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Question: 1

Prove that any integer n if n^3 is odd.

If n^3 is odd then $n^3 = 2m+1$ for some m

Therefore $2m = n^3 - 1 = (n-1)(n^2+n+1)$

n^2+n+1 is odd.

Since $n^2+n = n(n+1)$ is even.

being the product of consective integers.

But $2m$ is even, so $n-1$ is even since the product of two odd number is odd.

Therefore n is odd.

Question :02

As we know that

$$\sum_{k=1}^{50} k^2 = \sum_{k=1}^{24} k^2 + \sum_{k=25}^{50} k^2$$

Now we have.

$$\sum_{k=25}^{50} k^2 = \sum_{k=1}^{50} k^2 - \sum_{k=1}^{24} k^2$$

formula:

$$\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{k=25}^{50} k^2 = \frac{50 \cdot 51 \cdot 101}{6} - \frac{24 \cdot 25 \cdot 49}{6}$$

$$= 42925 - 4900$$

$$\boxed{\sum_{k=25}^{50} k^2 = 38025.}$$