

Name _____

Date _____

15.3 Units of area — worksheet

Understand the relationships between mm^2 , cm^2 , m^2 , hectares and km^2 , and convert between them. · 71 questions · Show your working.

Remember

- An area conversion factor is the **square** of the length one.
- $1 \text{ cm} = 10 \text{ mm}$, so **$1 \text{ cm}^2 = 100 \text{ mm}^2$** .
- $1 \text{ m} = 100 \text{ cm}$, so **$1 \text{ m}^2 = 10\,000 \text{ cm}^2$** .
- $1 \text{ km} = 1000 \text{ m}$, so **$1 \text{ km}^2 = 1\,000\,000 \text{ m}^2$** .
- **$1 \text{ hectare} = 10\,000 \text{ m}^2$** — a square 100 m by 100 m.
- **$1 \text{ km}^2 = 100 \text{ hectares}$** .
- Big unit → small unit: **multiply**. Small → big: **divide**.
- Choose a unit that keeps the numbers sensible: mm^2 for a stamp, hectares for a farm.
- When a shape has mixed units, convert **before** multiplying.

A · Fluency — Convert between mm^2 , cm^2 , m^2 , hectares and km^2 .

1 How many mm^2 are there in 1 cm^2 ?

2 How many mm^2 are there in 2 cm^2 ?

3 How many mm^2 are there in 3 cm^2 ?

4 How many mm^2 are there in 5 cm^2 ?

5 How many mm^2 are there in 7 cm^2 ?

6 How many mm^2 are there in 10 cm^2 ?

7 How many cm^2 are there in 1 m^2 ?

8 How many cm^2 are there in 2 m^2 ?

9 How many cm^2 are there in 3 m^2 ?

10 How many cm^2 are there in 5 m^2 ?

11 How many cm^2 are there in 7 m^2 ?

12 How many cm^2 are there in 10 m^2 ?

13 How many m^2 are there in 1 km^2 ?

14 How many m^2 are there in 2 km^2 ?

15 How many m^2 are there in 3 km^2 ?

16 How many m^2 are there in 5 km^2 ?

17 How many m^2 are there in 7 km^2 ?

18 How many m^2 are there in 10 km^2 ?

19 How many cm^2 are there in 100 mm^2 ?

20 How many cm^2 are there in 200 mm^2 ?

21 How many cm^2 are there in 400 mm^2 ?

22 How many cm^2 are there in 600 mm^2 ?

23 How many m^2 are there in 10000 cm^2 ?

24 How many m^2 are there in 20000 cm^2 ?

25 How many m^2 are there in 40000 cm^2 ?

26 How many m^2 are there in 60000 cm^2 ?

27 How many km^2 are there in 1000000 m^2 ?

28 How many km^2 are there in 2000000 m^2 ?

29 How many km^2 are there in 4000000 m^2 ?

30 How many km^2 are there in 6000000 m^2 ?

31 How many square metres are there in 1 hectare?

32 How many square metres are there in 2 hectares?

33 How many square metres are there in 3 hectares?

34 How many square metres are there in 5 hectares?

35 How many square metres are there in 10 hectares?

36 How many square metres are there in 7 hectares?

37 How many hectares are there in 20000 m²?

38 How many hectares are there in 50000 m²?

39 How many hectares are there in 80000 m²?

40 How many hectares are there in 120000 m²?

41 How many hectares are there in 35000 m²?

42 How many hectares are there in 450000 m²?

43 How many hectares are there in 1 km²?

44 How many hectares are there in 2 km²?

45 How many hectares are there in 5 km²?

46 How many hectares are there in 0.5 km²?

B · Reasoning — Why the factor is squared, and which unit to choose.

47 Why is 1 m² equal to 10 000 cm² and not 100 cm²?

- ☐ Because metres are big
- ☐ Because both sides are multiplied by 100, so the area is multiplied by 100×100
- ☐ It is a mistake
- ☐ Because of the metric system

48 1 cm = 10 mm. So 1 cm² = ...

- ☐ 10 mm²
- ☐ 20 mm²
- ☐ 100 mm²
- ☐ 1000 mm²

49 A hectare is ...

- ☐ 100 m²
- ☐ 1000 m²
- ☐ 10 000 m²
- ☐ 100 000 m²

50 Which unit would you use for the area of a farm?

- ☐ mm²
- ☐ cm²
- ☐ m²
- ☐ hectares

- 51** Which unit would you use for the area of a postage stamp?
- ☐ mm^2
 - ☐ m^2
 - ☐ hectares
 - ☐ km^2
- 52** Is 1 km^2 equal to 1000 m^2 ?
- ☐ Yes
 - ☐ No
- 53** Going from a big unit to a small one, the number ...
- ☐ gets smaller
 - ☐ gets bigger
 - ☐ stays the same
 - ☐ it depends
- 54** Going from a small unit to a big one, you ...
- ☐ multiply
 - ☐ divide
 - ☐ add
 - ☐ subtract
- 55** 1 km^2 is how many hectares?
- ☐ 10
 - ☐ 100
 - ☐ 1000
 - ☐ 10 000
- 56** Does the area conversion factor equal the length conversion factor?
- ☐ Yes
 - ☐ No

C · Challenge — Mixed units, and areas that need converting first.

- 57** A rectangle is 2 m by 50 cm. What is its area, in square metres?
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-
- 58** A rectangle is 2 m by 50 cm. What is its area, in square centimetres?
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-
- 59** A field is 300 m by 200 m. What is its area, in hectares?
-
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- 60** A tile is 15 cm by 20 cm. What is its area, in square millimetres?
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- 61** A farm covers 4.5 km^2 . How many hectares is that?
-
-
- 62** A room is 4 m by 3 m. How many 20 cm by 20 cm tiles cover it?
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- 63** A garden is 2500 m^2 . What fraction of a hectare is that? Give the answer as a decimal.

D · Word problems — Farms, parks, screens and solar panels.

- 64** A farmer owns 3 fields of 2 ha, 3 ha and 5 ha. How many square metres does he own altogether?

- 65** A nature reserve is 12 km^2 . How many hectares is that?

- 66** A phone screen is 7 cm by 15 cm. What is its area, in square millimetres?

- 67** A city park is $45\,000 \text{ m}^2$. How many hectares is that?

- 68** A sheet of paper is 210 mm by 297 mm. What is its area, in square millimetres?

- 69** A carpet is 5 m by 4 m. What is its area, in square centimetres?

- 70** Land costs \$8 per square metre. What does 0.5 ha cost, in dollars?

- 71** A solar farm covers $80\,000 \text{ m}^2$. Each panel needs 2 m^2 . How many panels fit?
