64 = 63 + 1
64 = 2 \cdot 32 = 4 \cdot 16 = 8 \cdot 8 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2

Squint power (second, after 1)

64 = 8^2 = 4^3 = 2^6

64 = 2^5 + 2^5, sum of fifth powers

Smallest number with exactly seven divisors:

64 = 2^6; 2^6 \pm 1 both composite
       (smallest such).

Dodecagonal numbers.
Centered triangular numbers

64 is both a square and a cube.

Number of partitions of 20 into distinct parts.
    (or into odd parts)

Regular 64-gon is constructible

Number of ordered partitions of 7.

Smallest power of two between composites:
64 \pm 1 both composite.

Difference between first pair of amicable numbers,
220 and 284. (Also, 66928 and 66992.)