

MTH 4441 HW #6 - SUBGROUPS

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Pat Rossi

Name _____

1. Given the group table for $(G, *)$, find all of the subgroups of $(G, *)$ and justify your answers. Draw a subgroup diagram for $(G, *)$.

*	e	a	b	c	d
e	e	a	b	c	d
a	a	b	c	d	e
b	b	c	d	e	a
c	c	d	e	a	b
d	d	e	a	b	c

2. Given the group table for $(G, *)$, find all of the subgroups of $(G, *)$ and justify your answers. Draw a subgroup diagram for $(G, *)$.

*	e	v	w	x	y	z
e	e	v	w	x	y	z
v	v	w	x	y	z	e
w	w	x	y	z	e	v
x	x	y	z	e	v	w
y	y	z	e	v	w	x
z	z	e	v	w	x	y

3. Given the group table for $(G, *)$, find all of the subgroups of $(G, *)$ and justify your answers. Draw a subgroup diagram for $(G, *)$.

*	e	v	w	x	y	z
e	e	v	w	x	y	z
v	v	e	x	z	w	y
w	w	x	e	y	z	v
x	x	z	y	e	v	w
y	y	w	z	v	e	x
z	z	y	v	w	x	e

4. Construct the group table for (\mathbb{Z}_4, \oplus) , and then find all of the subgroups of (\mathbb{Z}_4, \oplus) and justify your answers. Draw a subgroup diagram for (\mathbb{Z}_4, \oplus) .

(Note that $(\mathbb{Z}_4, \oplus) = (\{0, 1, 2, 3\}, \oplus)$, where \oplus is addition modulo 4)

5. Construct the group table for (\mathbb{Z}_5, \oplus) , and then find all of the subgroups of (\mathbb{Z}_5, \oplus) and justify your answers. Draw a subgroup diagram for (\mathbb{Z}_5, \oplus) .

(Note that $(\mathbb{Z}_5, \oplus) = (\{0, 1, 2, 3, 4\}, \oplus)$, where \oplus is addition modulo 5)

6. Construct the group table for (U_7, \odot) , and then find all of the subgroups of (U_7, \odot) and justify your answers. Draw a subgroup diagram for (U_7, \odot) . (Recall: $U_7 = \{1, 2, 3, 4, 5, 6\}$ and \odot is multiplication modulo 7.)

7. Given the group $(\mathbb{Z}, +)$, list some of the subgroups of $(\mathbb{Z}, +)$ and draw a subgroup diagram for the subgroups of $(\mathbb{Z}, +)$.