Twos Complement (2^s Complement).

2P- Binary. Representation

$$0 \quad 0 \quad 0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0$$

0×2^1

$0 \times 2^7 \quad 0 \times 2^6 \quad 0 \times 2^5 \quad 1 \times 2^4 \quad 1 \times 2^3 \quad 1 \times 2^2$

0×2^0

$$16 + 8 + 4 = 28$$
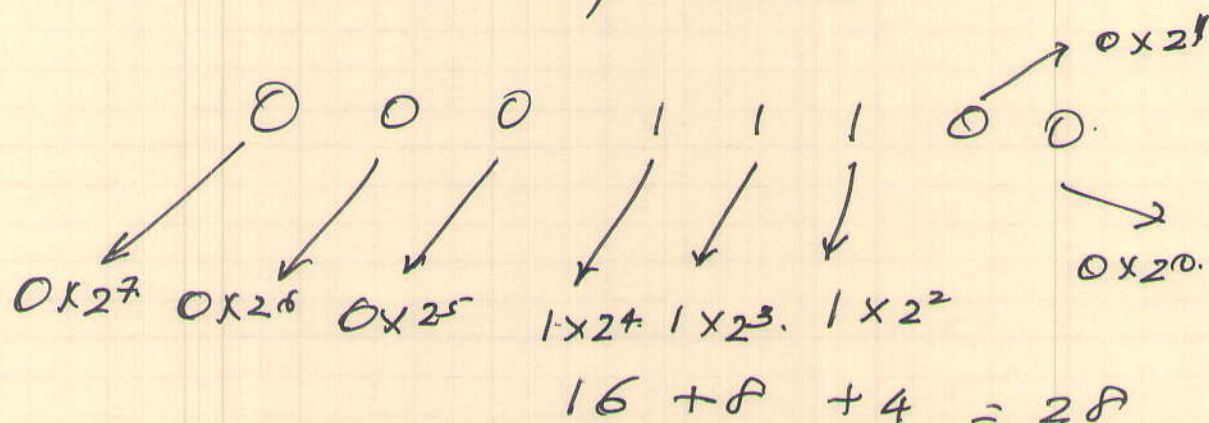
For twos Complement invert bits and add 1

$28 \rightarrow \quad 0 \ 0 \ 0 \ 1 \ 1 \ 1 \ 0 \ 0$

Inverting bit $\rightarrow \quad 1 \ 1 \ 1 \ 0 \ 0 \ 0 \ 1 \ 1$

$27 \quad 26 \ 25 \qquad \qquad 1 \times 2^0$

1×2^1

Adding 1. $\rightarrow \quad 1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0 \qquad 2 + 1 = 3$

$\hookrightarrow$ Twos Complement

This can also be performed by adding binary 1 to the inverted bits.

Binary of 1 : $0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 1$.

Adding to inverted bit. $\quad \begin{array}{r} 1 \ 1 \ 1 \ 0 \ 0 \ 0 \ 1 \ 1 \\ \hline 1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0 \end{array} \rightarrow 2^{1s}$ Complement

Expanding Octree Nodes.

R 7002020.

7 bits. (7 levels).

↓ · Expanding this black node one more level.

R 70020200
R 70020201.
R 70020202
R 70020203.
R 70020204.
R 70020205
R 70020206.
R 70020207.

} 8 children of R 7002020 black node.

You will have to expand all octree black nodes in the problems to 8 levels to perform the binary translation.

Intersection checking: (Common black nodes in both trees)

Traverse the tree from top down (digits from left to right) and compare each digit ~~into~~ in the tree.