Homework: Logic Gates

Name: _____

Draw a circuit that represents the logical statements.

1. *p* | (!*q* & !*p*)
2. *x* & ![*y* | (*x* &*z*)]
3. *p* | ![*q* & !(*q* | !*p*)]
4. *x* | (*y* & *z* & !*x*) & !*z*
5. (!*p* & *q* & !*r*) | (*p* & *q* & *r*) | (*p* & !*q* & *r*) | (!*p* & !*q* & !*r*)

Write a logic statement and draw a circuit that represents the truth tables.

6.

p	*q*	Output
T	T	F
T	F	T
F	T	T
F	F	T

7.

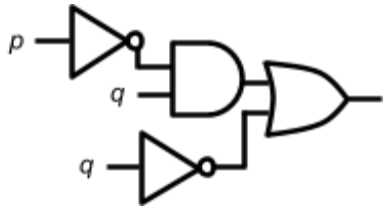
p	*q*	*r*	Output
T	T	T	T
T	T	F	F
T	F	T	T
T	F	F	F
F	T	T	F
F	T	F	T
F	F	T	F
F	F	F	F

8.

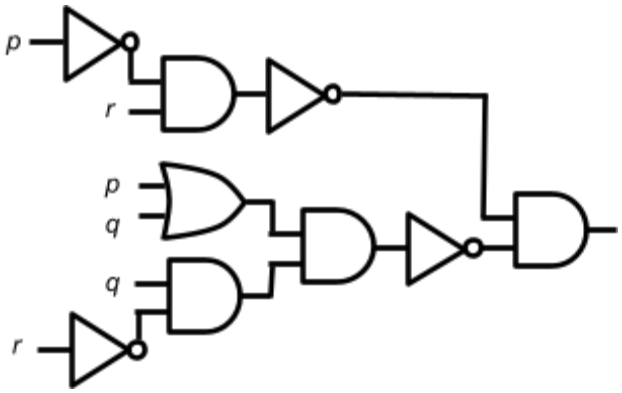
p	*q*	*r*	*s*	Output
T	T	T	T	F
T	T	T	F	F
T	T	F	T	T
T	T	F	F	F
T	F	T	T	F
T	F	T	F	T
T	F	F	T	F
T	F	F	F	F
F	T	T	T	T
F	T	T	F	F
F	T	F	T	F
F	T	F	F	F
F	F	T	T	F
F	F	T	F	F
F	F	F	T	F
F	F	F	F	T

Write a logical expression that is represented by the circuit.

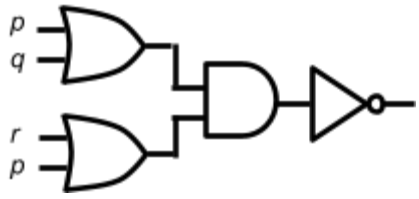
9.



10.

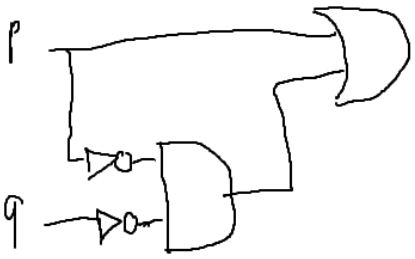


11.

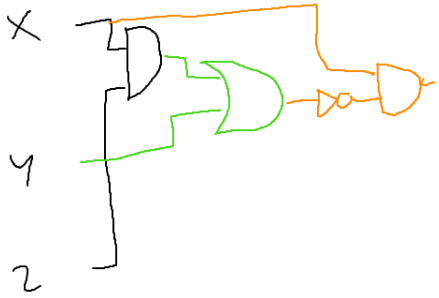


Homework: Logic Gates Solutions

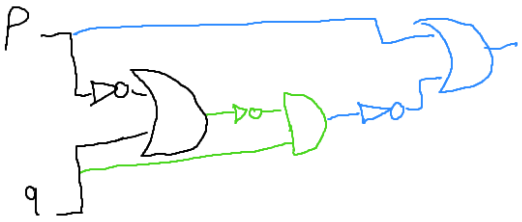
1.



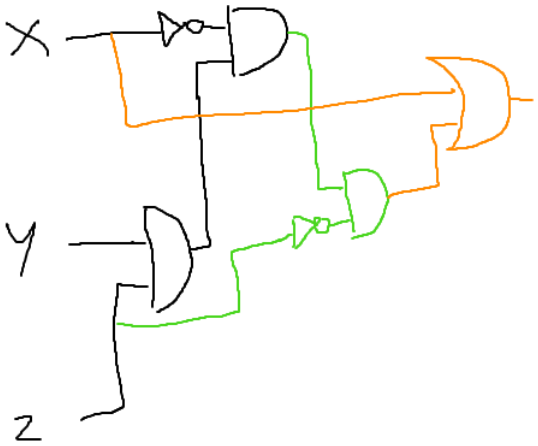
2.



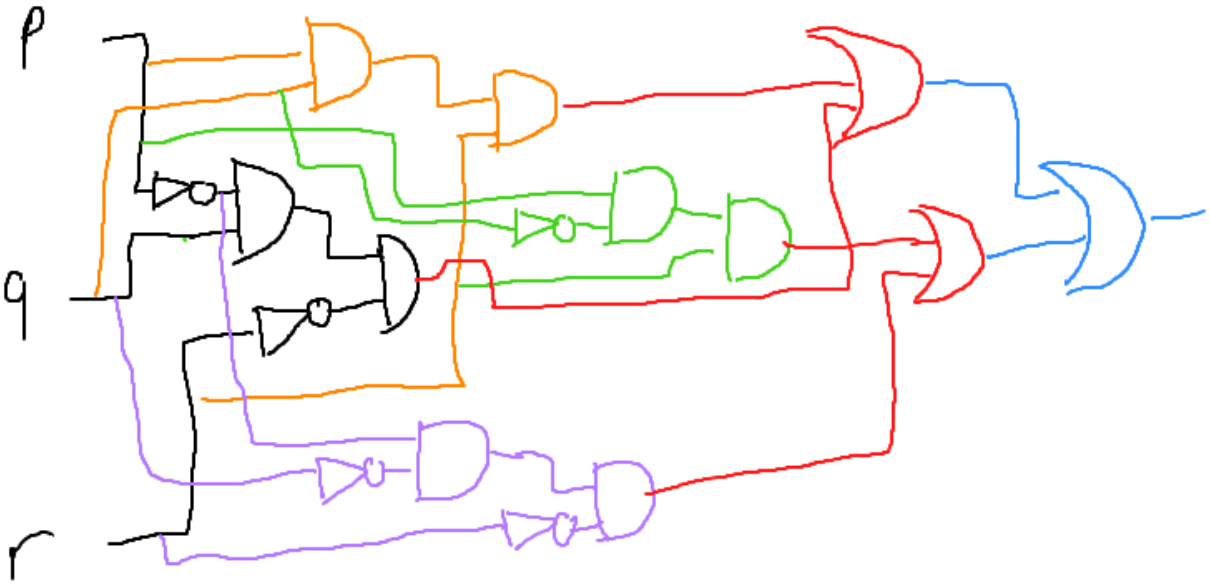
3.



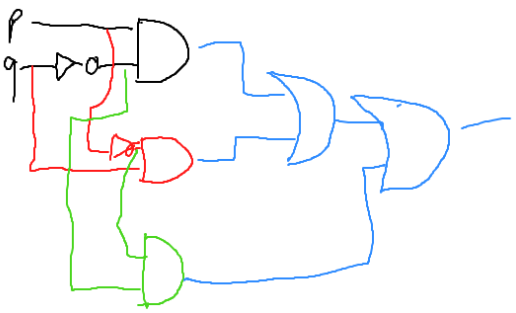
4. (OR statements have the lowest priority in the order of operations)



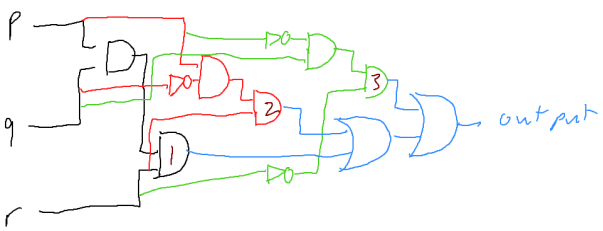
5. Can also be simplified to (p^r) v ~(pvr) ^ (qv~q)



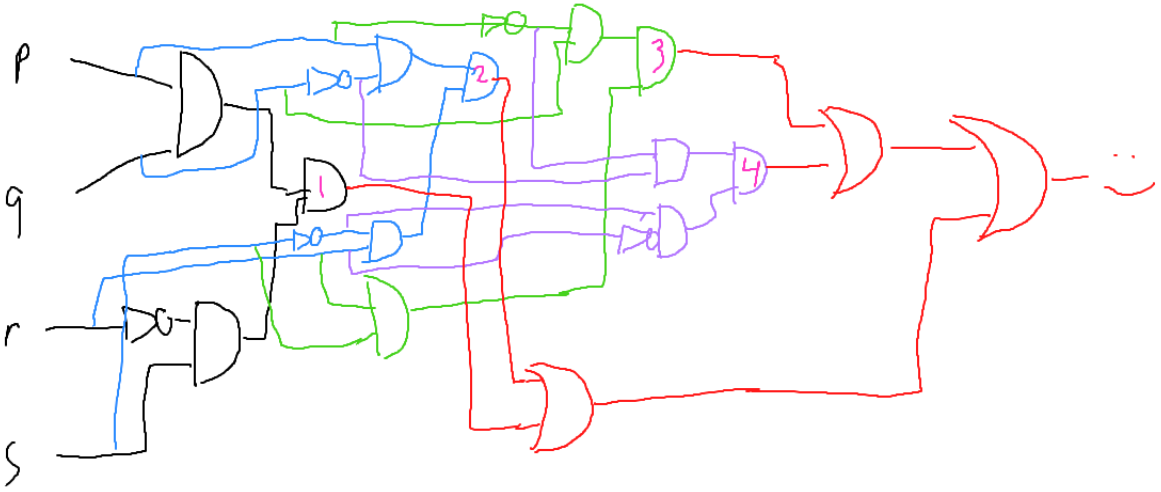
6. (p & !q) | (!p & q) | (!p & !q) OR ~(p^q)



7. (p ^ q ^ r) | (p ^ !q ^ r) | (!p ^ q ^ !r)



8. (p ^ q ^ !r ^ s) | (p ^ !q ^ r ^ !s) | (!p ^ q ^ r ^ s) | (!p ^ !q ^ !r ^ !s)



9. !q | (!p & q)
10. !(!p & r) & !((p | q) & (!r & q)
11. !((p | q) & (r | p))