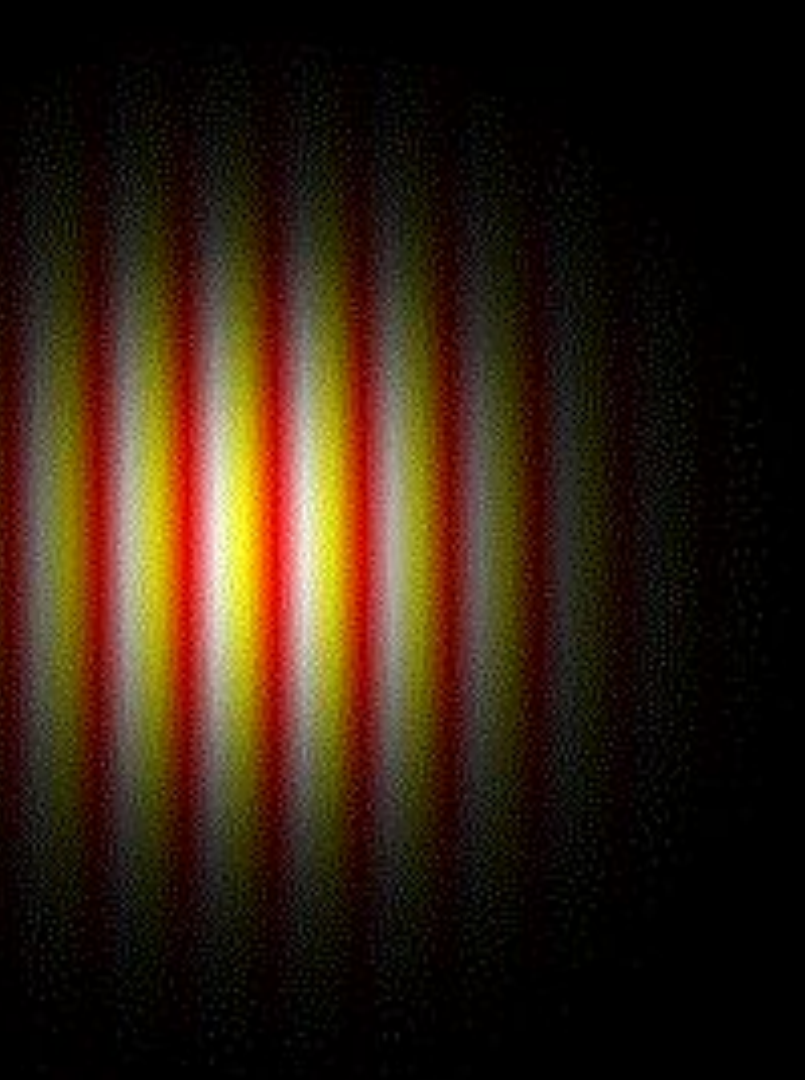
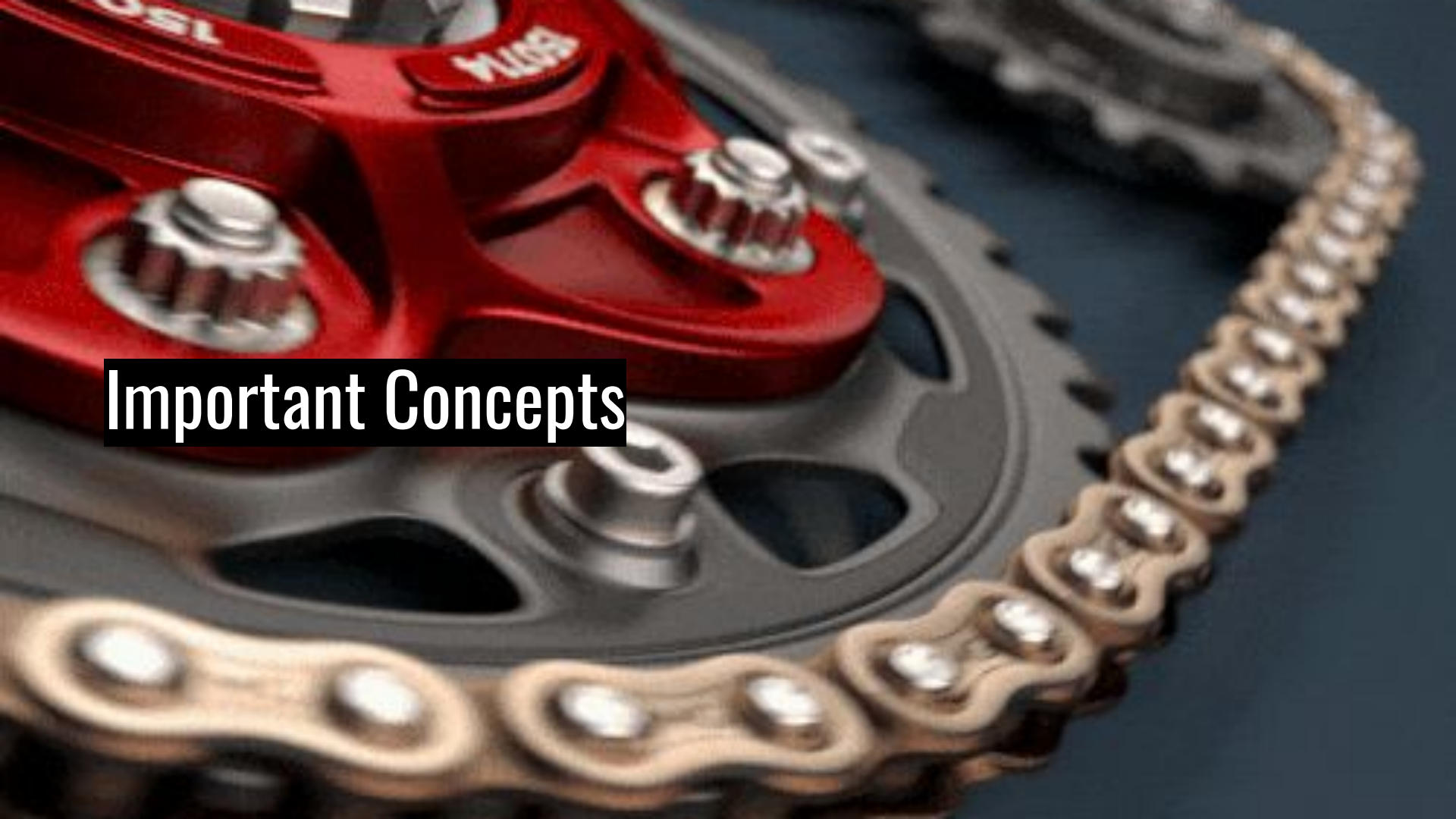


Translations



Important Concepts

Relationships

Relational Predicates

Background Concepts

DEF: A monadic predicate (a.k.a. a one-place predicate) is a predicate that says something about one thing;

e.g., “Joe is happy” has a monadic predicate, namely “_____ is happy.”

Background Concepts

DEF: a relational predicate (a.k.a. a dyadic predicate or a two-place predicate) is a predicate that asserts a relationship between two or more things;

e.g., the predicate in “Sabrina is taller than Katia” is “___ is taller than ___.”

Background Concepts

This relational predicate would be symbolized using two constants (or variables):

Tsk

It is read as

“Sabrina is taller than Katia.”

Translate the following:
“Jed knows everybody”

Paraphrase:
For all x, if x is a person, then Jed knows x.

$(\forall x)(Px \supset Kjx)$

Translate the following:
“Fred knows somebody”

Paraphrase:
There exists an x, such that x is a person and Fred knows x.

$(\exists x)(Px \ \& \ Kfx)$

Translate the following:
“Somebody knows Fred”

Paraphrase:
There exists an x, such that x is a person and x knows Fred.

$(\exists x)(Px \ \& \ Kxf)$

Translate the following:
“All brontosauri are taller than Courtney”

Paraphrase:
For all x, if x is a brontosaurus, then x is taller than Courtney.

$(\forall x)(Bx \supset Txc)$

Translate the following:
“Not all brontosauri are taller than Ashby”

Paraphrase:
It is not the case that for any x, if x is a brontosaurus, then x is taller than Ashby.

$\sim(\forall x)(Bx \supset Txa)$

Translate the following:
“Baron likes every hamburger.”

Paraphrase:
For every x, if x is a hamburger, then Baron likes x.

$(\forall x)(Hx \supset Lbx)$

Translate the following:
“Patrick does not like every hamburger”

Paraphrase:
It is not the case that for every x, if x is a hamburger, then Patrick likes x.

$\sim(\forall x)(Hx \supset Lpx)$

Translate the following:
“Toi does not like any hamburger”

Paraphrase:
For any x, if x is a hamburger, then Toi does not like x.

$(\forall x)(Hx \supset \sim Ltx)$

Translate the following:
“Everybody loves Raymond”

Paraphrase:
For all x, if x is a person, then x loves Raymond.

$(\forall x)\,(Px \supset Lxr)$

Translate the following:
“Not everybody likes García”

Paraphrase:
It is not the case that for all x, if x is a person, then x likes García.

$\sim(\forall x)(Px \supset Lxg)$

Translate the following:
“García doesn’t know anybody”

Paraphrase:
It is not the case that there is an x such that x is a person and García knows x.

$\sim(\exists x)(Px \ \& \ Kgx)$

or

$(\forall x)(Px \supset \sim Kgx)$

Translate the following:
“García doesn’t know everybody”

Paraphrase:
It is not the case that for every x, if x is a person then García knows x.

$\sim(\forall x)(Px \supset Kgx)$
or
$(\exists x)(Px \ \& \sim Kgx)$

Translate the following:
“Nobody knows García”

Paraphrase:
For all x, if x is a person, then it is not the case that x knows García.

$(\forall x)(Px \supset \sim Kxg)$

or

$\sim(\exists x)(Px \ \& \ Kxg)$

Reflexive sentences

Translate the following: “Narcissus loves himself”

Let Lxy stand for “x loves y” and let n stand for “Narcissus.” The sentences would be symbolized as:

Lnn

The following practice problems are taken from Herrick (2013; p. 511-12):

1. Pam is taller than Sue but Sue is older than Pam.
2. Archie Bunker does not like any liberal.
3. Archie Bunker does not like every liberal.
4. Wimpy, the hamburger man, respects himself.
5. Someone knows himself.
6. Everybody knows Bill Gates.
7. All elephants are larger than Nathan’s pet mouse.
8. Lorraine likes any horse.
9. Somebody knows Katie.
10. Matt is a friend of Elliot’s.
11. Sam dislikes somebody.
12. Sam dislikes everybody.

Overlapping quantifiers

If one quantifier appears immediately to the right of another quantifier, then the scope of the first quantifier is that quantifier itself plus the scope of the second quantifier, as in:

$$(\forall x)(\exists y)Tyx$$

Translate the following: “Everything is caused by something.”

Paraphrase: For every x, there exists at least one y such that y is the cause of x.

$$(\forall x)(\exists y)Cyx$$

Translate the following: “Something causes everything.”

Paraphrase: There exists some y, such that for every x in the universe, y is the cause of x.

$(\exists y)(\forall x)Cyx$

Translate the following:
“Everything causes something.”

Paraphrase: For all x, there exists some y, such that x is the cause of y.

$(\forall x)(\exists y)Cxy$

Universe of Discourse

DEF: the domain of a variable is the set of things the variable can take as values.

###
When we specify the universe of discourse for a sentence containing a variable, we are stating the domain of the variable;
i.e., we are specifying what it ranges over.
###

IF: the domain of a variable is everything in the universe

THEN: we call this the universal domain.

ELSE: the domain is a set of things within the universe, and so we call this a restricted domain.

Translate the following:
“All humans have moral rights.”

Paraphrase: For all x, if x is a human, then x has moral rights.

$$(\forall x)(Hx \supset Mx)$$

Translate the following:
“All humans have moral rights.”

If we stipulate that the domain is restricted only to persons (i.e., the variable x ranges only over persons), the we can symbolize this sentence as:

$$(\forall x)Mx$$

Translate the following, where the universe of discourse is restricted to persons:
“Someone knows someone.”

$(\exists x)(\exists y)Kxy$

You try it:

1. Everybody loves somebody.
2. Somebody loves everyone.

The following practice problems are taken from Herrick (2013; p. 518):

Universe of Discourse: Human Beings

1. There is a person who is universally respected.
2. There is a person who respects everybody.
3. Everybody respects someone or other.
4. Some people do not know anybody.
5. If everybody knows somebody, then somebody knows everybody.
6. If someone helps someone, then God is pleased.
7. Anyone who loves no one is to be pitied.
8. Someone is not known by anyone.