Math 321

1.4 ex of a n-ary Predicate.

There is a student in this class that has been in every room of at least one building on campus.

$I(s,r)$: "s has been in r"
Univ. of Disc.   s is from students in this class
                 r is from rooms.

$R(r,b)$: "r is a room in b"
Univ. of Disc.   r is from all rooms
                 b is from buildings on campus

$$\exists s \, \exists b \, \forall r \, (R(r,b) \wedge I(s,r))$$

(1.5) Rules of Inference for Quantifiers

$$\frac{\forall x P(x)}{\therefore P(c)}$$ Universal Instantiation

$$\frac{\exists x P(x)}{\therefore P(c)}$$ Existential Instantiation.

for the c
that has the property

$\underline{P(c) \text{ for some } C}$ Existential Generalization

$\therefore \exists x\, P(x)$

$\underline{P(c) \text{ for every } C}$ Universal Generalization.

$\therefore \forall x\, P(x)$

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(ex) p. 94 #26

"All lions are fierce"
"Some lions do not drink coffee"
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$\therefore$ "Some fierce creatures do not drink coffee"

total
Argument!

"Some lions do not drink coffee" } Existential
(1) (Simba) does not drink coffee ← Instant.
"All lions are fierce"

save
this

(2) for all creatures, if it is a lion then it is fierce. } Univ.
(2) if Simba is a lion, then Simba is fierce ← Inst.
Simba is a lion.
Simba is fierce and doesn't drink coffee.

Exist.
Generalization

_____

$\therefore$ "Some fierce creatures do not drink coffee"

1.6 Argument Process = Proof.

Statements you can show to be true
↑

① Lemma, proposition
② theorem
③ corollary

Proof.
the argument that shows the statement to be true.

ex — if p is even then p^2 is even.

pf — assume p is even

Show p^2 is even!

p is even

$p = 2 \cdot k$ for some k.