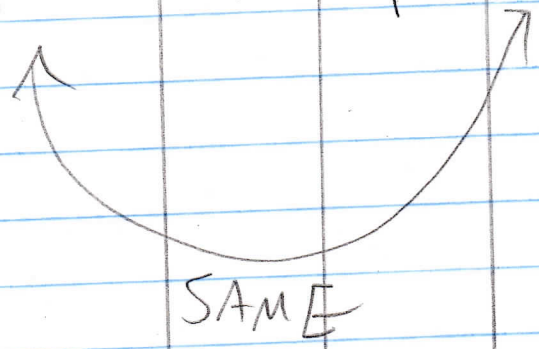


# problems

Prob 24 page 203

$(P \text{ AND } Q)$   
OR  $(P \text{ AND } R)$

P	Q	R	(Q OR R)	P AND (Q OR R)	P AND Q	P AND R
T	T	T	T	T	T	T
T	T	F	F	F	F	F
T	F	T	T	T	F	T
T	F	F	F	F	F	F
F	T	T	T	F	F	F
F	T	F	T	F	F	F
F	F	T	T	F	F	F
F	F	F	F	F	F	F



Problem 28 page 20: "If NOT Q, NOT P."

Problem 44 page 21:

Negate:  $\exists x \forall y (P(x) \text{ AND } Q(y))$ ,

Answer

$\forall x \exists y \text{ NOT } (P(x) \text{ AND } Q(y))$



$\forall x \exists y (\text{NOT } P(x)) \text{ OR } (\text{NOT } Q(y))$

Problem 66 page 22:

If  $m, n$  are integers and  $m \cdot n$  is odd, then  $m$  and  $n$  are odd.

Proof:

The contrapositive statement is:

"If  $m$  is even or  $n$  is even, then  $m \cdot n$  is even".

Assume that  $m$  is even,  $m = 2g$ . Then

$m \cdot n = (2g) \cdot n = 2(g \cdot n)$ , so  $2 \mid m \cdot n$  and

$m \cdot n$  is even. Assume that  $n$  is even,  $n = 2g$ . Then

$m \cdot n = m \cdot (2g) = 2(mg)$ , so  $2 \mid m \cdot n$ ,

Hence, the contrapositive statement holds. Q.E.D