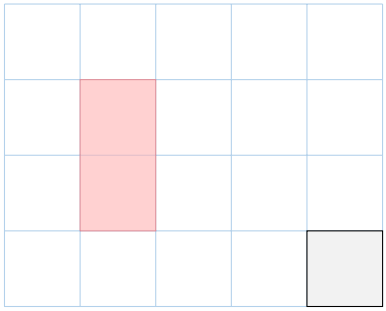
AREA FORMULAS

A AREA

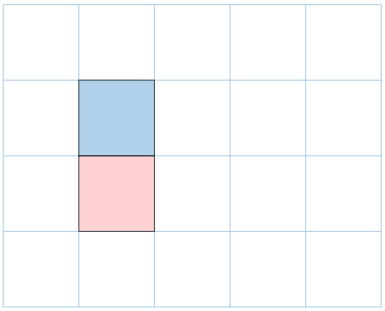
A.1 FINDING AREA OF A SHAPE

Ex 1: What is the area of the red figure?



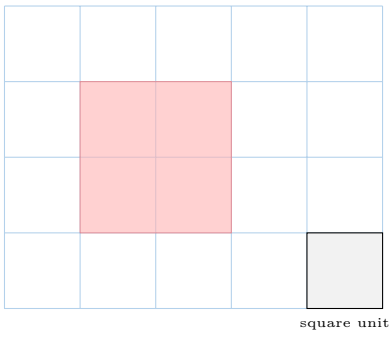
$\boxed{2}$ square units

Answer: To find the area, we count the number of unit squares inside the shape.



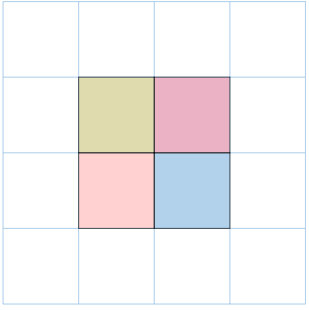
The area is 2 square units.

Ex 2: What is the area of the red figure?



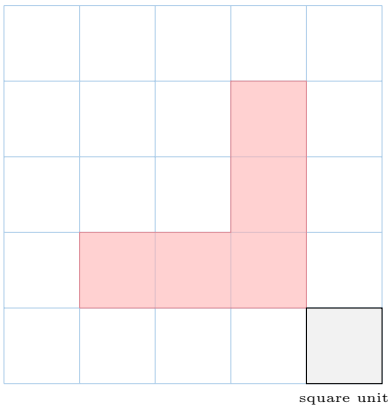
$\boxed{4}$ square units

Answer: To find the area, we count the number of unit squares inside the shape.



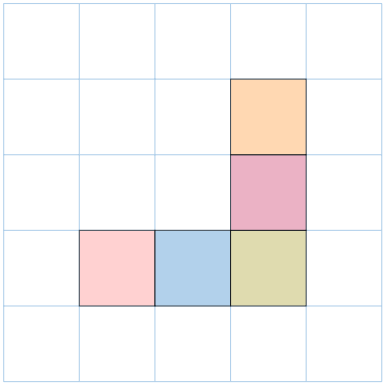
The area is 4 square units.

Ex 3: What is the area of the red figure?



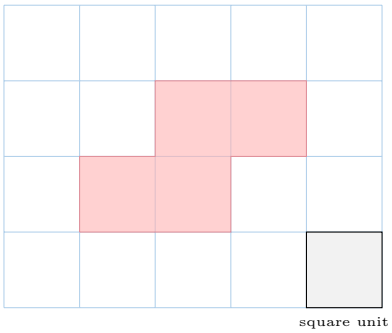
$\boxed{5}$ square units

Answer: To find the area, we count the number of unit squares inside the shape.



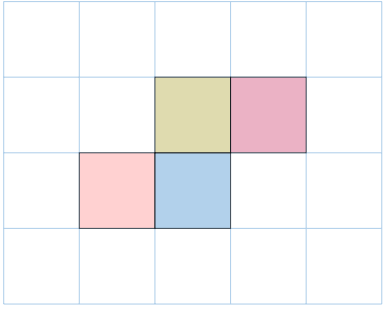
The area is 5 square units.

Ex 4: What is the area of the red figure?



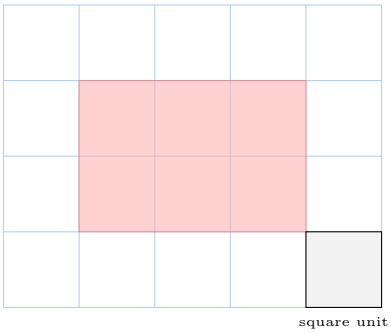
$\boxed{4}$ square units

Answer: To find the area, we count the number of unit squares inside the shape.



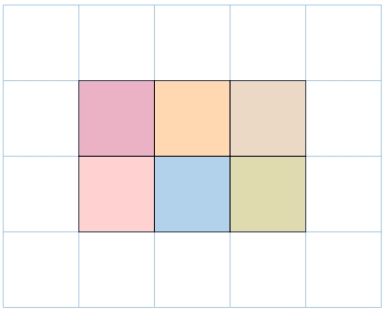
The area is 4 square units.

Ex 5: What is the area of the red figure?



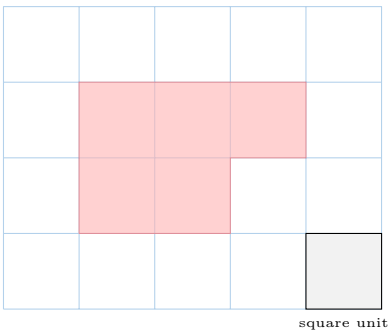
6 square units

Answer: To find the area, we count the number of unit squares inside the shape.



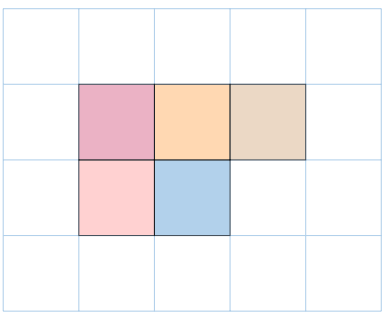
The area is 6 square units.

Ex 6: What is the area of the red figure?



5 square units

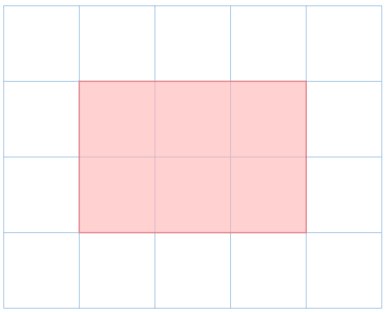
Answer: To find the area, we count the number of unit squares inside the shape.



The area is 5 square units.

A.2 BUILDING FORMULAS

MCQ 7: What is the area of the red rectangle?



Choose the 4 correct answers:

☒ $2+2+2$

☒ $3+3$

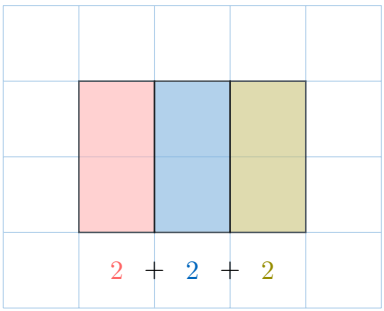
☐ $3+2+3+2$

☒ 2×3

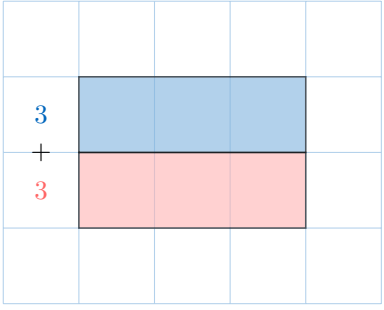
☒ 3×2

Answer:

- We can count the squares like that:

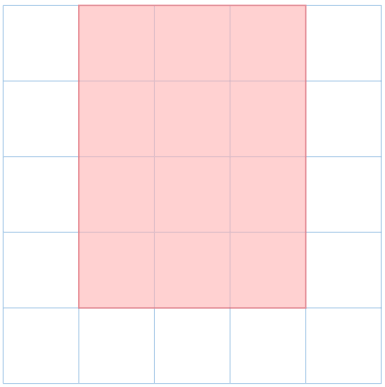


- $2+2+2=3\times 2$.
- We can also count like that



- $3+3=2\times 3$.

MCQ 8: What is the area of the red rectangle?

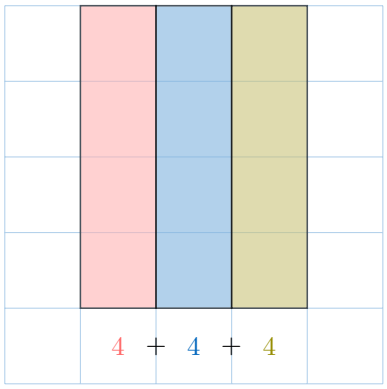


Choose 4 correct answers:

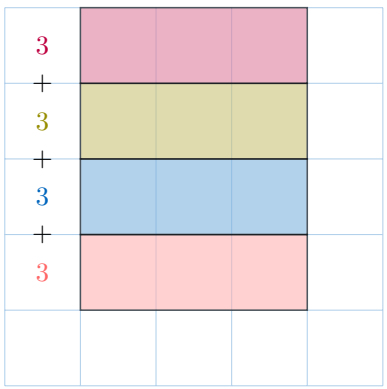
- ☐ $3+4+3+4$
- ☒ $4+4+4$
- ☒ $3+3+3+3$
- ☒ 4×3
- ☒ 3×4

Answer:

- We can count the squares like that:

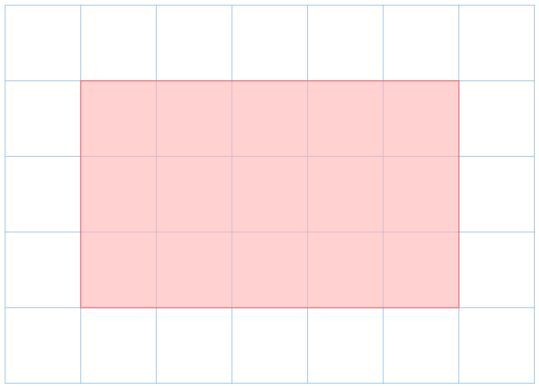


- $4+4+4=3\times 4$.
- We can also count like that:



- $3+3+3+3=4\times 3$.

MCQ 9: What is the area of the red rectangle?

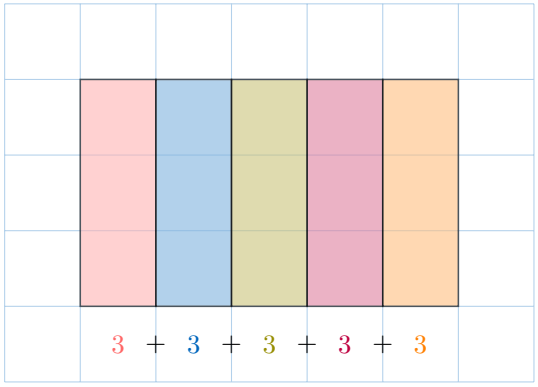


Choose the 4 correct answers:

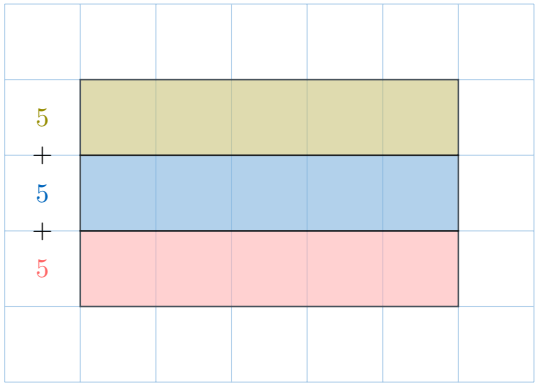
- ☒ $3+3+3+3+3$
- ☒ $5+5+5$
- ☐ $5+3+5+3$
- ☒ 3×5
- ☒ 5×3

Answer:

- We can count the squares like that:



- $3+3+3+3+3=5\times 3$.
- We can also count like that:

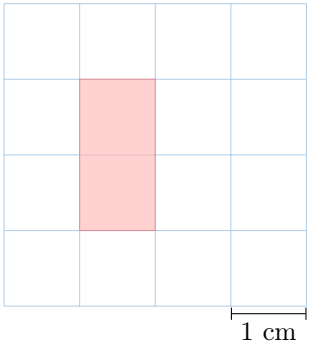


- $5+5+5=3\times 5$.

B UNITS OF AREA

B.1 FINDING AREA OF A SHAPE

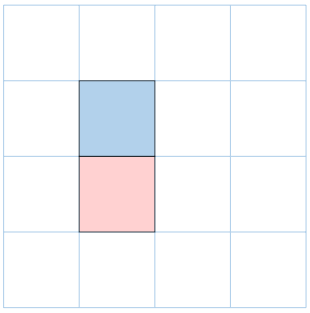
Ex 10: What is the area of the red figure?



2 **cm²**

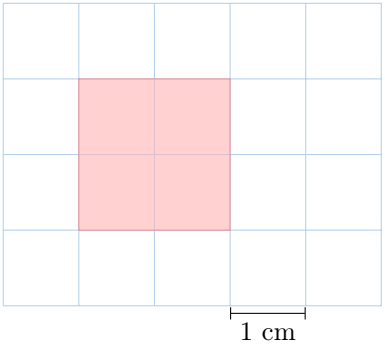
Answer:

- The unit of area is cm^2.
- To find the area, we count the number of square centimeters inside the shape.



The area is 2 cm^2.

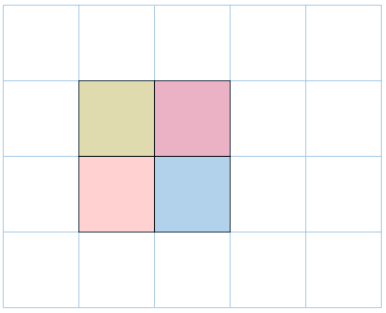
Ex 11: What is the area of the red figure?



4 **cm²**

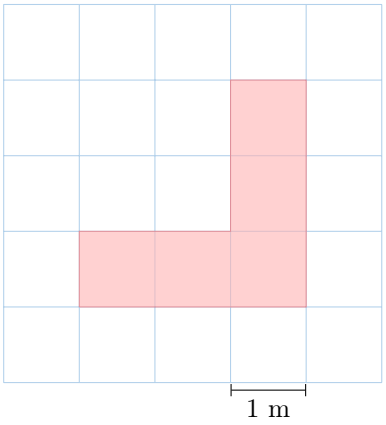
Answer:

- The unit of area is cm^2.
- To find the area, we count the number of square centimeters inside the shape.



The area is 4 cm^2.

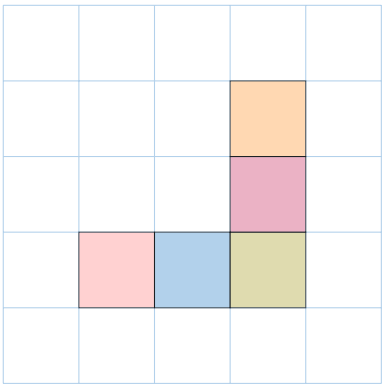
Ex 12: What is the area of the red figure?



5 **m²**

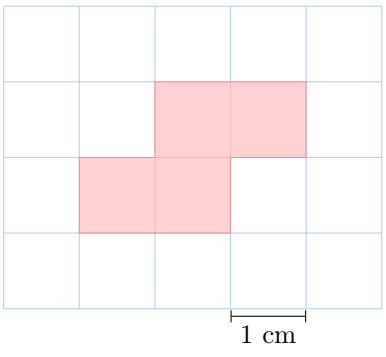
Answer:

- The unit of area is m^2.
- To find the area, we count the number of square meters inside the shape.



The area is 5 m^2.

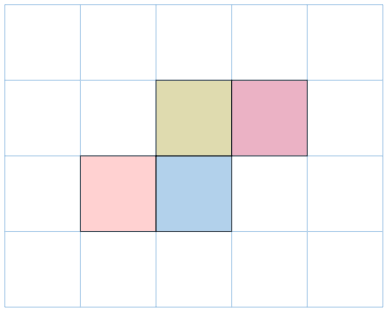
Ex 13: What is the area of the red figure?



4 **cm²**

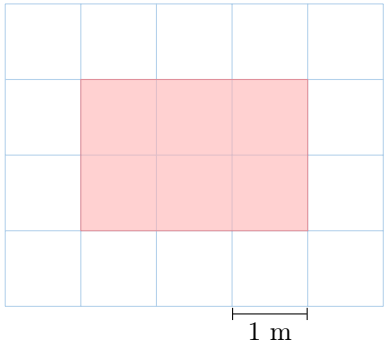
Answer:

- The unit of area is cm^2.
- To find the area, we count the number of square centimeters inside the shape.



The area is 4 cm^2.

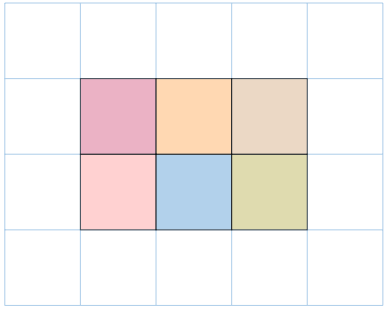
Ex 14: What is the area of the red figure?



6 **m²**

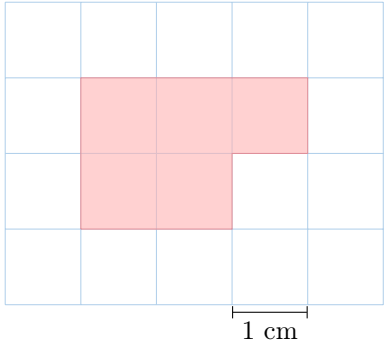
Answer:

- The unit of area is m^2.
- To find the area, we count the number of square meters inside the shape.



The area is 6 m^2.

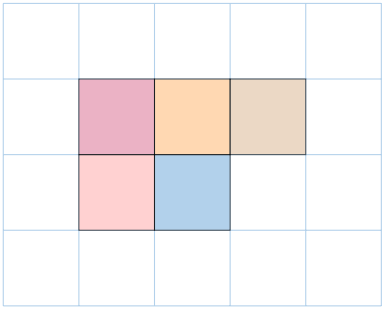
Ex 15: What is the area of the red figure?



5 **cm²**

Answer:

- The unit of area is cm^2.
- To find the area, we count the number of square centimeters inside the shape.



The area is 5 cm^2.

B.2 CHOOSING UNITS FOR AREA

MCQ 16: What unit will be used to measure the area of your bedroom?

Choose 1 answer:

- ☐ Square millimeters
- ☐ Square centimeters
- ☒ Square meters
- ☐ Square kilometers

Answer: Square meters will be used to measure the area of your bedroom because it's a larger unit, perfect for measuring bigger spaces like a room, but not as large as a square kilometer or as small as a square centimeter or square millimeter.

MCQ 17: What unit will be used to measure the area of a piece of paper?

Choose 1 answer:

- ☐ Square millimeters
- ☒ Square centimeters
- ☐ Square meters
- ☐ Square kilometers

Answer: Square centimeters will be used to measure the area of a piece of paper because it's a smaller unit, perfect for measuring smaller spaces like a sheet of paper, but not as small as a square millimeter or as large as a square meter or square kilometer.

MCQ 18: What unit will be used to measure the area of a country?

Choose 1 answer:

- ☐ Square millimeters
- ☐ Square centimeters
- ☐ Square meters

☒ Square kilometers

Answer: Square kilometers will be used to measure the area of a country because it's a very large unit, perfect for measuring huge spaces like a country, while square meters, square centimeters, and square millimeters are too small.

MCQ 19: What unit will be used to measure the area of a playground?

Choose 1 answer:

☐ Square millimeters

☐ Square centimeters

☒ Square meters

☐ Square kilometers

Answer: Square meters will be used to measure the area of a playground because it's a larger unit, perfect for measuring bigger spaces like a playground, but not as large as a square kilometer or as small as a square centimeter or square millimeter.

MCQ 20: What unit will be used to measure the area of a tiny sticker like a glitter dot?

Choose 1 answer:

☒ Square millimeters

☐ Square centimeters

☐ Square meters

☐ Square kilometers

Answer: Square millimeters will be used to measure the area of a tiny sticker because it is a very small object. Square centimeters, square meters, and square kilometers are too large to be practical.

C CONVERSION OF AREA UNITS

C.1 CONVERTING AREA UNITS

Ex 21: Convert:

$$3\,\text{cm}^2 = \boxed{300}\ \text{mm}^2.$$

Answer:

- *Multiplication Method:*

$$\begin{aligned} 3\,\text{cm}^2 &= 3 \times 100\,\text{mm}^2 \\ &= 300\,\text{mm}^2 \end{aligned}$$

- *Conversion Table Method:*

km^2		ha			m^2			cm^2		mm^2	
									3	0	0

So,

$$3\,\text{cm}^2 = 300\,\text{mm}^2$$

Ex 22: Convert:

$$5\,000\,\text{mm}^2 = \boxed{50}\ \text{cm}^2.$$

Answer:

- *Division Method:*

$$\begin{aligned} 5\,000\,\text{mm}^2 &= 5\,000 \div 100\,\text{cm}^2 \\ &= 50\,\text{cm}^2 \end{aligned}$$

- *Conversion Table Method:*

km^2		ha			m^2			cm^2		mm^2	
								5	0	0	0

So,

$$5\,000\,\text{mm}^2 = 50\,\text{cm}^2$$

Ex 23: Convert:

$$6\,\text{m}^2 = \boxed{60000}\ \text{cm}^2.$$

Answer:

- *Multiplication Method:*

$$\begin{aligned} 6\,\text{m}^2 &= 6 \times 10\,000\,\text{cm}^2 \\ &= 60\,000\,\text{cm}^2 \end{aligned}$$

- *Conversion Table Method:*

km^2		ha			m^2			cm^2		mm^2	
						6	0	0	0	0	

So,

$$6\,\text{m}^2 = 60\,000\,\text{cm}^2$$

Ex 24: Convert:

$$90\,000\,\text{cm}^2 = \boxed{9}\ \text{m}^2.$$

Answer:

- *Division Method:*

$$\begin{aligned} 90\,000\,\text{cm}^2 &= 90\,000 \div 10\,000\,\text{m}^2 \\ &= 9\,\text{m}^2 \end{aligned}$$

- *Conversion Table Method:*

km^2		ha			m^2			cm^2		mm^2	
						9	0	0	0	0	

So,

$$90\,000\,\text{cm}^2 = 9\,\text{m}^2$$

C.2 CONVERTING AREA UNITS WITH DECIMAL NUMBERS

Ex 25: Convert:

$$24.5\,\text{m}^2 = \boxed{245000}\ \text{cm}^2.$$

Answer:

- *Multiplication Method:*

$$\begin{aligned} 24.5\,\text{m}^2 &= 24.5 \times 10\,000\,\text{cm}^2 \\ &= 245\,000\,\text{cm}^2 \end{aligned}$$

- *Conversion Table Method:*

km²		ha				m²				cm²		mm²	
						2	4.	5	0	0	0		

So,

$$24.5\,\text{m}^2 = 245\,000\,\text{cm}^2$$

Ex 26: Convert:

$$5\,000\,\text{cm}^2 = \boxed{0.5}\ \text{m}^2.$$

Answer:

- *Division Method:*

$$\begin{aligned} 5\,000\,\text{cm}^2 &= 5\,000 \div 10\,000\,\text{m}^2 \\ &= 0.5\,\text{m}^2 \end{aligned}$$

- *Conversion Table Method:*

km²		ha				m²				cm²		mm²	
							0.	5	0	0	0		

So,

$$5\,000\,\text{cm}^2 = 0.5\,\text{m}^2$$

Ex 27: Convert:

$$0.25\,\text{cm}^2 = \boxed{25}\ \text{mm}^2.$$

Answer:

- *Multiplication Method:*

$$\begin{aligned} 0.25\,\text{cm}^2 &= 0.25 \times 100\,\text{mm}^2 \\ &= 25\,\text{mm}^2 \end{aligned}$$

- *Conversion Table Method:*

km²		ha				m²				cm²		mm²	
											0.	2	5

So,

$$0.25\,\text{cm}^2 = 25\,\text{mm}^2$$

Ex 28: Convert:

$$534\,\text{mm}^2 = \boxed{5.34}\ \text{cm}^2.$$

Answer:

- *Division Method:*

$$\begin{aligned} 534\,\text{mm}^2 &= 534 \div 100\,\text{cm}^2 \\ &= 5.34\,\text{cm}^2 \end{aligned}$$

- *Conversion Table Method:*

km²		ha				m²				cm²		mm²	
											5.	3	4

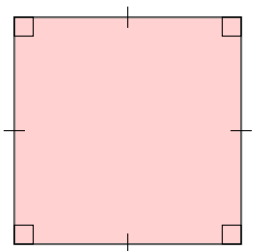
So,

$$534\,\text{mm}^2 = 5.34\,\text{cm}^2$$

D AREA OF A RECTANGLE OR A SQUARE

D.1 FINDING AREAS OF SQUARES AND RECTANGLES

Ex 29: What is the area of the red square?



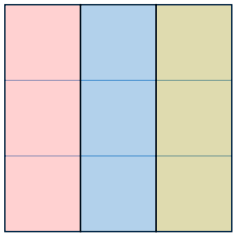
$\boxed{9}\ \text{cm}^2$

Answer:

- **Method 1: Use the formula**

$$\begin{aligned} \text{Area} &= s \times s \\ &= 3 \times 3 \\ &= 9\,\text{cm}^2 \end{aligned}$$

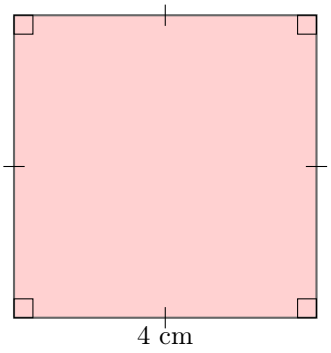
- **Method 2: Count the number of unit squares in each column**



$3 + 3 + 3$

$$\begin{aligned} \text{Area} &= 3 + 3 + 3 \\ &= 3 \times 3 \\ &= 9\,\text{cm}^2 \end{aligned}$$

Ex 30: What is the area of the red square?



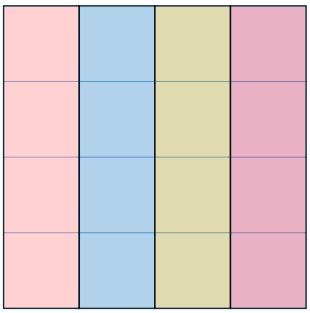
$\boxed{16}$ cm^2

Answer:

- **Method 1: Use the formula**

$$\begin{aligned}\text{Area} &= s \times s \\ &= 4 \times 4 \\ &= 16\,\text{cm}^2\end{aligned}$$

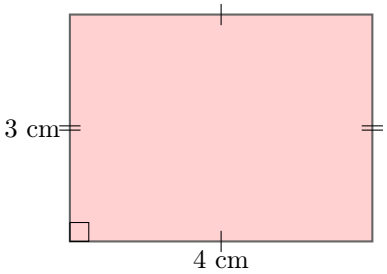
- **Method 2: Count the number of unit squares in each column**



$4 + 4 + 4 + 4$

$$\begin{aligned}\text{Area} &= 4+4+4+4 \\ &= 4 \times 4 \\ &= 16\,\text{cm}^2\end{aligned}$$

Ex 31: What is the area of the red rectangle?



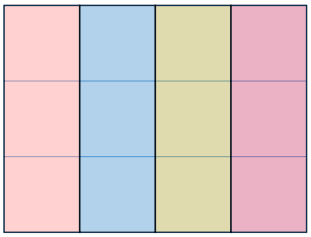
$\boxed{12}$ cm^2

Answer:

- **Method 1: Use the formula**

$$\begin{aligned}\text{Area} &= l \times w \\ &= 4 \times 3 \\ &= 12\,\text{cm}^2\end{aligned}$$

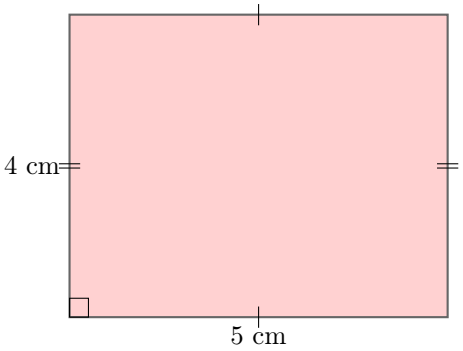
- **Method 2: Count the number of unit squares in each column**



$3 + 3 + 3 + 3$

$$\begin{aligned}\text{Area} &= 3+3+3+3 \\ &= 4 \times 3 \\ &= 12\,\text{cm}^2\end{aligned}$$

Ex 32: What is the area of the red rectangle?



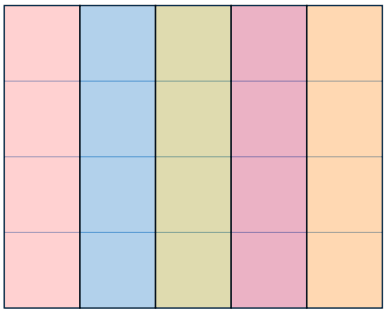
$\boxed{20}$ cm^2

Answer:

- **Method 1: Use the formula**

$$\begin{aligned}\text{Area} &= l \times w \\ &= 5 \times 4 \\ &= 20\,\text{cm}^2\end{aligned}$$

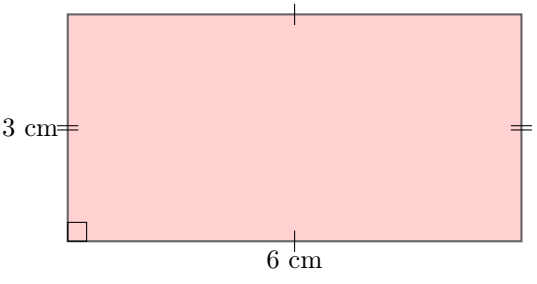
- **Method 2: Count the number of unit squares in each column**



$4 + 4 + 4 + 4 + 4$

$$\begin{aligned}\text{Area} &= 4+4+4+4+4 \\ &= 5 \times 4 \\ &= 20\,\text{cm}^2\end{aligned}$$

Ex 33: What is the area of the red rectangle?



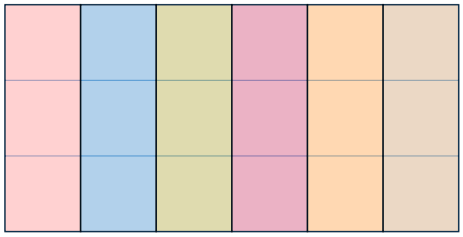
$\boxed{18}$ cm^2

Answer:

- **Method 1: Use the formula**

$$\begin{aligned}\text{Area} &= l \times w \\ &= 6 \times 3 \\ &= 18\,\text{cm}^2\end{aligned}$$

- **Method 2: Count the number of unit squares in each column**



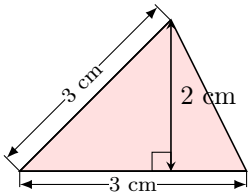
$3 + 3 + 3 + 3 + 3 + 3$

$$\begin{aligned}\text{Area} &= 3+3+3+3+3+3 \\ &= 6 \times 3 \\ &= 18\,\text{cm}^2\end{aligned}$$

E AREA OF A TRIANGLE

E.1 FINDING AREAS OF TRIANGLES

Ex 34: Find the area of the figure

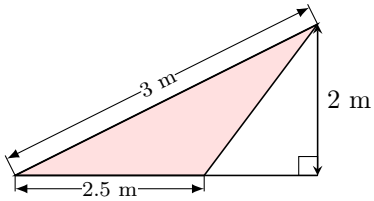


$A = \boxed{3}$ cm^2

Answer:

$$\begin{aligned}A &= \frac{b \times h}{2} \\ &= \frac{3\text{ cm} \times 2\text{ cm}}{2} \\ &= 3\text{ cm}^2\end{aligned}$$

Ex 35: Find the area of the figure

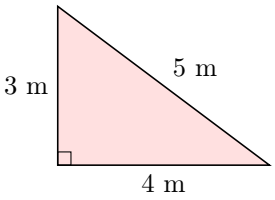


$A = \boxed{2.5}$ cm^2

Answer:

$$\begin{aligned}A &= \frac{b \times h}{2} \\ &= \frac{2.5\text{ m} \times 2\text{ m}}{2} \\ &= 2.5\text{ m}^2\end{aligned}$$

Ex 36: Find the area of the figure

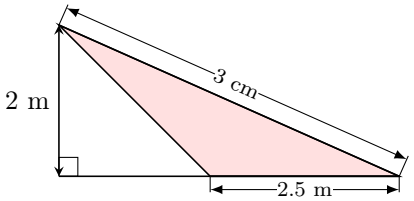


$A = \boxed{6}$ m^2

Answer:

$$\begin{aligned}A &= \frac{b \times h}{2} \\ &= \frac{4\text{ m} \times 3\text{ m}}{2} \\ &= 6\text{ m}^2\end{aligned}$$

Ex 37: Find the area of the figure

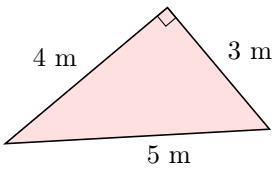


$A = \boxed{2.5}$ cm^2

Answer:

$$\begin{aligned}A &= \frac{b \times h}{2} \\ &= \frac{2.5\text{ m} \times 2\text{ m}}{2} \\ &= 2.5\text{ m}^2\end{aligned}$$

Ex 38: Find the area of the figure



$A = \boxed{6}$ m^2

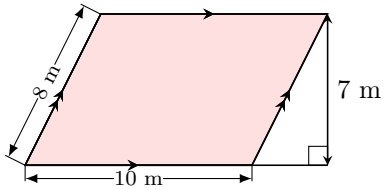
Answer:

$$\begin{aligned}A &= \frac{b \times h}{2} \\ &= \frac{4\text{ m} \times 3\text{ m}}{2} \\ &= 6\text{ m}^2\end{aligned}$$

F AREA OF A PARALLELOGRAM

F.1 FINDING AREAS OF PARALLELOGRAMS

Ex 39: Find the area of the figure

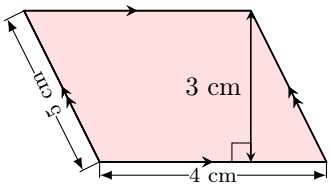


$A = \boxed{70}$ m^2

Answer:

$$\begin{aligned} A &= b \times h \\ &= 10 \text{ m} \times 7 \text{ m} \\ &= 70 \text{ m}^2 \end{aligned}$$

Ex 40: Find the area of the figure

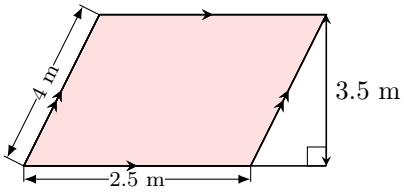


$A = \boxed{12}$ cm^2

Answer:

$$\begin{aligned} A &= b \times h \\ &= 4 \text{ cm} \times 3 \text{ cm} \\ &= 12 \text{ cm}^2 \end{aligned}$$

Ex 41: Find the area of the figure (you can use a calculator)

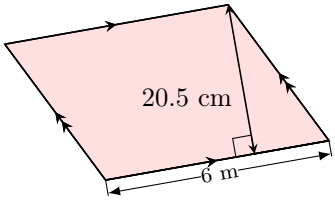


$A = \boxed{8.75}$ m^2

Answer:

$$\begin{aligned} A &= b \times h \\ &= 2.5 \text{ m} \times 3.5 \text{ m} \\ &= 8.75 \text{ m}^2 \end{aligned}$$

Ex 42: Find the area of the figure (you can use a calculator)



$A = \boxed{123}$ cm^2

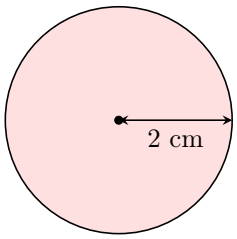
Answer:

$$\begin{aligned} A &= b \times h \\ &= 6 \text{ cm} \times 20.5 \text{ cm} \\ &= 123 \text{ cm}^2 \end{aligned}$$

G AREA OF A CIRCLE

G.1 FINDING AREAS OF CIRCLES

Ex 43: Find the area of the figure (round at 1 decimal place)

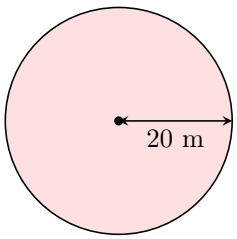


$A \approx \boxed{12.6}$ cm^2

Answer:

$$\begin{aligned} A &= \pi \times r \times r \\ &= \pi \times 2 \text{ cm} \times 2 \text{ cm} \\ &= 12.56637... \text{ cm}^2 \\ &\approx 12.6 \text{ cm}^2 \end{aligned}$$

Ex 44: Find the area of the figure (round to 1 decimal place)

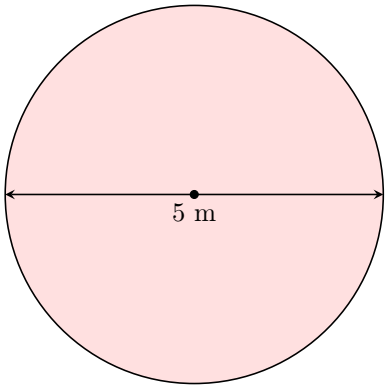


$A \approx \boxed{1256.6}$ m^2

Answer:

$$\begin{aligned} A &= \pi \times r \times r \\ &= \pi \times 20 \text{ m} \times 20 \text{ m} \\ &= 1256.63706... \text{ m}^2 \\ &\approx 1256.6 \text{ m}^2 \end{aligned}$$

Ex 45: Find the area of the figure (round to 1 decimal place)



$A \approx \boxed{19.6}\ \text{m}^2$

Answer:

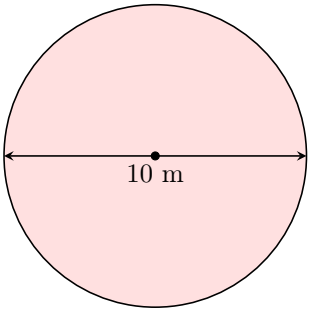
- The radius is half of the diameter.

$$\begin{aligned} r &= \frac{d}{2} \\ &= \frac{5}{2} \\ &= 2.5 \text{ m} \end{aligned}$$

- The area of circle is

$$\begin{aligned} A &= \pi \times r \times r \\ &= \pi \times 2.5 \times 2.5 \\ &\approx 19.6 \text{ m}^2 \end{aligned}$$

Ex 46: Find the area of the figure (round to 1 decimal place)



$A \approx \boxed{78.5}\ \text{m}^2$

Answer:

- The radius is half of the diameter.

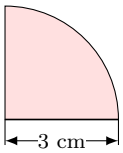
$$\begin{aligned} r &= \frac{d}{2} \\ &= \frac{10}{2} \\ &= 5 \text{ m} \end{aligned}$$

- The area of the circle is

$$\begin{aligned} A &= \pi \times r \times r \\ &= \pi \times 5 \times 5 \\ &\approx 78.5 \text{ m}^2 \end{aligned}$$

G.2 FINDING AREA OF CIRCULAR SECTORS

Ex 47: Find the area of the quarter circle: (Round to 1 decimal place)



$A = \boxed{7.1}\ \text{cm}^2$

Answer:

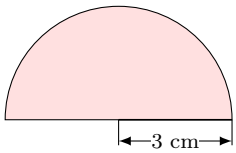
- The area of the quarter circle is:

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{radius} \times \text{radius} \\ &= \frac{90}{360} \times \pi \times 3^2 \\ &= \frac{1}{4} \times \pi \times 9 \\ &\approx 7.1\,\text{cm}^2 \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

L'aire du quart de cercle est :

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{rayon} \times \text{rayon} \\ &= \frac{90}{360} \times \pi \times 3^2 \\ &= \frac{1}{4} \times \pi \times 9 \\ &\approx 7,1\,\text{cm}^2 \quad \text{(arrondi à 1 chiffre après la virgule)} \end{aligned}$$

Ex 48: Find the area of the half circle: (Round to 1 decimal place)



$A = \boxed{14.1}\ \text{cm}^2$

Answer:

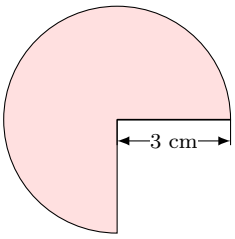
- The area of the half circle is:

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{radius} \times \text{radius} \\ &= \frac{180}{360} \times \pi \times 3^2 \\ &= \frac{1}{2} \times \pi \times 9 \\ &\approx 14.1\,\text{cm}^2 \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

L'aire du demi-cercle est :

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{rayon} \times \text{rayon} \\ &= \frac{180}{360} \times \pi \times 3^2 \\ &= \frac{1}{2} \times \pi \times 9 \\ &\approx 14,1\,\text{cm}^2 \quad \text{(arrondi à 1 chiffre après la virgule)} \end{aligned}$$

Ex 49: Find the area of the three-quarter circle: (Round to 1 decimal place)



$A = \boxed{21.2}\ \text{cm}^2$

Answer:

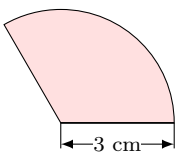
- The area of the three-quarter circle is:

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{radius} \times \text{radius} \\ &= \frac{270}{360} \times \pi \times 3^2 \\ &= \frac{3}{4} \times \pi \times 9 \\ &\approx 21.2\,\text{cm}^2 \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

L'aire des trois quarts de cercle est :

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{rayon} \times \text{rayon} \\ &= \frac{270}{360} \times \pi \times 3^2 \\ &= \frac{3}{4} \times \pi \times 9 \\ &\approx 21,2\,\text{cm}^2 \quad \text{(arrondi à 1 chiffre après la virgule)} \end{aligned}$$

Ex 50: Find the area of the one-third circle: (Round to 1 decimal place)



$A = \boxed{9.4}\ \text{cm}^2$

Answer:

- The area of the one-third circle is:

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{radius} \times \text{radius} \\ &= \frac{120}{360} \times \pi \times 3^2 \\ &= \frac{1}{3} \times \pi \times 9 \\ &\approx 9.4\,\text{cm}^2 \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

L'aire du tiers de cercle est :

$$\begin{aligned} A &= \frac{\text{angle}}{360} \times \pi \times \text{rayon} \times \text{rayon} \\ &= \frac{120}{360} \times \pi \times 3^2 \\ &= \frac{1}{3} \times \pi \times 9 \\ &\approx 9,4\,\text{cm}^2 \quad \text{(arrondi à 1 chiffre après la virgule)} \end{aligned}$$

H AREA FORMULAS

H.1 SOLVING PROBLEMS

Ex 51: A rectangular terrace is 8 m long and 5 m wide. The tiling costs 20 dollars per square meter.
What is the area of the terrace?

$\boxed{40}\ \text{m}^2$

What is the cost to tile the terrace?

$\boxed{800}$ dollars

Answer:

- The area of the rectangular terrace is:

$$\begin{aligned} A &= \text{length} \times \text{width} \\ &= 8\,\text{m} \times 5\,\text{m} \\ &= 40\,\text{m}^2 \end{aligned}$$

- The cost to tile the terrace is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Area} \times \text{cost per m}^2 \\ &= 40\,\text{m}^2 \times 20\,\text{dollars per m}^2 \\ &= 800\,\text{dollars} \end{aligned}$$

Ex 52: A triangular garden has a base of 12 m and a height of 8 m. The cost to plant grass is 5 dollars per square meter.
What is the area of the garden?

$\boxed{48}\ \text{m}^2$

What is the cost to plant grass in the garden?

$\boxed{240}$ dollars

Answer:

- The area of the triangular garden is:

$$\begin{aligned} A &= \frac{\text{base} \times \text{height}}{2} \\ &= \frac{12\,\text{m} \times 8\,\text{m}}{2} \\ &= 48\,\text{m}^2 \end{aligned}$$

- The cost to plant grass in the garden is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Area} \times \text{cost per m}^2 \\ &= 48\,\text{m}^2 \times 5\,\text{dollars per m}^2 \\ &= 240\,\text{dollars} \end{aligned}$$

Ex 53: A rectangular wall is 8 m long and 5 m high. The cost to paint the wall is 20 dollars per square meter.
What is the area of the wall?

$\boxed{40}$ m^2

What is the cost to paint the wall?

$\boxed{800}$ dollars

Answer:

- The area of the rectangular wall is:

$$\begin{aligned} A &= \text{length} \times \text{height} \\ &= 8\,\text{m} \times 5\,\text{m} \\ &= 40\,\text{m}^2 \end{aligned}$$

- The cost to paint the wall is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Area} \times \text{cost per m}^2 \\ &= 40\,\text{m}^2 \times 20\,\text{dollars per m}^2 \\ &= 800\,\text{dollars} \end{aligned}$$

Ex 54: A triangular roof has a base of 10 m and a height of 6 m. The cost to cover the roof with wood is 15 dollars per square meter.
What is the area of the roof?

$\boxed{30}$ m^2

What is the cost to cover the roof with wood?

$\boxed{450}$ dollars

Answer:

- The area of the triangular roof is:

$$\begin{aligned} A &= \frac{\text{base} \times \text{height}}{2} \\ &= \frac{10\,\text{m} \times 6\,\text{m}}{2} \\ &= 30\,\text{m}^2 \end{aligned}$$

- The cost to cover the roof with wood is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Area} \times \text{cost per m}^2 \\ &= 30\,\text{m}^2 \times 15\,\text{dollars per m}^2 \\ &= 450\,\text{dollars} \end{aligned}$$

Ex 55: A circular garden has a radius of 4 m. The cost to plant flowers is 10 dollars per square meter.
What is the area of the garden? (Round to 2 decimal places)

$\boxed{50.24}$ m^2

What is the cost to plant flowers in the garden? (Round to 1 decimal place)

$\boxed{502.4}$ dollars

Answer:

- The area of the circular garden is:

$$\begin{aligned} A &= \pi \times \text{radius} \times \text{radius} \\ &= \pi \times 4\,\text{m} \times 4\,\text{m} \\ &= 16\pi\,\text{m}^2 \\ &\approx 50.24\,\text{m}^2 \quad \text{(rounded to 2 decimal places)} \end{aligned}$$

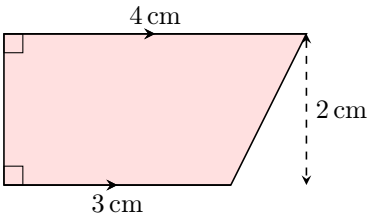
- The cost to plant flowers in the garden is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Area} \times \text{cost per m}^2 \\ &= 50.24\,\text{m}^2 \times 10\,\text{dollars per m}^2 \\ &= 502.4\,\text{dollars} \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

I AREA OF COMPOSITE FIGURES

I.1 FINDING AREAS OF COMPOSITE FIGURES

Ex 56: Find the area of the figure:



$A = \boxed{7}$ cm^2

Answer:

- The area of the figure is calculated by subtracting the area of the triangle from the area of the rectangle:

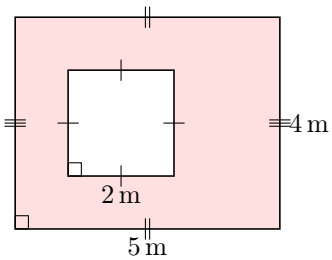
$$\begin{aligned} A &= \text{area of rectangle} - \text{area of triangle} \\ &= (4 \times 2) - \frac{1 \times 2}{2} \\ &= 8 - 1 \\ &= 7\,\text{cm}^2 \end{aligned}$$

L'aire de la figure est calculée en soustrayant l'aire du triangle de l'aire du rectangle :

$A =$  $-$ 

$$\begin{aligned} A &= \text{aire du rectangle} - \text{aire du triangle} \\ &= (4 \times 2) - \frac{1 \times 2}{2} \\ &= 8 - 1 \\ &= 7\,\text{cm}^2 \end{aligned}$$

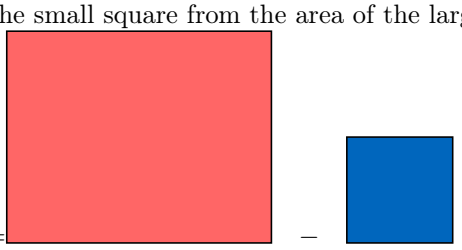
Ex 57: Find the area of the figure:



$A = \boxed{16}\ \text{m}^2$

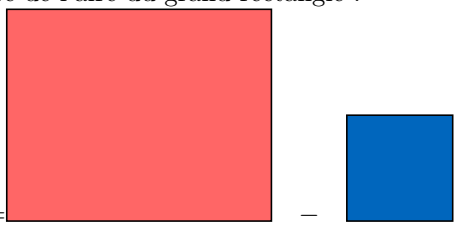
Answer:

- The area of the figure is calculated by subtracting the area of the small square from the area of the large rectangle:

$A =$  $-$

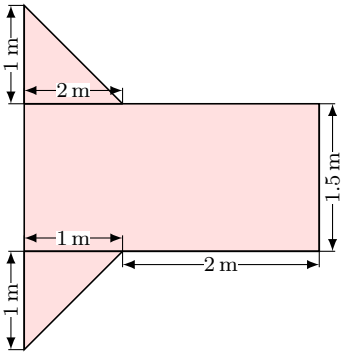
$$\begin{aligned} A &= \text{area of large rectangle} - \text{area of small square} \\ &= (5 \times 4) - (2 \times 2) \\ &= 20 - 4 \\ &= 16\,\text{m}^2 \end{aligned}$$

L'aire de la figure est calculée en soustrayant l'aire du petit carré de l'aire du grand rectangle :

$A =$  $-$

$$\begin{aligned} A &= \text{aire du grand rectangle} - \text{aire du petit carré} \\ &= (5 \times 4) - (2 \times 2) \\ &= 20 - 4 \\ &= 16\,\text{m}^2 \end{aligned}$$

Ex 58: Find the area of the figure:



$A = \boxed{4}\ \text{m}^2$

Answer:

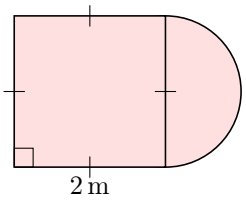
- The area of the figure is calculated by adding the area of the rectangle and the areas of the two triangles:

$$\begin{aligned} A &= \text{area of rectangle} + 2 \times \text{area of triangle} \\ &= (2 \times 1.5) + 2 \times \frac{1 \times 1}{2} \\ &= 3 + 1 \\ &= 4\,\text{m}^2 \end{aligned}$$

L'aire de la figure est calculée en additionnant l'aire du rectangle et les aires des deux triangles :

$$\begin{aligned} A &= \text{aire du rectangle} + 2 \times \text{aire du triangle} \\ &= (2 \times 1,5) + 2 \times \frac{1 \times 1}{2} \\ &= 3 + 1 \\ &= 4\,\text{m}^2 \end{aligned}$$

Ex 59: Calculate the area of the figure:

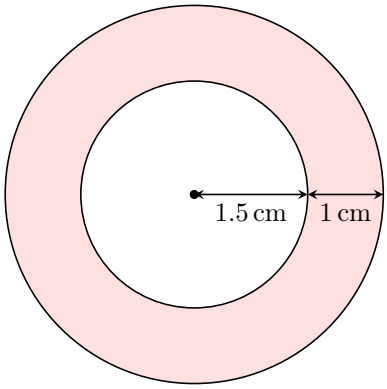


$A = \boxed{5.57}\ m^2$ (round at 2 decimal place)

Answer: The area of the figure is calculated by adding the area of the square and the area of the semi-circle:

$$\begin{aligned} A &= \text{area of square} + \text{area of semi-circle} \\ &= (2 \times 2) + \frac{1}{2} \times \pi \times 1 \times 1 \\ &\approx 5.57\,\text{m}^2 \end{aligned}$$

Ex 60: Calculate the area of the figure: (Round to 2 decimal places)



$A =$ 12.56 cm^2

Answer:

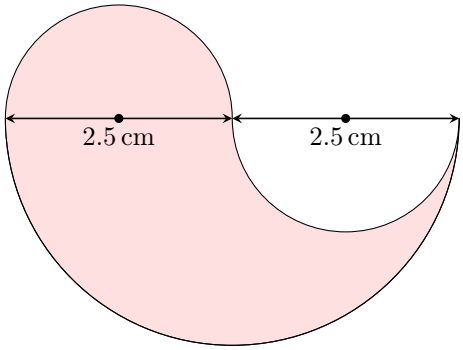
- The area of the figure is calculated by subtracting the area of the small circle from the area of the large circle:

$$\begin{aligned} A &= \text{area of large circle} - \text{area of small circle} \\ &= (\pi \times 2.5 \times 2.5) - (\pi \times 1.5 \times 1.5) \\ &= 6.25\pi - 2.25\pi \\ &= 4\pi \\ &\approx 12.56\,\text{cm}^2 \quad \text{(rounded to 2 decimal places)} \end{aligned}$$

L'aire de la figure est calculée en soustrayant l'aire du petit cercle de l'aire du grand cercle :

$$\begin{aligned} A &= \text{aire du grand cercle} - \text{aire du petit cercle} \\ &= (\pi \times 2,5 \times 2,5) - (\pi \times 1,5 \times 1,5) \\ &= 6,25\pi - 2,25\pi \\ &= 4\pi \\ &\approx 12,56\,\text{cm}^2 \quad \text{(arrondi à 2 chiffres après la virgule)} \end{aligned}$$

Ex 61: Calculate the area of the figure: (Round to 2 decimal places)



$A =$ 9.81 cm^2

Answer:

- The area of the figure is the area of the large semi-circle (since the small semi-circles cancel each other out):

$$\begin{aligned} A &= \text{area of large semi-circle} - \text{area of small semi-circle} + \text{area of small semi-circle} \\ &= \text{area of large semi-circle} \\ &= \frac{1}{2} \times \pi \times 2.5 \times 2.5 \\ &\approx 9.81\,\text{cm}^2 \quad \text{(rounded to 2 decimal places)} \end{aligned}$$

L'aire de la figure est l'aire du grand demi-cercle (car les petits demi-cercles s'annulent mutuellement) :

$$\begin{aligned} A &= \text{aire du grand demi-cercle} - \text{aire du petit demi-cercle} + \text{air} \\ &= \text{aire du grand demi-cercle} \\ &= \frac{1}{2} \times \pi \times 2,5 \times 2,5 \\ &\approx 9,81\,\text{cm}^2 \quad \text{(arrondi à 2 chiffres après la virgule)} \end{aligned}$$