Math 61

| SECTION 8.1 |

(#8) $P = true$
$Q = true$
$R = false$

$(P \land Q) \lor R$
$(T \land T) \lor F$
$T \lor F$
(T)

The given statement is true

(#16) Form a truth table for the given statement

$(P \land Q) \rightarrow Q$

P	Q	$P \land Q$	$(P \land Q) \rightarrow Q$
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	T

a tautology

(#18) $[(P \rightarrow Q) \land P] \rightarrow Q$

P	Q	$P \rightarrow Q$	$(P \rightarrow Q) \land P$	$(P \rightarrow Q) \land P] \rightarrow Q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

a tautology

(#32) Write the negation of

"If I am 18 or older, then I can vote"

The negation of $P \rightarrow Q$ is
$P \land \sim Q$

| I am 18 or older and I cannot vote

(#33) The negation of
"If I study hard and make an A, then I can be a member of Phi Theta Kappa."

is

| I study hard and make an A
| and cannot be a member
| of Phi Theta Kappa

because the negation
of $P \rightarrow Q$ is $P \land \sim Q$

#27 Show that $[(P \to Q) \land (Q \to R)] \to (P \to R)$ is a tautologie.

P	Q	R	P→Q	Q→R	(P→Q)∧(Q→R)	[(P→Q)∧(Q→R)]→(P→R)
T	T	T	T	T	T	T
T	T	F	T	F	F	T
T	F	T	F	T	F	T
T	F	F	F	T	F	T
F	T	T	T	T	T	T
F	T	F	T	F	F	T
F	F	T	T	T	T	T
F	F	F	T	T	T	T

a tautologi-

#28 Show that $[P \lor (Q \land R)]$ and $[(P \lor Q) \land (P \lor R)]$ are logically equivalent.

P	Q	R	Q∧R	P∨(Q∧R)	P∨Q	P∨R	(P∨Q)∧(P∨R)
T	T	T	T	T	T	T	T
T	T	F	F	T	T	T	T
T	F	T	F	T	T	T	T
T	F	F	F	T	T	T	T
F	T	T	T	T	T	T	T
F	T	F	F	F	T	F	F
F	F	T	F	F	F	T	F
F	F	F	F	F	F	F	F

identical truth values

therefore the two statiments are logically equivalent

SECTION 1.1

#11

Hypothesis:
If you go to the game

Conclusion:
you will have a good time.

#12

Hypothesis:
If the diagonals of a parallelogram are perpendicular

Conclusion
The parallelogram is a rhombus.

#14

Hypothesis:
If $\frac{a}{b} = \frac{c}{d}$, $b \neq 0$, $d \neq 0$

Conclusion
$a \cdot d = b \cdot c$

#17

Hypothesis
If a figure is a square:

Conclusion
The figure is a rectangle.

#18

Hypothesis
If two angles of an isosceles triangle are both angles

Conclusion
They are congruent