Square the Factor

RP10-V1 · storyboard · RP10 Convert squared and cubed units. Read each picture with its sentences.

Picture 1

How many square centimetres are in 28 m²?

$$1\ \text{m}^2 = 100\ \text{cm} \times 100\ \text{cm} = 10\,000\ \text{cm}^2$$

a square 100 cm on each side

$$28\ \text{m}^2 \times \left(\frac{100\ \text{cm}}{1\ \text{m}}\right)^2$$

square the whole factor

$$\boxed{28 \times 10\,000 = 280\,000\ \text{cm}^2}$$

1. How many square centimetres are in 28 square metres?
2. One square metre is a square 100 centimetres on each side: 100 times 100, that is 10 thousand square centimetres.
3. Square the whole factor, the number and the unit together.
4. 28 times 10 thousand is 280 thousand square centimetres.

Picture 2

Trap $1\ \mathrm{m}^2\ \text{in}\ \mathrm{cm}^2$

$\times\ 1\ \mathrm{m}^2 = 100\ \mathrm{cm}^2$

✓ $1\ \mathrm{m}^2 = 10\,000\ \mathrm{cm}^2$

5. Watch for the trap: using the factor only once.
6. One square metre is not 100 square centimetres.
7. Use the factor twice: 10 thousand.

Picture 3

Each tile on a spacecraft covers 25 cm² and costs $\$13$. How much does it cost to cover 20 m²?

$$20\ \text{m}^2 \times \left(\frac{100\ \text{cm}}{1\ \text{m}}\right)^2 = 200\,000\ \text{cm}^2$$

the same units as the tile

$$200\,000 \div 25 = 8000\ \text{tiles}$$

$$\boxed{8000 \times \$13 = \$104\,000}$$

8. Each tile on a spacecraft covers 25 square centimetres and costs 13 dollars.
9. How much does it cost to cover 20 square metres?
10. First put the area in the same units as the tile: 20 square metres is 200 thousand square centimetres.
11. Each tile covers 25, so divide: 8000 tiles.
12. 8000 tiles at 13 dollars each cost 104 thousand dollars.

Picture 4

Trap $(100\ \text{cm})^2$

$\times\ 200\ \text{cm}^2$

✓ $10\,000\ \text{cm}^2$

13. Watch for the trap: doubling instead of squaring.
14. Squaring 100 means 100 times itself, 10 thousand, not 200.