

## Prison Break for Radicals

The prisoners need help to break out of prison.

Groups of prisoners work on escaping, but only one out of each group ever makes it out alive.

If a guy doesn't have enough helpers to escape, he stays inside the prison.

If all the prisoners are gone, the prison closes down.

**Low Security Prison** – prisoners need only one other guy to help them escape and only one of the two makes it out alive.

1)  $\sqrt{\quad} = \sqrt[2]{\text{need pairs to escape}}$  Then, on the way out, one gets shot, and one makes it out alive.

Example:  $\sqrt{50x^4y^3} = \sqrt[2]{2 \cdot 5 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y} = \underline{\hspace{2cm}} \sqrt{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}} \sqrt{\underline{\hspace{2cm}}}$

**High Security Prison** – prisoners need more helpers to escape – several get shot on the way out and only one from each group makes it out alive.

2)  $\sqrt[3]{\text{need groups of three to escape}}$  Then, on the way out, two get shot, and one makes it out alive.

Example:

$\sqrt[3]{8x^4y^6z^2} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot z \cdot z} = \underline{\hspace{2cm}} \sqrt[3]{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}} \sqrt[3]{\underline{\hspace{2cm}}}$

3)  $\sqrt[4]{\text{need groups of four to escape}}$  Then, on the way out, three get shot, and one makes it out alive.

Example:  $3 \sqrt[4]{324x^5y^3} = 3 \sqrt[4]{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}} \sqrt[4]{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}} \sqrt[4]{\underline{\hspace{2cm}}}$

Prime Factorization:

4)  $\sqrt[5]{\text{need groups of five to escape}}$  Then, on the way out, four get shot, and one makes it out alive.

Example:  $\sqrt[5]{243x^{10}} = \sqrt[5]{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}} \sqrt[5]{\underline{\hspace{2cm}}} = \underline{\hspace{2cm}}$

Prime Factorization:

(No guys left in jail – prison closes down)