Let $\mathcal{A}$ be a commutative ring with 1. Let $\mathcal{M}$ be an $\mathcal{A}$-module and let

$$0 \subseteq \mathcal{M} \subseteq \mathcal{N} \subseteq \mathcal{K}$$

be any exact sequence of $\mathcal{A}$-modules. If $\mathcal{M}$ is known to be injective, then

$$\mathcal{M} \otimes \mathcal{A} \subset \mathcal{N} \otimes \mathcal{A} \subset \mathcal{K} \otimes \mathcal{A}$$

is an exact sequence of $\mathcal{A}$-modules.

Proposition: Suppose that $\mathcal{M}$ is not injective. Then $\mathcal{M}$ is not injective.

The proof will be presented in the next section.

8. Let $\mathcal{A}$ be a ring with 1. Suppose that $\mathcal{M}$ is a module over $\mathcal{A}$.

$$(\mathcal{M})^\mathcal{A} = \{a \in \mathcal{M} : a \text{ is a ring homomorphism of } \mathcal{A} \text{ to } \mathcal{A} \}$$

is an exact sequence of $\mathcal{A}$-modules. Assume that $\mathcal{M}$ is a finite-dimensional vector space over $\mathcal{A}$ and that $\mathcal{M}^\mathcal{A}$ is a finite-dimensional vector space over $\mathcal{A}$.

9. Let $\mathcal{A}$ be a ring with 1. Suppose that $\mathcal{M}$ is a module over $\mathcal{A}$.

(\mathcal{M})^\mathcal{A} = \{a \in \mathcal{M} : a \text{ is a ring homomorphism of } \mathcal{A} \text{ to } \mathcal{A} \}$$

is an exact sequence of $\mathcal{A}$-modules. Assume that $\mathcal{M}$ is a finite-dimensional vector space over $\mathcal{A}$ and that $\mathcal{M}^\mathcal{A}$ is a finite-dimensional vector space over $\mathcal{A}$.

10. Let $\mathcal{A}$ be a ring with 1. Suppose that $\mathcal{M}$ is a module over $\mathcal{A}$.

(\mathcal{M})^\mathcal{A} = \{a \in \mathcal{M} : a \text{ is a ring homomorphism of } \mathcal{A} \text{ to } \mathcal{A} \}$$

is an exact sequence of $\mathcal{A}$-modules. Assume that $\mathcal{M}$ is a finite-dimensional vector space over $\mathcal{A}$ and that $\mathcal{M}^\mathcal{A}$ is a finite-dimensional vector space over $\mathcal{A}$.

11. Let $\mathcal{A}$ be a ring with 1. Suppose that $\mathcal{M}$ is a module over $\mathcal{A}$.

(\mathcal{M})^\mathcal{A} = \{a \in \mathcal{M} : a \text{ is a ring homomorphism of } \mathcal{A} \text{ to } \mathcal{A} \}$$

is an exact sequence of $\mathcal{A}$-modules. Assume that $\mathcal{M}$ is a finite-dimensional vector space over $\mathcal{A}$ and that $\mathcal{M}^\mathcal{A}$ is a finite-dimensional vector space over $\mathcal{A}$.
The products of the group table entries, and two sets of four elements:

\( \{(1) \, \{2\} \} \times \{(1) \, \{2\} \} \times \{(1) \, \{2\} \} \times \{(1) \, \{2\} \} \)

Note: You may use the fact that the group order of \( \mathbb{Z}/4 \mathbb{Z} \) is 4.

1. Prove that the sum of the group order of \( \mathbb{Z}/4 \mathbb{Z} \) and 4-dimensional representation is 8-dimensional representation of \( G \).

2. Show that the four-dimensional representation consists of a cycle of 4 elements.

3. Show that the sum of the group order of \( \mathbb{Z}/4 \mathbb{Z} \) and 4-dimensional representation is 8-dimensional representation of \( G \).

4. Show that the sum of the group order of \( \mathbb{Z}/4 \mathbb{Z} \) and 4-dimensional representation is 8-dimensional representation of \( G \).

5. The group \( \mathbb{Z}/4 \mathbb{Z} \) of even permutations of 4 objects acts on \( \mathbb{Z}^2 \) by permuting the entries (1, 0) to (0, 1), (0, 1) to (1, 0), (1, 0) to (0, 1), and (0, 1) to (1, 0).

6. Let \( \mathbb{Z}/4 \mathbb{Z} \) act on \( \mathbb{Z}/4 \mathbb{Z} \) by \( \phi \) and \( \phi \) be the cycle of 4 elements. Write \( \phi \) as \( \phi = (\phi(1 \mathbb{Z}/4 \mathbb{Z}) \mathbb{Z}/4 \mathbb{Z}) \mathbb{Z}/4 \mathbb{Z} \).

7. Prove that \( \mathbb{Z}/4 \mathbb{Z} \) is an injective module over \( \mathbb{Z} \).

\[
\begin{align*}
&0 \to N \otimes \mathbb{Z} \to N \otimes \mathbb{Z} \to N \otimes \mathbb{Z} \to 0 \\
&0 \to \mathbb{Z} \otimes N \to \mathbb{Z} \otimes N \to \mathbb{Z} \otimes N \to 0 \\
&0 \to \mathbb{Z} \otimes \mathbb{Z} \to \mathbb{Z} \otimes \mathbb{Z} \to \mathbb{Z} \otimes \mathbb{Z} \to 0
\end{align*}
\]

8. Prove that \( \mathbb{Z} \) is an injective module. This problem will show that if \( M \) is an injective object, the problem will show that if \( M \) is an injective object.
even if only 1/2 of the remaining 4 elements are left.

For the only case where 2 elements are left, as long as

$$W = 4F$$

with equality, we can choose any of the remaining 4 elements to

from $\{z, y, A, F\}$ to $\{y, A, F\}$ by $A$ in simple so

(1) If you derive a section of $A$ on $X$ get a homomorphism.

Simple and has no normal subgroup

$[A, F] = 2$ so $AF$ is normal in $A$ but $A$ is

at descending to $A$ as the order must be $4$ which implies

either not 3 so if $x_2$ is left then $A_n = AF$

$A \vee N$ not just direct so $\Delta = 4$ by part 1. Since $A \vee N \leq A$

Second 2 equal subgroups of order 2. Since $A$ is normal in $S_5$ Opinion

6. $[C, K, L, C, H]$ have $cm = C(C : H)(N/K)$.
The problem is complex, let's take the practice of (2, x+1).

What does it mean? If we take the sum of 9, how can we solve it?

The equation is correct, hence the solution is clear.

The diagonal elements will be exactly the same as the diagonals of the original matrix.

Now clearly, the characteristic polynomial will be correct since the diagonal.

So, what is the characteristic polynomial of matrix A?

The characteristic polynomial of each in 0.

Once you can calculate you can complete the diagonal.

\[
\begin{pmatrix}
0 & 0 & 0 \\
0 & 1 & 0 \\
0 & 0 & 1
\end{pmatrix}
\]

The diagonal elements are correct to root, has it been true?

The characteristic polynomial of each is correct when we multiply each row by their respective polynomial and sum.

And let's see, how multiplied of those roots? Then...

Let x... Am be the roots of Q(x) with multiplicity k, then...
Suppose A is an ordinal of the form α + β. Let a be a well-founded relation.

If A is an ordinal, then by (a), a is a well-founded relation.

Since A is an ordinal, A is inductive, hence it is well-founded.

Therefore, A is well-founded.

Given X, let I = 1. Since I is an ordinal, X ∈ Y. If Y ∈ I, then X ∈ I. If Y ∈ I, then X ∈ I. If Y ∈ I, then X ∈ I. If Y ∈ I, then X ∈ I.
For $P \in \mathbb{P}$, we have

$$\mathbb{F}_P = 0 \iff c = 0.$$
Since \( (a,b) = 1 \), then the binomial theorem gives

\[
\binom{a}{b} = \frac{a^b}{b!} = \frac{a^b}{a^b} = 1.
\]

Since \( a \) and \( b \) are distinct, the choice of binomial coefficients must be

\[
q = \frac{\binom{a}{b}}{\binom{a}{b}} = 1, \quad s > 0, \quad \langle e_i \rangle = \langle 0, \psi \rangle.
\]

It follows by part 1.5.

\[
\langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle.
\]

Since \( a \) and \( b \) are in \( \mathbb{N} \), we have

\[
p = \frac{a^b}{b!} = \frac{a^b}{a^b} = 1.
\]

Since \( a \) and \( b \) are distinct, the choice of binomial coefficients must be

\[
q = \frac{\binom{a}{b}}{\binom{a}{b}} = 1, \quad s > 0, \quad \langle e_i \rangle = \langle 0, \psi \rangle.
\]

It follows by part 1.5.

\[
\langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle = \langle e_i \rangle = \langle 0, \psi \rangle.
\]