Define *homoiconicity*.

Wikipedia: a property of some programming languages, in which the primary representation of programs is also a data structure in a primitive type of the language itself.

"code-as-data"

Describe the Clojure build process.

The reader converts the program text into forms which are then converted into Clojure data structures, which are then compiled.

What are the most common forms?

Boolean, number, string, character, keyword, symbol, nil, vector, list, map.

How are Clojure numbers different from Java's?

- Integers are automatically promoted to arbitrary-size `BigIntegers` as needed.
- `BigIntegers` and `BigDecimals` have a literal form, a number ending with `M`.

What can symbols refer to?

Functions with standard identifiers, operators, Java classes, Clojure namespaces, Java packages, data structures, refs

What are the rules for symbol names?

They may not begin with a number.
They consist of letters, numbers, `+`, `-`, `*`, `/`, `?`.

`.` and _ are also possible, but have special meaning with respect to namespaces.

How are string literals different from Java's?

- They can be multiline.
- They are displayed to the screen with escaped newlines.

How are strings different from Java's?

They are sequences of characters, so higher-order sequence functions work on them.

Describe `str`.

It creates a string, much like `toString`, but is n-ary and ignores `nil`.

How are escape characters created?

\backspace, \formfeed, \newline, \return, \space, \tab

How can a string be created from a sequence of characters?

```
(apply str [\a \b \c])
```

`apply` is making an n-ary call to `str` given a sequence argument.

How can you test for strict booleans?

Use `true?` and `false?`.

Give two ways to query a map.

- `(map key)`
- `(keyword-key map)`

Note the second form works only if the key is a keyword.

What are structs used for?

To document the fact that multiple maps are similar, i.e., they share common keys.

What special symbols are used in the documentation?

`&` indicates the following param is of variable arity and available as a seq.
`*` indicates the previous param is of variable arity.
`+` indicates the previous param is of variable, non-zero arity.
`?` indicates the previous param is optional.

Define a struct.

Instantiate a struct.

```
(defstruct name & keys)

(struct name & vals)
```

What is the basis of a struct?

The keys listed in the struct's definition.

How can one create a struct that lacks keys from the basis or has additional keys?

```
(struct-map name & inits)
```

Any missing keys will be given the value `nil` in the resulting struct.

How are structs different from maps?

The difference is mostly stylistic, although structs do store their values in indexed slots.

What's the difference between a reader macro and a form?

Reader macros are applied prior to the text being broken into forms.

What's the most common reader macro?

The comment, `;`.

Why are programs barred from defining additional reader macros?

To prevent code becoming unreadable to others, and to prevent Clojure from fragmenting into non-interoperable dialects.

How can you test for the type of a form?

Use the built in predicates `keyword?`, `symbol?`, etc.

What is the signature of `defn` with a single param list?

```
(defn name doc-string? attr-map? [params*] body)
```

What is the signature of `defn` with multiple param lists?

```
(defn name doc-string? attr-map?
 ([params*] body)+ )
```

What is `defn`, really?

A macro for:

```
(def name (fn [params*] exprs*))
```

The doc-string and attrs are added to the var metadata.

What is the vararg syntax?

Just as in the documentation syntax, us a `&` before the final parameter.