§ 3.0 Direct Proof Review

1, 10

Jan 30

Instructions. Prove by using the definitions of even and odd integer.

(1) On a separate sheet of paper, write the statement of your group's Lemma and your group's proof.
(2) Turn in one paper per group.
(3) Each group member should put their name (and Pin) on the BACK of the paper.
(4) Please use 0.7 lead pencil (I hae some extras) and leave enough space for comments.

1. **Lemma SEE**. The sum of two even integers is an even integer.
2. **Lemma SEO**. The sum of an even integer and an odd integer is an odd integer.
3. **Lemma SOO**. The sum of two odd integers is an even integer.
4. **Lemma PEA**. The product of an even integer and any integer is an even integer.

Below space is for your Thinking Land.

Outline for a proof of a conditional statement: hypothesis ⇒ conclusion
i.e. $P \Rightarrow Q$.

Proof. Let ⟨state your hypothesis, in doing so you are often setting your notation⟩. We will show ⟨state what you want to show⟩.

opening

⟨The next paragraph(s) should be the "meat" of your proof. Argue why your hypothesis give you the conclusion. Justify each step.⟩ We have just shown ⟨what we needed to show, i.e. the conclusion.⟩,

meat

We have just shown: ⟨state what just shown.⟩ ∎

conclusion

From Ch 3 handout, last page.

$$(\forall x \in U)\ [P(x) \Rightarrow Q(x)]$$

▶. Direct proof §3.1

TL. Let $x \in U$.
Let $P(x)$ hold/be-true.
We shall show $Q(x)$ holds/is-true ⟨Start arguing that $Q(x)$ holds.⟩