Tricks in Multiplication

Strategy 1. Finding the Number of "0" in the product

$$10 = 2 \times 5$$
$$100 = 4 \times 25 = 2^2 \times 5^2$$
$$1000 = 8 \times 125 = 2^3 \times 5^3$$

Examples

1. $25 \times 16 \times 125$
2. $25 \times 32 \times 125 \times 35$
3. $25 \times 96 \times 125$

Strategy 2. Using the Distributive Property

$$a \times b + a \times c = a \times (b + c)$$

Examples

1. $37 \times 88 + 37 \times 12$
2. $69 \times 36 - 38 \times 18$
3. $156 \times 48 - 124 \times 12$

Strategy 3. Multiplication with 5, 25 and 125

$$5 = \frac{10}{2}, 25 = \frac{100}{4}, 125 = \frac{1000}{8}$$

Examples

1. 842×5
2. 246×25
3. 376×125
4. 975×25
5. 1234×125

Strategy 4. Squaring numbers ending with 5

Examples

1. 35^2
2. 25^2
3. 75^2
4. 95^2
5. 115^2
6. $\sqrt{\frac{42.25}{90.25}}$
7. $\sqrt{\frac{72.25}{30.25}}$

Strategy 4.1 Multiplication of two special 2-digit numbers

the sum of two unit-digits is 10 and the tens digits are the same

Examples

1. 23×27
2. 61×69
3. 48×42
4. 56×54
5. 92×98

Strategy 5. Using the Power of "9"

$$9 = 10 - 1$$
$$99 = 100 - 1$$

Examples

1. 202×99
2. $9 + 99 + 999 + 9999 + 99999$
3. $398 + 3998 + 39\,998 + 399\,998$

Challenge Problems

1. Find the value of $9999 \times 2222 + 3333 \times 3334$.
2. Find the sum of all the digits of $\underbrace{333\ldots333}_{2021\ 3s} \times \underbrace{666\ldots666}_{2021\ 6s}$.