (c) There is not an existance of a letter, that is not in all the words of the english dictionary. This is true if you don't count non letter words That I mentioned above.
   (d) All the letters in the set of A, There does not exist a word where a letter is in the word.
   true?

5. (a) $\exists x \in A, \exists y \in W,$ 'f' $\in$ "philosophy"
   ... :/ false cause, no.
   (b) $\forall x \in A, \exists z \in W, P(x, z) \wedge \exists d \in A, \forall y \in W, P(d, y)$
   True unless you count non letter words
   (c) $\exists x \in A, \exists w \in W, P(x, w) \to \exists l \in A, P(l, w)$
   False, a and I.
   (d) I feel like this is silly because you are saying that a word that has f and g is a word...?
   $\forall w \in W, P((f + g), w) = w$ ...? I feel dumb...
   (e) $\exists w \in W, \forall a \in w, \exists z \in W, P(a, w) \to P(a, z) \wedge$ 'y' $\in z$
   True. Pay and yap

(f) $\forall a \in A, \exists w \in W, P(a, w) \rightarrow \exists z \in W, \forall a \in A, P(a, z)$
This would be true if there was such a word but there is not. False.

(g) $\forall a \in A, \exists w \in W, P(a, w) \rightarrow \forall s \in W P(a, s)$
What I think this is saying is that for each letter of the alphabet there is a word with that letter only if all the words in the english dictionary have that letter in it. Which is false.

(h) $\exists x \in A, \exists y \in W, P(x, y) \leftrightarrow \exists l \in A, l \neq x$
True

(i) Not sure how to do this...

false.

SECRET 1 There is a silly very simple easteregg in here if you add up or subtract down something...