Real LSAT Problem

Several critics have claimed that any contemporary poet who writes formal poetry — poetry that is rhymed and metered — is performing a politically conservative act. This is plainly false. Consider Molly Peacock and Marilyn Hacker, two contemporary poets whose poetry is almost exclusively formal and yet who are themselves politically progressive feminists.

The conclusion drawn above follows logically if which one of the following is assumed?

A. No one who is a feminist is also politically conservative.

B. No poet who writes unrhymed or unmetered poetry is politically conservative.

C. No one who is politically progressive is capable of performing a politically conservative act.

D. Anyone who sometimes writes poetry that is not politically conservative never writes poetry that is politically conservative.

E. The content of a poet's work, not the work's form, is the most decisive factor in determining what political consequences, if any, the work will have.

The Meaning of Quantied Sentences

Wednesday, 26 March

Aristotelian Forms

Forms:

QL sentence:

ARISTOTELIAN FORMS

Forms:	QL sentence:
All Ps are Qs.	$\forall x(P(x) \rightarrow Q(x))$

Aristotelian Forms

Forms:	QL sentence:
All Ps are Qs.	$\forall x(P(x) \rightarrow Q(x))$
All fish can swim	$\forall x(Fish(x) \rightarrow CanSwim(x))$

Aristotelian Forms

Forms:	QL sentence:
All Ps are Qs.	$\forall x(P(x) \rightarrow Q(x))$
All fish can swim	$\forall x(Fish(x) \rightarrow CanSwim(x))$
Some Ps are Qs.	$\exists x(P(x) \wedge Q(x))$

Aristotelian Forms

Forms:	QL sentence:
All Ps are Qs.	$\forall x(P(x) \rightarrow Q(x))$
All fish can swim	$\forall x(Fish(x) \rightarrow CanSwim(x))$
Some Ps are Qs.	$\exists x(P(x) \wedge Q(x))$
Some birds can fly	$\exists x(Bird(x) \wedge CanFly(x))$

Aristotelian Forms

Forms:

QL sentence:

Aristotelian Forms

Forms:	QL sentence:

- No Ps are Qs. $\forall x(P(x) \rightarrow \neg Q(x))$

Aristotelian Forms

Forms:	QL sentence:
No Ps are Qs.	$\forall x(P(x) \to \neg Q(x))$
No cubes are small	$\forall x(Cube(x) \to \neg Small(x))$

Aristotelian Forms

Forms:	QL sentence:
No Ps are Qs.	$\forall x(P(x)\rightarrow\neg Q(x))$
No cubes are small	$\forall x(Cube(x)\rightarrow\neg Small(x))$
Some Ps are not Qs.	$\exists x(P(x)\wedge\neg Q(x))$

Aristotelian Forms

Forms:	QL sentence:
• No Ps are Qs.	$\forall x(P(x) \rightarrow \neg Q(x))$
• No cubes are small	$\forall x(Cube(x) \rightarrow \neg Small(x))$
• Some Ps are not Qs.	$\exists x(P(x) \wedge \neg Q(x))$
• Some large things are not dodecs	$\exists x(Large(x) \wedge \neg Dodec(x))$

Harder Basic Forms

a is to the left of every cube

Harder Basic Forms

a is to the left of every cube

$$\forall x(Cube(x) \rightarrow LeftOf(a,x))$$

HARDER BASIC FORMS

a is to the left of every cube

$\forall x(\text{Cube}(x) \rightarrow \text{LeftOf}(a,x))$

a is not to the left of any cubes

Harder Basic Forms

a is to the left of every cube

$$\forall x(\mathrm{Cube}(x) \rightarrow \mathrm{LeftOf}(a,x))$$

a is not to the left of any cubes

$$\neg\exists x(\mathrm{Cube}(x) \wedge \mathrm{LeftOf}(a,x))$$

HARDER BASIC FORMS

a is to the left of every cube

$\forall x(\text{Cube}(x) \rightarrow \text{LeftOf}(a,x))$

a is not to the left of any cubes

$\neg\exists x(\text{Cube}(x) \land \text{LeftOf}(a,x))$

$\forall x(\text{Cube}(x) \rightarrow \neg\text{LeftOf}(a,x))$

HARDER BASIC FORMS

a is to the left of every cube

$$\forall x(Cube(x) \rightarrow LeftOf(a,x))$$

a is not to the left of any cubes

$$\neg\exists x(Cube(x) \land LeftOf(a,x))$$

$$\forall x(Cube(x) \rightarrow \neg LeftOf(a,x))$$

$$\forall x(LeftOf(a,x) \rightarrow \neg Cube(x))$$

Complex Predicates

Some Ps are Qs $\exists x(P(x) \wedge Q(x))$

Complex Predicates

Some Ps are Qs

$\exists x(P(x) \wedge Q(x))$

Some Ps that are also Rs are Qs

$\exists x[(P(x) \wedge R(x)) \wedge Q(x)]$

Complex Predicates

Some Ps are Qs	$\exists x(P(x) \wedge Q(x))$
Some Ps that are also Rs are Qs	$\exists x[(P(x) \wedge R(x)) \wedge Q(x)]$
Some Ps are Rs and Qs	$\exists x(P(x) \wedge (R(x) \wedge Q(x)))$

Complex Predicates

Some Ps are Qs

$\exists x(P(x) \wedge Q(x))$

Some Ps that are also Rs are Qs

$\exists x[(P(x) \wedge R(x)) \wedge Q(x)]$

Some Ps are Rs and Qs

$\exists x(P(x) \wedge (R(x) \wedge Q(x)))$

These are obviously equivalent

Complex Predicates

Some Ps are Qs

$\exists x(P(x) \wedge Q(x))$

Some Ps that are also Rs are Qs

$\exists x[(P(x) \wedge R(x)) \wedge Q(x)]$

Some Ps are Rs and Qs

$\exists x(P(x) \wedge (R(x) \wedge Q(x))$

Complex Predicates

Some Ps are Qs

$\exists x(P(x) \land Q(x))$

Some Ps that are also Rs are Qs

$\exists x[(P(x) \land R(x)) \land Q(x)]$

Some Ps are Rs and Qs

$\exists x(P(x) \land (R(x) \land Q(x))$

Some small cubes are to the right of *a*

$\exists x(Small(x) \land Cubes(x) \land RightOf(x,a))$

Complex Predicates

All Ps are Qs $\forall x(P(x) \rightarrow Q(x))$

Complex Predicates

All Ps are Qs

$\forall x(P(x) \rightarrow Q(x))$

All Ps that are also Rs are Qs

$\forall x[(P(x) \wedge R(x)) \rightarrow Q(x)]$

Complex Predicates

All Ps are Qs

$\forall x(P(x) \rightarrow Q(x))$

All Ps that are also Rs are Qs

$\forall x[(P(x) \wedge R(x)) \rightarrow Q(x)]$

All Ps are Rs and Qs

$\forall x[P(x) \rightarrow (R(x) \wedge Q(x))]$

Complex Predicates

All Ps are Qs

$\forall x(P(x) \rightarrow Q(x))$

All Ps that are also Rs are Qs

$\forall x[(P(x) \wedge R(x)) \rightarrow Q(x)]$

All Ps are Rs and Qs

$\forall x[P(x) \rightarrow (R(x) \wedge Q(x))]$

These are NOT equivalent

Complex Predicates

Every cube is either large or small

Complex Predicates

Every cube is either large or small

$$\forall x(\mathrm{Cube}(x) \rightarrow (\mathrm{Large}(x) \vee \mathrm{Small}(x))$$

Complex Predicates

Every cube is either large or small

$$\forall x(\mathrm{Cube}(x) \rightarrow (\mathrm{Large}(x) \vee \mathrm{Small}(x))$$

All small cubes are to the right of *a*

Complex Predicates

Every cube is either large or small

$$\forall x(Cube(x) \rightarrow (Large(x) \vee Small(x))$$

All small cubes are to the right of *a*

$$\forall x[(Small(x) \wedge Cubes(x)) \rightarrow RightOf(x,a)]$$

Complex Predicates

Every cube is either large or small

$$\forall x(\text{Cube}(x) \to (\text{Large}(x) \vee \text{Small}(x))$$

All small cubes are to the right of *a*

$$\forall x[(\text{Small}(x) \wedge \text{Cubes}(x)) \to \text{RightOf}(x,a)]$$

Every cube in the same row as *a* is small

Complex Predicates

Every cube is either large or small

$$\forall x(\text{Cube}(x) \rightarrow (\text{Large}(x) \vee \text{Small}(x))$$

All small cubes are to the right of *a*

$$\forall x[(\text{Small}(x) \wedge \text{Cubes}(x)) \rightarrow \text{RightOf}(x,a)]$$

Every cube in the same row as *a* is small

$$\forall x[(\text{Cube}(x) \wedge \text{SameRow}(x,a)) \rightarrow \text{Small}(x)]$$

Complex Predicates

The only things in back of *a* are large cubes

Complex Predicates

The only things in back of *a* are large cubes

$$\forall x(\mathrm{BackOf}(x,a) \rightarrow (\mathrm{Large}(x) \wedge \mathrm{Cube}(x)))$$

Complex Predicates

The only things in back of *a* are large cubes

$$\forall x(\mathrm{BackOf}(x,a) \rightarrow (\mathrm{Large}(x) \land \mathrm{Cube}(x))$$

No small cubes are in the same row as *a*

Complex Predicates

The only things in back of *a* are large cubes

$$\forall x(BackOf(x,a) \rightarrow (Large(x) \wedge Cube(x))$$

No small cubes are in the same row as *a*

$$\forall x[(Small(x) \wedge Cubes(x)) \rightarrow \neg SameRow(x,a)]$$

Complex Predicates

The only things in back of *a* are large cubes

$$\forall x(BackOf(x,a) \rightarrow (Large(x) \wedge Cube(x))$$

No small cubes are in the same row as *a*

$$\forall x[(Small(x) \wedge Cubes(x)) \rightarrow \neg SameRow(x,a)]$$

Nothing in the same row as *a* is a small cube

Complex Predicates

The only things in back of *a* are large cubes

$$\forall x(\text{BackOf}(x,a) \rightarrow (\text{Large}(x) \wedge \text{Cube}(x))$$

No small cubes are in the same row as *a*

$$\forall x[(\text{Small}(x) \wedge \text{Cubes}(x)) \rightarrow \neg \text{SameRow}(x,a)]$$

Nothing in the same row as *a* is a small cube

$$\forall x(\text{SameRow}(x,a) \rightarrow \neg(\text{Small}(x) \wedge \text{Cube}(x)))$$

Complex Predicates

Everything that isn't large or small is medium

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \lor Small(x)) \rightarrow Medium(x))$$

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \vee Small(x)) \rightarrow Medium(x))$$

$$\forall x((\neg Large(x) \wedge \neg Small(x)) \rightarrow Medium(x))$$

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \vee Small(x)) \rightarrow Medium(x))$$

$$\forall x((\neg Large(x) \wedge \neg Small(x)) \rightarrow Medium(x))$$

$$\forall x(Large(x) \vee Small(x) \vee Medium(x))$$

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \vee Small(x)) \rightarrow Medium(x))$$

$$\forall x((\neg Large(x) \wedge \neg Small(x)) \rightarrow Medium(x))$$

$$\forall x(Large(x) \vee Small(x) \vee Medium(x))$$

$\neg(P \vee Q) \rightarrow R \Leftrightarrow$

$(\neg P \wedge \neg Q) \rightarrow R \Leftrightarrow$

$P \vee Q \vee R$

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \vee Small(x)) \rightarrow Medium(x))$$

$$\forall x((\neg Large(x) \wedge \neg Small(x)) \rightarrow Medium(x))$$

$$\forall x(Large(x) \vee Small(x) \vee Medium(x))$$

$\neg(P \vee Q) \rightarrow R \Leftrightarrow$

$(\neg P \wedge \neg Q) \rightarrow R \Leftrightarrow$ Therefore

$P \vee Q \vee R$

Complex Predicates

Everything that isn't large or small is medium

$$\forall x(\neg(Large(x) \vee Small(x)) \rightarrow Medium(x))$$

$$\forall x((\neg Large(x) \wedge \neg Small(x)) \rightarrow Medium(x))$$

$$\forall x(Large(x) \vee Small(x) \vee Medium(x))$$

$\neg(P \vee Q) \rightarrow R \Leftrightarrow$

$(\neg P \wedge \neg Q) \rightarrow R \Leftrightarrow$

$P \vee Q \vee R$

Therefore

$\forall x\ \neg(P \vee Q) \rightarrow R \Leftrightarrow$

$\forall x(\neg P \wedge \neg Q) \rightarrow R \Leftrightarrow$

$\forall x\ P \vee Q \vee R$

Complex Predicates

Nothing is large unless it is in the same row as *a*

Complex Predicates

Nothing is large unless it is in the same row as *a*

$$\forall x(\neg \mathrm{SameRow}(x,a) \rightarrow \neg \mathrm{Large}(x))$$

Complex Predicates

Nothing is large unless it is in the same row as *a*

$$\forall x(\neg SameRow(x,a) \rightarrow \neg Large(x))$$

$$\forall x(Large(x) \rightarrow SameRow(x,a))$$

Complex Predicates

Nothing is large unless it is in the same row as *a*

$\forall x(\neg SameRow(x,a) \rightarrow \neg Large(x))$

$\forall x(Large(x) \rightarrow SameRow(x,a))$

If something is in the same row as *a*, then it is large.

Complex Predicates

Nothing is large unless it is in the same row as *a*

$$\forall x(\neg SameRow(x,a) \rightarrow \neg Large(x))$$

$$\forall x(Large(x) \rightarrow SameRow(x,a))$$

If something is in the same row as *a*, then it is large.

$$\forall x(SameRow(x,a) \rightarrow Large(x))$$