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HW 3

1 Ex 56:

✓ a) $16_{10} + 9_{10} = 010000_2 + 001001_2$

```
  010000
+ 001001
  011001
```

$\boxed{011001}$ - (no overflow)

✓ b) $27_{10} + 31_{10}$

```
  1 11 1 1
  011011
+ 011111
  111010
```

$\boxed{111010}$ - overflow

✓ c) $-4_{10} + 19_{10}$

$4 = 000100$

$-4_{10} = 111011 + 1 = 111100$

```
  1
  111100
+ 010011
 1001111
```

$\cancel{1}001111 =$ $\boxed{001111}$ - no overflow

✓ d) $3_{10} + -32_{10}$

$-32 = 100000$

```
  100000
+ 000011
  100011
```

$\boxed{100011}$ - no overflow

e) $-16_{10} + -9_{10}$

$16 = 010000$ $\quad$ $9 = 001001$

$-16 = 101111+1 = 110000$ $\quad$ $-9 = 110110+1 = 110111$

$$
\begin{array}{r}
110000 \\
+\ 110111 \\
\hline
\cancel{1}100111
\end{array}
= \boxed{100111 - \text{no overflow}}
$$

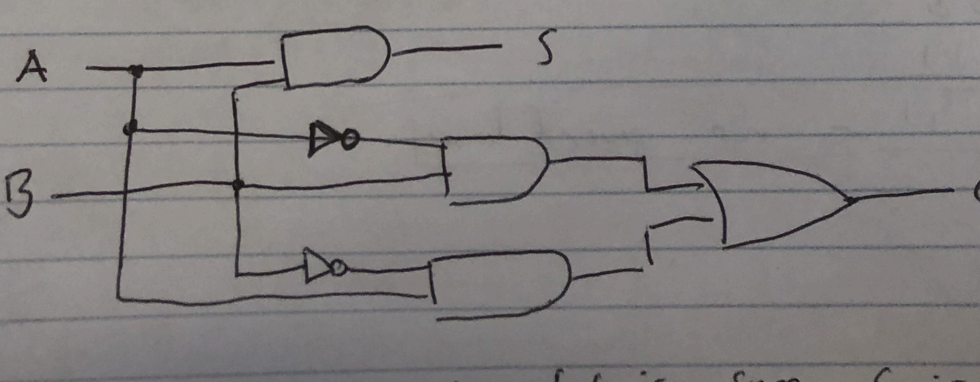
f) $-27_{10} + -31_{10}$

$$
\begin{array}{r}
100101 \\
+\ 100001 \\
\hline
\cancel{1}000110
\end{array}
= \boxed{000110 - \text{overflow}}
$$

Ex 68:

Both statements are equivalent and correct. Alyssa's statement ~~basically~~ takes the inverse and adds 1 (adding 1 flips the already flipped bits until it reaches a 0 or flipped 1). Ben is also correct since he subtracting 1 before flipping is the same as flipping then adding 1.

2 $S = A * B$ and $C = \bar{A} * B + A * \bar{B}$




Used as half-adder (C is sum, S is carry)

√3 NAND3