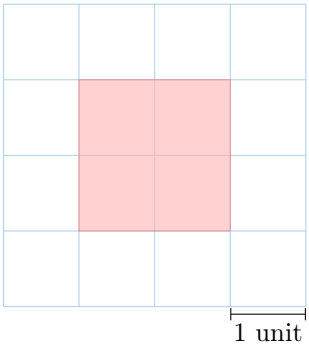
PERIMETER

A DEFINITION

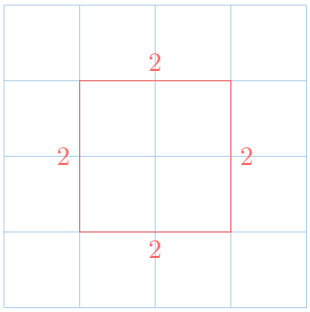
A.1 FINDING PERIMETER OF A SHAPE

Ex 1: What is the perimeter of the shaded figure?



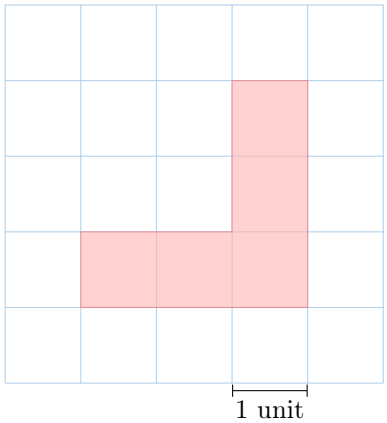
$\boxed{8}$ units

Answer:



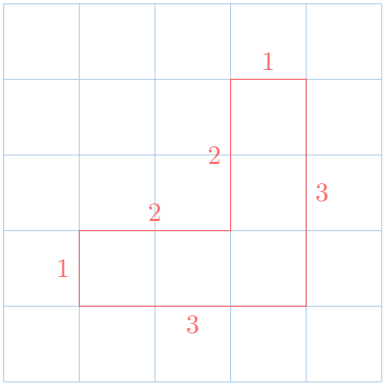
To find the perimeter, we add the length of all 4 sides : $2 + 2 + 2 + 2$.
The perimeter is 8 units.

Ex 2: What is the perimeter of the shaded figure?



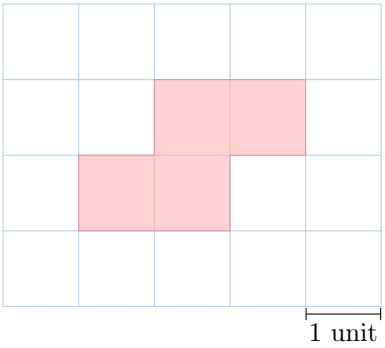
$\boxed{12}$ units

Answer:



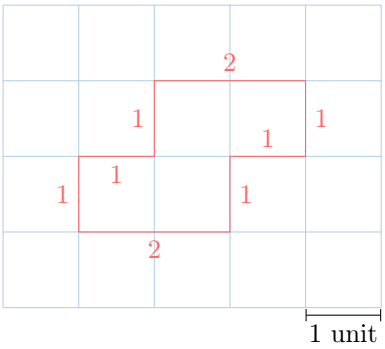
To find the perimeter, we add the length of all sides: $3 + 3 + 1 + 2 + 2 + 1$.
The perimeter is 12 units.

Ex 3: What is the perimeter of the shaded figure?



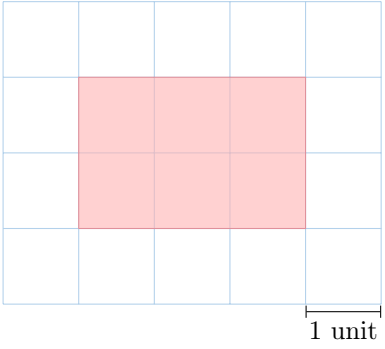
$\boxed{10}$ units

Answer:



To find the perimeter, we add the length of all sides: $2 + 1 + 1 + 1 + 2 + 1 + 1 + 1$.
The perimeter is 10 units.

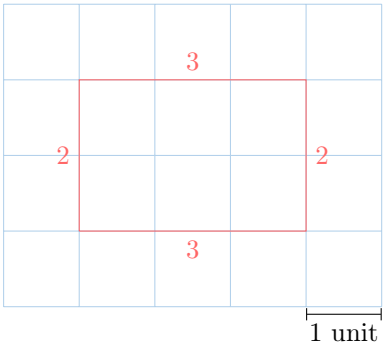
Ex 4: What is the perimeter of the shaded figure?



Answer:

$\boxed{10}$ units

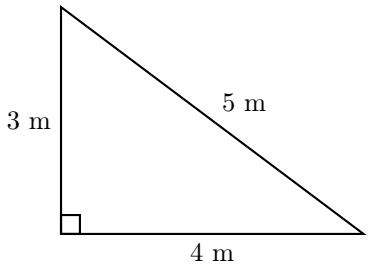
Answer:



To find the perimeter, we add the length of all sides: 3 + 2 + 3 + 2.
The perimeter is 10 units.

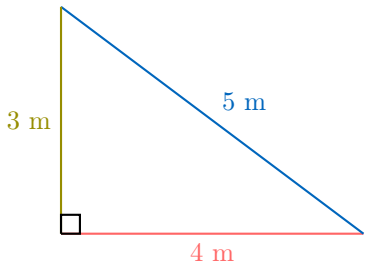
A.2 FINDING PERIMETER WHEN GIVEN SIDE LENGTHS

Ex 5: What is the perimeter of the right angle triangle?



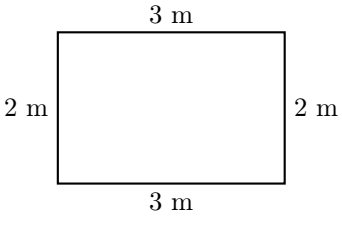
$\boxed{12}$ meters

Answer: We find the perimeter by adding all of the side lengths.



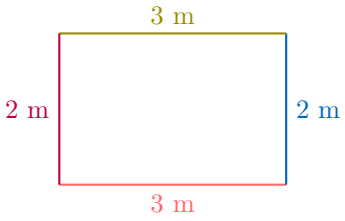
$$\text{Perimeter} = 4\text{ m} + 5\text{ m} + 3\text{ m}$$
$$= 12\text{ m}$$

Ex 6: What is the perimeter of the rectangle?



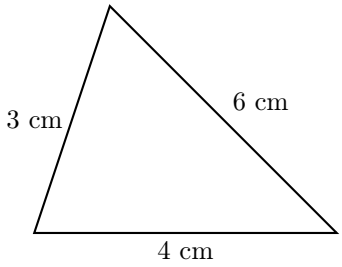
$\boxed{10}$ meters

Answer: We find the perimeter by adding all of the side lengths.



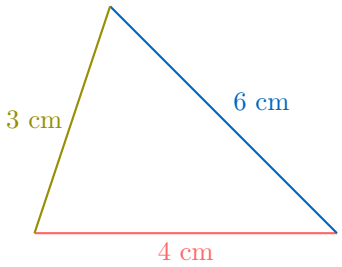
$$\text{Perimeter} = 3\text{ m} + 2\text{ m} + 3\text{ m} + 2\text{ m}$$
$$= 10\text{ m}$$

Ex 7: What is the perimeter of the scalene ?



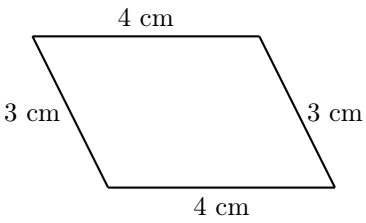
$\boxed{13}$ centimeters

Answer: We find the perimeter by adding all of the side lengths.



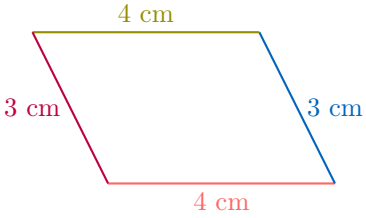
$$\text{Perimeter} = 4\text{ cm} + 6\text{ cm} + 3\text{ cm}$$
$$= 13\text{ cm}$$

Ex 8: What is the perimeter of the parallelogram?



$\boxed{14}$ centimeters

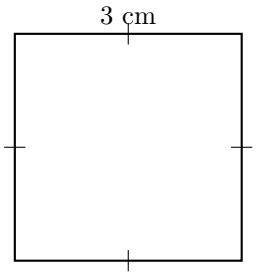
Answer: We find the perimeter by adding all of the side lengths.



$$\text{Perimeter} = 4\text{ cm} + 3\text{ cm} + 4\text{ cm} + 3\text{ cm}$$
$$= 14\text{ cm}$$

A.3 BUILDING EXPRESSIONS

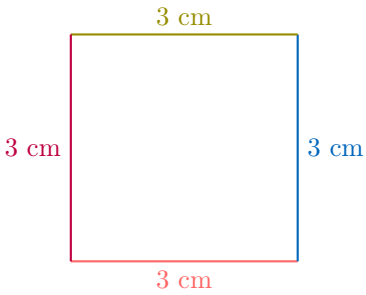
MCQ 9: Which of the following expressions can be used to find the perimeter of the square?
All sides are the same length.



Choose 2 answers:

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

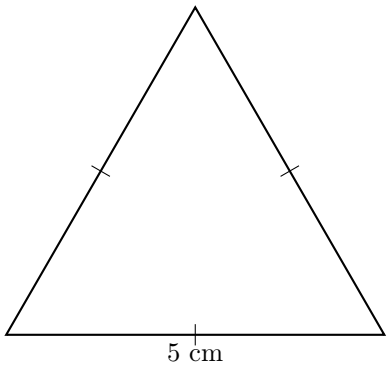
Answer: In the square, all sides are the same length.



$$\text{Perimeter} = 3 + 3 + 3 + 3$$
$$= 4 \times 3$$

So, the correct expressions are 4×3 and $3+3+3+3$, both equal to 12 cm.

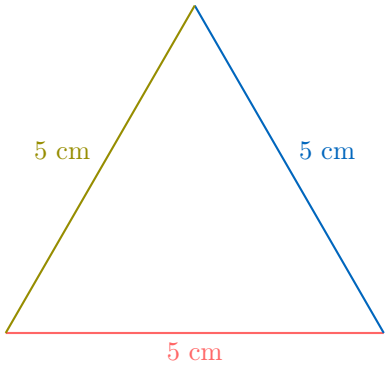
MCQ 10: Which of the following expressions can be used to find the perimeter of the equilateral triangle?
All sides are the same length.



Choose 2 answers:

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

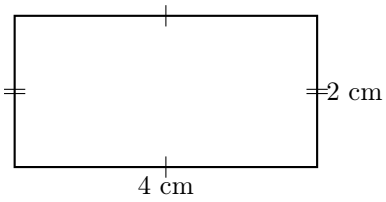
Answer: In the equilateral triangle, all sides are the same length.



$$\text{Perimeter} = 5 + 5 + 5$$
$$= 3 \times 5$$

So, the correct expressions are 3×5 and $5+5+5$, both equal to 15 cm.

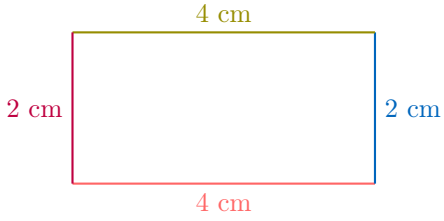
MCQ 11: Which of the following expressions can be used to find the perimeter of the rectangle?
Opposite sides are the same length.



Choose 2 answers:

- ☐ $2 + 4$
- ☒ $(2 \times 2) + (2 \times 4)$
- ☒ $4 + 4 + 2 + 2$
- ☐ 4×2

Answer: In the rectangle, opposite sides are the same length.

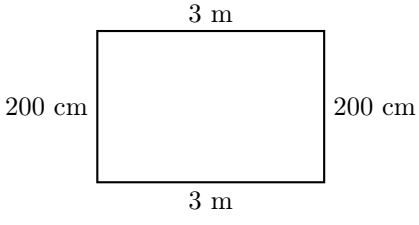


$$\text{Perimeter} = 4 + 4 + 2 + 2$$
$$= (2 \times 4) + (2 \times 2)$$

So, the correct expressions are $(2 \times 2) + (2 \times 4)$ and $4+4+2+2$, both equal to 12 cm.

A.4 FINDING PERIMETER WHEN GIVEN SIDE LENGTHS USING CONVERSION UNIT LENGTHS

Ex 12: What is the perimeter of the rectangle?



$\boxed{10}$ meters

Answer:

- **Convert to the same unit:**
  - *Division Method:*

$$200\,\text{cm} = 200 \div 100\,\text{m}$$
$$= 2\,\text{m}$$

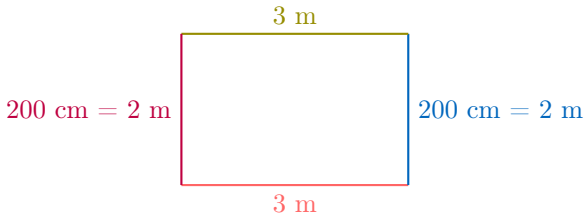
  - *Conversion Table Method:*

km			m		cm	mm
			2	0	0	

So,

$$200\,\text{cm} = 2\,\text{m}$$

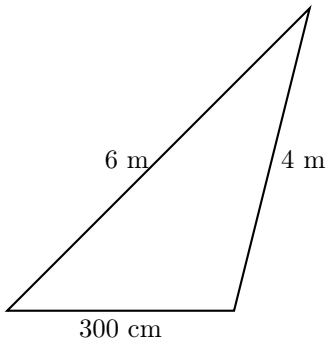
- **Add all the side lengths:**



$$\text{Perimeter} = 3\text{ m} + 2\text{ m} + 3\text{ m} + 2\text{ m}$$
$$= (3 + 2 + 3 + 2)\,\text{m}$$
$$= 10\,\text{m}$$

So, the perimeter of the rectangle is 10 meters.

Ex 13: What is the perimeter of the triangle?



$\boxed{13}$ meters

Answer:

- **Convert to the same unit:**
  - *Division Method:*

$$300\,\text{cm} = 300 \div 100\,\text{m}$$
$$= 3\,\text{m}$$

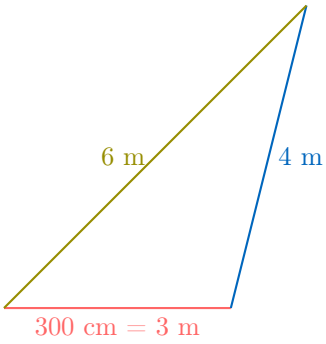
  - *Conversion Table Method:*

km			m		cm	mm
			3	0	0	

So,

$$300\,\text{cm} = 3\,\text{m}$$

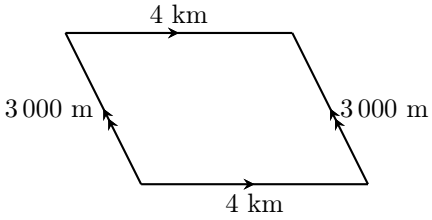
- **Add all the side lengths:**



$$\text{Perimeter} = 3\text{ m} + 4\text{ m} + 6\text{ m}$$
$$= (3 + 4 + 6)\,\text{m}$$
$$= 13\,\text{m}$$

So, the perimeter of the triangle is 13 meters.

Ex 14: What is the perimeter of the parallelogram?



$\boxed{14}$ kilometers

Answer:

- **Convert to the same unit:**
  - *Division Method:*

$$3\,000\,\text{m} = 3\,000 \div 1\,000\,\text{km}$$
$$= 3\,\text{km}$$

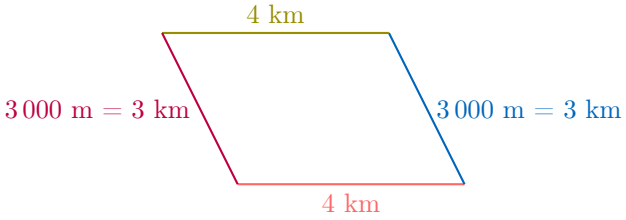
  - *Conversion Table Method:*

km			m		cm	mm
3	.	0	0	0		

So,

$$3\,000\,\text{m} = 3\,\text{km}$$

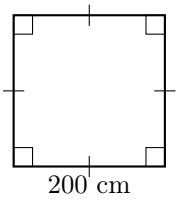
- **Add all the side lengths:**



$$\text{Perimeter} = 4\text{ km} + 3\text{ km} + 4\text{ km} + 3\text{ km}$$
$$= (4 + 3 + 4 + 3)\,\text{km}$$
$$= 14\,\text{km}$$

So, the perimeter of the parallelogram is 14 kilometers.

Ex 15: What is the perimeter of the square in meters?



8 meters

Answer:

- **Convert to the same unit:**
  - *Division Method:*

$$\begin{aligned} 200\,\text{cm} &= 200 \div 100\,\text{m} \\ &= 2\,\text{m} \end{aligned}$$

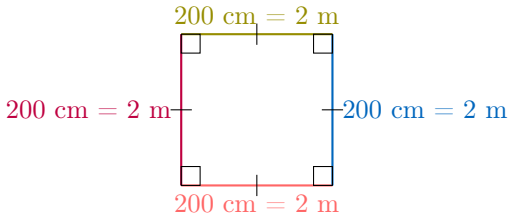
  - *Conversion Table Method:*

km			m		cm	mm
			2	0	0	

So,

$$200\,\text{cm} = 2\,\text{m}$$

- **Add all the side lengths:**The square has 4 sides, each 2 m.



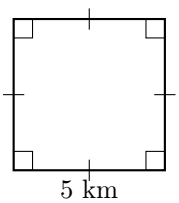
$$\begin{aligned} \text{Perimeter} &= 2\text{ m} + 2\text{ m} + 2\text{ m} + 2\text{ m} \\ &= (2+2+2+2)\,\text{m} \\ &= 4 \times 2\,\text{m} \\ &= 8\,\text{m} \end{aligned}$$

So, the perimeter of the square is 8 meters.

B PERIMETER OF COMMON SHAPES

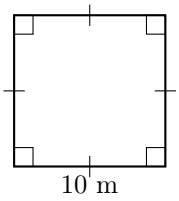
B.1 FINDING PERIMETERS OF SQUARES AND RECTANGLES

Ex 16: What is the perimeter of the square?



20 kilometers

Ex 17: What is the perimeter of the square?



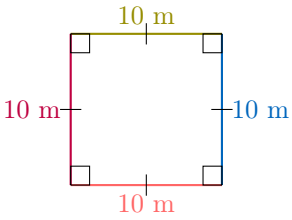
40 meters

Answer:

- **Method 1: Use the formula**

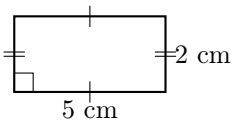
$$\begin{aligned} \text{Perimeter} &= 4 \times c \\ &= 4 \times 10 \\ &= 40\,\text{m} \end{aligned}$$

- **Method 2: Add all the side lengths**



$$\begin{aligned} \text{Perimeter} &= 10 + 10 + 10 + 10 \\ &= 4 \times 10 \\ &= 40\,\text{m} \end{aligned}$$

Ex 18: What is the perimeter of the rectangle?



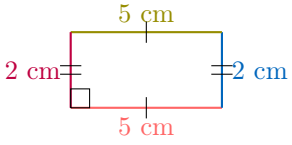
14 centimeters

Answer:

- **Method 1: Use the formula**

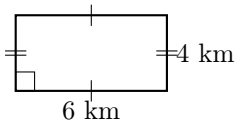
$$\begin{aligned} \text{Perimeter} &= (2 \times L) + (2 \times l) \\ &= (2 \times 5) + (2 \times 2) \\ &= 10 + 4 \\ &= 14\,\text{cm} \end{aligned}$$

- **Method 2: Add all the side lengths**



$$\begin{aligned} \text{Perimeter} &= 5 + 2 + 5 + 2 \\ &= 14\,\text{cm} \end{aligned}$$

Ex 19: What is the perimeter of the rectangle?



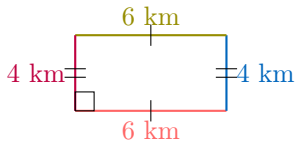
20 kilometers

Answer:

- **Method 1: Use the formula**

$$\begin{aligned}\text{Perimeter} &= (2 \times L) + (2 \times l)\\ &= (2 \times 6) + (2 \times 4)\\ &= 12\,\text{km} + 8\,\text{km}\\ &= 20\,\text{km}\end{aligned}$$

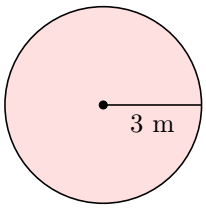
- **Method 2: Add all the side lengths**



$$\begin{aligned}\text{Perimeter} &= 6 + 4 + 6 + 4\\ &= 20\,\text{km}\end{aligned}$$

B.2 FINDING CIRCUMFERENCES

Ex 20: What is the perimeter of the circle?



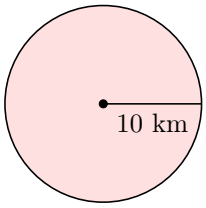
18.8 meters (round at 1 decimal place)

Answer: Using the formula for the perimeter (circumference) of a circle:

$$\begin{aligned}P &= 2 \times \pi \times r\\ &= 2 \times \pi \times 3\\ &\approx 18.8496\ldots \quad \text{(use calculator)}\\ &\approx 18.8\,\text{m} \quad \text{(round at 1 decimal place)}\end{aligned}$$

So, the perimeter is approximately 18.8 meters.

Ex 21: What is the perimeter of the circle?



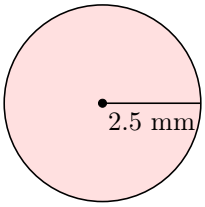
62.8 kilometers (round at 1 decimal place)

Answer: Using the formula for the perimeter (circumference) of a circle:

$$\begin{aligned}P &= 2 \times \pi \times r\\ &= 2 \times \pi \times 10\\ &\approx 62.8319\ldots \quad \text{(use calculator)}\\ &\approx 62.8\,\text{km} \quad \text{(round at 1 decimal place)}\end{aligned}$$

So, the perimeter is approximately 62.8 kilometers.

Ex 22: What is the perimeter of the circle?



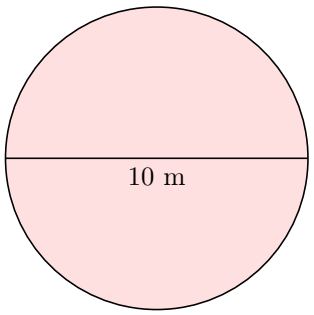
15.7 millimeters (round at 1 decimal place)

Answer: Using the formula for the perimeter (circumference) of a circle:

$$\begin{aligned}P &= 2 \times \pi \times r\\ &= 2 \times \pi \times 2.5\\ &\approx 15.7079\ldots \quad \text{(use calculator)}\\ &\approx 15.7\,\text{mm} \quad \text{(round at 1 decimal place)}\end{aligned}$$

So, the perimeter is approximately 15.7 millimeters.

Ex 23: What is the perimeter of the circle with a diameter of 10 meters?



31.4 meters (round to 1 decimal place)

Answer:

- The radius r is half of the diameter:

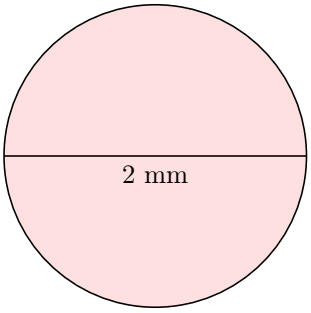
$$\begin{aligned}r &= \frac{\text{d}}{2}\\ &= \frac{10}{2}\\ &= 5\,\text{m}\end{aligned}$$

- Using the formula for the perimeter (circumference) of a circle:

$$\begin{aligned}P &= 2 \times \pi \times r\\ &= 2 \times \pi \times 5\\ &\approx 31.4159\ldots \quad \text{(use calculator)}\\ &\approx 31.4\,\text{m} \quad \text{(rounded to 1 decimal place)}\end{aligned}$$

So, the perimeter is approximately 31.4 meters.

Ex 24: What is the perimeter of the circle with a diameter of 2 millimeters?



6.3 millimeters (round to 1 decimal place)

Answer:

- The radius r is half of the diameter:

$$\begin{aligned} r &= \frac{\mathrm{d}}{2} \\ &= \frac{2}{2} \\ &= 1\,\mathrm{mm} \end{aligned}$$

- Using the formula for the perimeter (circumference) of a circle:

$$\begin{aligned} P &= 2 \times \pi \times r \\ &= 2 \times \pi \times 1 \\ &\approx 6.2832... \quad \text{(use calculator)} \\ &\approx 6.3\,\mathrm{mm} \quad \text{(rounded to 1 decimal place)} \end{aligned}$$

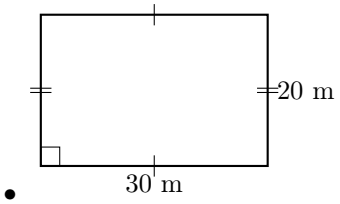
So, the perimeter is approximately 6.3 millimeters.

B.3 SOLVING PROBLEMS

Ex 25: A farmer wants to build a fence around a rectangular field that measures 30 m by 20 m. The cost of the fence is 10 dollars per meter. What is the total cost to build the fence around the field?

1000 dollars

Answer:



- **Find the perimeter of the rectangular field:** Using the formula for the perimeter of a rectangle:

$$\begin{aligned} \text{Perimeter} &= (2 \times L) + (2 \times l) \\ &= (2 \times 30) + (2 \times 20) \\ &= 60\,\mathrm{m} + 40\,\mathrm{m} \\ &= 100\,\mathrm{m} \end{aligned}$$

- **Calculate the cost of the fence:** The cost is 10 dollars per meter, and the perimeter is 100 m:

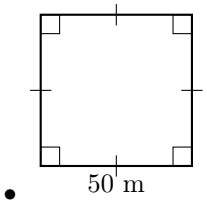
$$\begin{aligned} \text{Total cost} &= \text{Perimeter} \times \text{Cost per meter} \\ &= 100 \times 10 \\ &= 1\,000\,\text{dollars} \end{aligned}$$

So, the total cost to build the fence is 1 000 dollars.

Ex 26: A park manager wants to install a pathway of lights around a square park that has a side length of 50 m. The cost of installing the lights is 15 dollars per meter. What is the total cost to install the lights around the park?

3000 dollars

Answer:



- **Find the perimeter of the square park:** Using the formula for the perimeter of a square:

$$\begin{aligned} \text{Perimeter} &= 4 \times s \\ &= 4 \times 50 \\ &= 200\,\mathrm{m} \end{aligned}$$

- **Calculate the cost of the lights:** The cost is 15 dollars per meter, and the perimeter is 200 m:

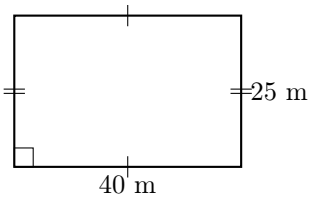
$$\begin{aligned} \text{Total cost} &= \text{Perimeter} \times \text{Cost per meter} \\ &= 200 \times 15 \\ &= 3\,000\,\text{dollars} \end{aligned}$$

So, the total cost to install the lights is 3 000 dollars.

Ex 27: A school wants to create a border of flowers around a rectangular garden that measures 40 m by 25 m. The cost of planting the flowers is 8 dollars per meter. What is the total cost to create the flower border around the garden?

1040 dollars

Answer:



- **Find the perimeter of the rectangular garden:** Using the formula for the perimeter of a rectangle:

$$\begin{aligned} \text{Perimeter} &= (2 \times L) + (2 \times l) \\ &= (2 \times 40) + (2 \times 25) \\ &= 80\,\mathrm{m} + 50\,\mathrm{m} \\ &= 130\,\mathrm{m} \end{aligned}$$

- **Calculate the cost of the flower border:** The cost is 8 dollars per meter, and the perimeter is 130 m:

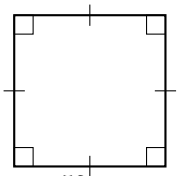
$$\begin{aligned}\text{Total cost} &= \text{Perimeter} \times \text{Cost per meter} \\ &= 130 \times 8 \\ &= 1\,040 \text{ dollars}\end{aligned}$$

So, the total cost to create the flower border is 1 040 dollars.

Ex 28: To celebrate a community event, children form a human chain to surround a square park with a side length of 50 m. If 2 children are needed per meter, how many children are required to surround the park?

$\boxed{400}$ children

Answer:

- 

- **Find the perimeter of the square park:** Using the formula for the perimeter of a square:

$$\begin{aligned}\text{Perimeter} &= 4 \times s \\ &= 4 \times 50 \\ &= 200 \text{ m}\end{aligned}$$

- **Calculate the number of children needed:** There are 2 children per meter, and the perimeter is 200 m:

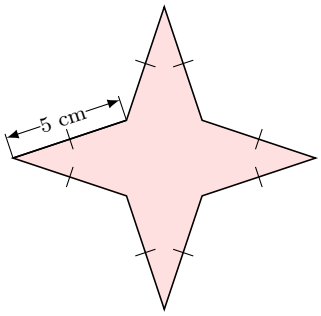
$$\begin{aligned}\text{Total children} &= \text{Perimeter} \times \text{Children per meter} \\ &= 200 \times 2 \\ &= 400 \text{ children}\end{aligned}$$

So, the total number of children needed to surround the park is 400 children.

C PERIMETER OF COMPOSITE FIGURES

C.1 FINDING THE PERIMETER OF COMPOSITE FIGURES

Ex 29: Find the perimeter of the star:



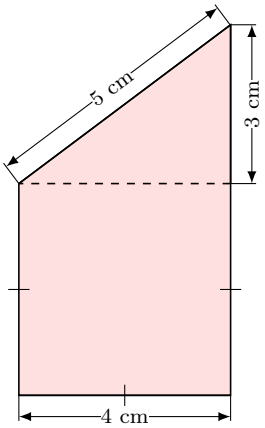
$P =$ $\boxed{40}$ cm

Answer: The star has 8 equal outer sides, each measuring 5 cm, as shown by the marks.
To find the perimeter, add the lengths of all outer sides:

$$\begin{aligned}P &= 8 \times 5 \\ &= 40 \text{ cm}\end{aligned}$$

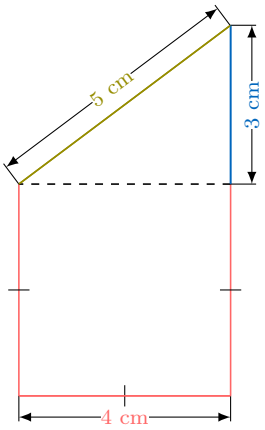
So, the perimeter of the star is 40 cm.

Ex 30: Find the perimeter of the composite figure:



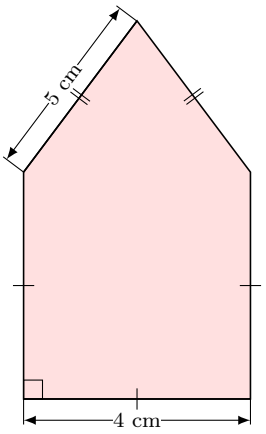
$P =$ $\boxed{20}$ cm

Answer:



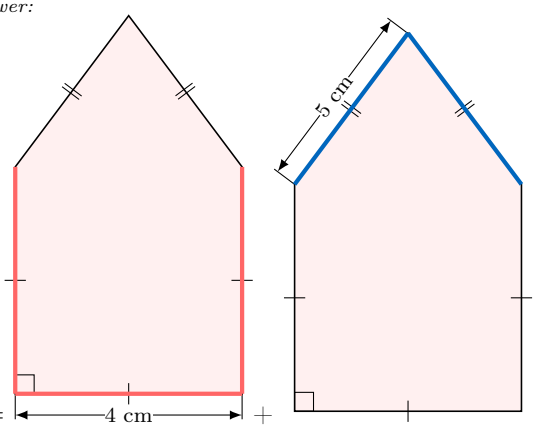
$$\begin{aligned}P &= 3 \times 4 + 3 + 5 \\ &= 20 \text{ cm}\end{aligned}$$

Ex 31: Find the perimeter of the composite :



$P =$ $\boxed{22}$ cm

Answer:

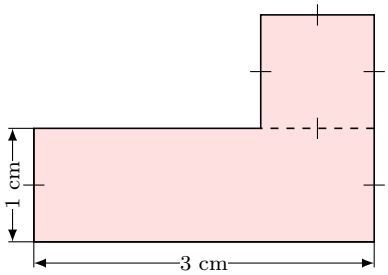


$P =$ +

$P = 3 \times 4 \text{ cm} + 2 \times 5 \text{ cm}$

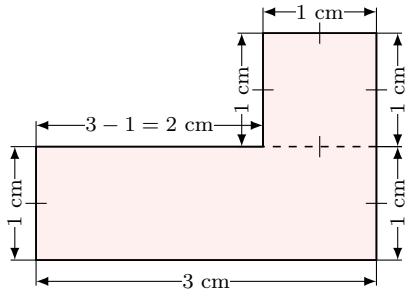
$P = 22 \text{ cm}$

Ex 32: Find the perimeter of the figure:



$P = \boxed{10} \text{ cm}$

Answer:



$P = 5 \times 1 + 3 + 2$

$= 10 \text{ cm}$

So, the perimeter of the composite figure is 10 cm.