## PERIMETER

## A LENGTH UNITS

### A.1 CHOOSING LENGTH UNITS

**MCQ 1:** Which unit will be used to measure how long a pencil is?

Choose 1 answer:

- $\Box$  Millimeters
- $\Box$  Centimeters
- $\boxtimes$  Meters
- $\Box\,$  Kilometers

Answer: Centimeters will be used to measure how long a pencil is.

MCQ 2: Which unit will be used to measure the distance between two cities? Choose 1 answer:

- $\Box$  Millimeters
- $\Box$  Centimeters
- $\Box$  Meters
- $\boxtimes$  Kilometers

Answer: Kilometers will be used to measure the distance between two cities.

MCQ 3: Which unit will be used to measure how tall a tree is?

Choose 1 answer:

- $\Box$  Millimeters
- $\Box$  Centimeters
- $\boxtimes$  Meters
- $\Box$  Kilometers

Answer: Meters will be used to measure how tall a tree is.

**MCQ 4:** Which unit will be used to measure the length of an ant?

Choose 1 answer:

- $\boxtimes$  Millimeters
- $\Box$  Centimeters
- $\Box$  Meters
- $\Box$  Kilometers

Answer: Millimeters will be used to measure the length of an ant.

**MCQ 5:** Which unit will be used to measure how long a book is?

Choose 1 answer:

- $\Box$  Millimeters
- $\Box$  Centimeters

- $\boxtimes$  Meters
- $\Box\,$  Kilometers

Answer: Centimeters will be used to measure how long a book is.

#### A.2 MEASURING

Ex 6:



The giraffe measures 5 meters tall.

Answer: The giraffe measures 5 meters tall.

Ex 7:



The key measures 6 centimeters long.

Answer: The key measures 6 centimeters long.

Ex 8:



The shark measures 4 meters long.

Answer: The shark measures 4 meters long.

Ex 9:



The lizard measures 7 centimeters long. *Answer:* The lizard measures 7 centimeters long. **Ex 10:** 



Mount Fuji measures 4 **kilometers** tall. Answer: Mount Fuji measures 4 kilometers tall.



Ex 11:



The ant measures 6 millimeters long. Answer: The ant measures 6 millimeters long.

 $0\mathrm{mm}\ 1\mathrm{mm}\ 2\mathrm{mm}\ 3\mathrm{mm}\ 4\mathrm{mm}\ 5\mathrm{mm}\ 6\mathrm{mm}$ 



## **B** CONVERSION OF LENGTH UNITS

## **B.1 CONVERTING UNITS OF LENGTH**

Ex 12: Convert:

$$2 \,\mathrm{km} = 2000 \,\mathrm{m}.$$

Answer:

• Multiplication Method:

 $2 \operatorname{km} = 2 \times 1\,000 \operatorname{m}$  $= 2\,000 \operatorname{m}$ 

• Conversion Table Method:

km			m	$\mathrm{cm}$	mm
2	0	0	0		

So,

 $2\,\mathrm{km} = 2\,000\mathrm{m}$ 

Ex 13: Convert:

 $4 \,\mathrm{m} = 400 \,\mathrm{cm}.$ 

Answer:

• Multiplication Method:

$$4 \mathrm{m} = 4 \times 100 \mathrm{cm}$$
$$= 400 \mathrm{cm}$$

• Conversion Table Method:

km		m		$\mathrm{cm}$	mm
		4	0	0	

So,

 $4\,\mathrm{m} = 400\,\mathrm{cm}$ 

**Ex 14:** Convert:



$$300 \,\mathrm{cm} = 3 \,\mathrm{m}.$$

Answer:

• Division Method:

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

• Conversion Table Method:

km		m		cm	mm
		3	0	0	

So,

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

Ex 15: Convert:

 $4\,000\,\mathrm{m} = 4\,\mathrm{km}.$ 

Answer:

• Division Method:

$$4\,000\,\mathrm{m} = 4\,000 \div 1\,000\,\mathrm{km}$$
  
= 4 km

• Conversion Table Method:

km			m	cm	mm
4	0	0	0		

So,

```
4\,000\,\mathrm{m}=4\,\mathrm{km}
```

Ex 16: Convert:

 $23 \,\mathrm{cm} = 230 \,\mathrm{mm}.$ 

Answer:

• Multiplication Method:

 $\begin{array}{l} 23\,\mathrm{cm} = 23\times10\,\mathrm{mm} \\ = 230\,\mathrm{mm} \end{array}$ 

• Conversion Table Method:

km		m		cm	mm
			2	3	0

So,

 $23\,\mathrm{cm}=230\,\mathrm{mm}$ 

Ex 17: Convert:

 $6\,000\,\text{mm} = 6\,\text{m}.$ 

Answer:

• Division Method:

 $6\,000\,\mathrm{mm} = 6\,000 \div 1\,000\,\mathrm{m}$ = 6 m

• Conversion Table Method:

km		m		cm	mm
		6	0	0	0

So,

 $6\,000\,\mathrm{mm}=6\,\mathrm{m}$ 

# B.2 CONVERTING UNITS OF LENGTH WITH DECIMAL NUMBERS

Ex 18: Convert:

$$2.3 \,\mathrm{km} = 2300 \,\mathrm{m}.$$

Answer:

• Multiplication Method:

 $2.3 \,\mathrm{km} = 2.3 \times 1\,000 \,\mathrm{m}$ = 2 300 m

• Conversion Table Method:

km			m	$\mathrm{cm}$	mm
2.	3	0	0		

So,

$$2.3\,\mathrm{km}=2\,300\mathrm{m}$$

**Ex 19:** Convert:

$$1.60 \,\mathrm{m} = 160 \,\mathrm{cm}.$$

Answer:

• Multiplication Method:

 $1.60 \,\mathrm{m} = 1.60 \times 100 \,\mathrm{cm}$ = 160 cm

• Conversion Table Method:

km		m		$\mathrm{cm}$	mm
		1.	6	0	

So,

$$1.60\,\mathrm{m}=160\,\mathrm{cm}$$

Ex 20: Convert:

$$22.5 \,\mathrm{cm} = 225 \,\mathrm{mm}.$$

Answer:

• Multiplication Method:

$$\begin{array}{l} 22.5\,\mathrm{cm} = 22.5\times10\,\mathrm{mm} \\ = 225\,\mathrm{mm} \end{array}$$

• Conversion Table Method:

km		m		$\mathrm{cm}$	mm
			2	2.	5

So,

 $22.5\,\mathrm{cm}=225\,\mathrm{mm}$ 

**Ex 21:** Convert:

```
185 \,\mathrm{cm} = 1.85 \,\mathrm{m}.
```

Answer:

3



• Division Method:

$$185 \,\mathrm{cm} = 185 \div 100 \,\mathrm{m}$$
  
= 1.85 m

• Conversion Table Method:

[	km		m		$\mathrm{cm}$	mm
			1.	8	5	

So,

$$185 \,\mathrm{cm} = 1.85 \,\mathrm{m}$$

Ex 22: Convert:

$$2\,300\,\mathrm{m} = \boxed{2.3}\,\mathrm{km}$$

Answer:

• Division Method:

 $2\,300\,\mathrm{m} = 2\,300 \div 1\,000\,\mathrm{km}$ = 2.3 km

• Conversion Table Method:

ŀ	m			m	cm	mm
4	2.	3	0	0		

So,

$$2\,300\,\mathrm{m} = 2.3\,\mathrm{km}$$

Ex 23: Convert:

$$42.2 \,\mathrm{km} = 42200 \,\mathrm{m}.$$

Answer:

• Multiplication Method:

 $\begin{array}{l} 42.2\,{\rm km} = 42.2\times1\,000\,{\rm m} \\ = 42\,200\,{\rm m} \end{array}$ 

• Conversion Table Method:

	km			m	cm	mm
4	2,	2	0	0		

So,

$$42.2\,\mathrm{km} = 42\,200\,\mathrm{m}$$

## **B.3 SOLVING PROBLEMS WITH UNIT CONVERSIONS**

MCQ 24: Hugo and Louis go walking. Louis walks 5000 meters, and Hugo walks 4.2 kilometers. Who did the longest walk?

 $\boxtimes$  Louis

 $\Box\,$ Hugo

Answer: To compare their distances, we need to use the same unit. We can choose to convert either to meters or kilometers as our reference unit. Let's explore both options:

Option 1: Convert to meters (Louis's unit) Hugo walks 4.2 km. Using the conversion table:

km			m		cm	mm
4.	2	0	0	0		

So, 4.2 km = 4200 m. Now, compare:

- Louis: 5000 m
- Hugo: 4 200 m

**Option 2: Convert to kilometers (Hugo's unit)** Louis walks 5 000 m. Using the conversion table:

km			m	cm	mm
5.	0	0	0		

So,  $5\,000 \text{ m} = 5.0 \text{ km}$ . Now, compare:

- Louis: 5.0 km
- Hugo: 4.2 km

In both cases, since  $5\,000$  m (or 5.0 km) is more than  $4\,200$  m (or 4.2 km), Louis did the longest walk.

Why choose kilometers? In the following problems, we'll often convert to kilometers when comparing large distances, like those between places, because kilometers are a more convenient unit for such scales, making the numbers smaller and easier to compare.

MCQ 25: A giraffe is 5.1 meters tall, and a horse is 200 centimeters tall. Which animal is taller?

 $\boxtimes$  Giraffe

 $\Box$  Horse

 ${\it Answer:}$  Let's convert the horse's height to meters to compare with the giraffe.

The horse is 200 cm tall. Using the conversion table:

km		m		cm	mm
		2	0	0	

So, 200 cm = 2 m. Now, compare:

- Giraffe: 5.1 m
- Horse: 2 m

Since 5.1 m is more than 2 m, the giraffe is taller.

**MCQ 26:** A snake is 3.8 meters long, and a crocodile is 400 centimeters long. Which animal is longer?

- $\boxtimes$  Snake
- $\Box$  Crocodile

 ${\it Answer:}$  Let's convert the crocodile's length to meters to compare with the snake.

The crocodile is 400 cm long. Using the conversion table:

[	$\mathrm{km}$		m		cm	mm
			4	0	0	

(°±°)

So, 400 cm = 4 m. Now, compare:

- Snake: 3.8 m
- Crocodile: 4 m

Since 4 m is more than 3.8 m, the crocodile is longer.

MCQ 27: Emma walks 2.7 km to school, and Liam walks 3000 meters to school. Who walks farther?

 $\boxtimes$  Emma

 $\Box$ Liam

Answer: Let's convert Liam's distance to kilometers to compare with Emma, as kilometers are more convenient for such distances.

Liam walks  $3\,000$  m. Using the conversion table:

km			m	$\mathrm{cm}$	mm
3.	0	0	0		

So, 3000 m = 3.0 km. Now, compare:

- Emma: 2.7 km
- Liam: 3.0 km

Since 3.0 km is more than 2.7 km, Liam walks farther.

## C PERIMETER

## C.1 FINDING PERIMETER OF A SHAPE

Ex 28: What is the perimeter of the shaded figure?





Answer:



To find the perimeter, we add the length of all 4 sides : 2 + 2 + 2 + 2 + 2.

The perimeter is 8 units.

**Ex 29:** What is the perimeter of the shaded figure?







To find the perimeter, we add the length of all sides: 3 + 3 + 1 + 2 + 2 + 1.

The perimeter is 12 units.

Answer:

**Ex 30:** What is the perimeter of the shaded figure?



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 31: What is the perimeter of the shaded figure?



10 units

Answer:



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

The perimeter is 10 units.

## C.2 FINDING PERIMETER WHEN GIVEN SIDE LENGTHS

Ex 32: What is the perimeter of the right angle triangle?



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



**Ex 33:** What is the perimeter of the rectangle?



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





**Ex 34:** What is the perimeter of the scalene ?



13 centimeters

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







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





#### C.3 BUILDING EXPRESSIONS

MCQ 36: Which of the following expressions can be used to find the perimeter of the square? All sides are the same length.



Choose 2 answers:

 $\boxtimes 4 \times 3$ 

 $\Box$  4+3

 $\boxtimes 3 + 3 + 3 + 3$ 

 $\Box \ 3+3$ 

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



$$Perimeter = 3 + 3 + 3 + 3$$
$$= 4 \times 3$$

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

MCQ 37: 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
$\boxtimes$	$3 \times 5$
$\boxtimes$	5 + 5 + 5
	5 + 5

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





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

MCQ 38: Which of the following expressions can be used to find the perimeter of the rectangle? Opposite sides are the same length.



Choose 2 answers:

 $\Box 2+4$  $\boxtimes (2 \times 2) + (2 \times 4)$  $\boxtimes 4+4+2+2$  $\Box 4 \times 2$ 

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





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.

## C.4 FINDING PERIMETER WHEN GIVEN SIDE LENGTHS USING CONVERSION UNIT LENGTHS

**Ex 39:** What is the perimeter of the rectangle?



Answer:

- Convert to the same unit:
  - Division Method:

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

- Conversion Table Method:

km		m		cm	$\mathbf{m}\mathbf{m}$
		2	0	0	

So,



#### • Add all the side lengths:





So, the perimeter of the rectangle is 10 meters.

#### **Ex 40:** What is the perimeter of the triangle?



Answer:

- Convert to the same unit:
  - Division Method:

 $300 \,\mathrm{cm} = 300 \div 100 \,\mathrm{m}$ 



- Conversion Table Method:



- $300\,\mathrm{cm}=3\,\mathrm{m}$
- Add all the side lengths:



Perimeter = 3 m + 4 m + 6 m= (3 + 4 + 6) m= 13 m

So, the perimeter of the triangle is 13 meters.

Ex 41: What is the perimeter of the parallelogram?



(\*<u>+</u>)

Answer:

• Convert to the same unit:

- Division Method:

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

- Conversion Table Method:

km		m		cm	mm
3	0	0	0		

So,



• Add all the side lengths:













Answer:

- Convert to the same unit:
  - Division Method:

$$200 \operatorname{cm} = 200 \div 100 \operatorname{m}$$
$$= 2 \operatorname{m}$$

- Conversion Table Method:



So,

- $200\,\mathrm{cm} = 2\,\mathrm{m}$
- Add all the side lengths: The square has 4 sides, each 2 m.



Perimeter = 
$$2 m + 2 m + 2 m + 2 m$$
  
=  $(2 + 2 + 2 + 2) m$   
=  $4 \times 2 m$   
=  $8 m$ 

So, the perimeter of the square is 8 meters.

## D PERIMETER OF COMMON SHAPES

## D.1 FINDING PERIMETERS OF SQUARES AND RECTANGLES

**Ex 43:** What is the perimeter of the square?





Answer:

• Method 1: Use the formula

Perimeter  $= 4 \times c$  $= 4 \times 5$ = 20 km

#### • Method 2: Add all the side lengths



Perimeter = 5 + 5 + 5 + 5=  $4 \times 5$ = 20 km





40 meters

Answer:

• Method 1: Use the formula

```
Perimeter = 4 \times c
= 4 \times 10
= 40 \text{ m}
```



• Method 2: Add all the side lengths



Perimeter = 10 + 10 + 10 + 10=  $4 \times 10$ = 40 m

Ex 45: What is the perimeter of the rectangle?



Answer:

• Method 1: Use the formula

Perimeter = 
$$(2 \times L) + (2 \times l)$$
  
=  $(2 \times 5) + (2 \times 2)$   
=  $10 + 4$   
=  $14 \text{ cm}$ 

• Method 2: Add all the side lengths



$$Perimeter = 5 + 2 + 5 + 2$$
$$= 14 \text{ cm}$$





20 kilometers

Answer:

• Method 1: Use the formula

Perimeter = 
$$(2 \times l) + (2 \times w)$$
  
=  $(2 \times 6) + (2 \times 4)$   
=  $12 \text{ km} + 8 \text{ km}$   
=  $20 \text{ km}$ 

• Method 2: Add all the side lengths



Perimeter = 6 + 4 + 6 + 4= 20 km

#### D.2 FINDING CIRCUMFERENCES





18.8 meters (round at 1 decimal place)

Answer: Using the formula for the perimeter (circumference) of a circle:  $P = 2 \times \pi \times \pi$ 

$$P = 2 \times \pi \times r$$
  
= 2 × \pi × 3  
\approx 18.8496... (use calculator)  
\approx 18.8 m (round at 1 decimal place)

So, the perimeter is approximately 18.8 meters.

**Ex 48:** What is the perimeter of the circle?





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

 $P = 2 \times \pi \times r$ = 2 × \pi × 10 \approx 62.8319... (use calculator) \approx 62.8 km (round at 1 decimal place)

So, the perimeter is approximately 62.8 kilometers.





15.7 millimeters (round at 1 decimal place)

Answer: Using the formula for the perimeter (circumference) of a circle:  $P = 2 \times \pi \times \pi$ 

$$P = 2 \times \pi \times r$$
  
= 2 × \pi × 2.5  
\approx 15.7079... (use calculator)  
\approx 15.7 mm (round at 1 decimal place)

So, the perimeter is approximately 15.7 millimeters.

**Ex 50:** What is the perimeter of the circle with a diameter of 10 meters?





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Answer:

• The radius r is half of the diameter:

$$\dot{r} = \frac{d}{2}$$
$$= \frac{10}{2}$$
$$= 5 \text{ m}$$

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

 $P = 2 \times \pi \times r$ = 2 × \pi × 5 \approx 31.4159... (use calculator) \approx 31.4 m (rounded to 1 decimal place)

So, the perimeter is approximately 31.4 meters.

**Ex 51:** 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:

$$r = \frac{d}{2}$$
$$= \frac{2}{2}$$
$$= 1 \,\mathrm{mm}$$

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

$$P = 2 \times \pi \times r$$
  
= 2 × \pi × 1  
\approx 6.2832... (use calculator)  
\approx 6.3 mm (rounded to 1 decimal place)

So, the perimeter is approximately 6.3 millimeters.

### **D.3 SOLVING PROBLEMS**

**Ex 52:** 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





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

Perimeter =  $(2 \times l) + (2 \times w)$ =  $(2 \times 30) + (2 \times 20)$ = 60 m + 40 m= 100 m

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

Total cost = Perimeter × Cost per meter =  $100 \times 10$ = 1000 dollars

So, the total cost to build the fence is 1000 dollars.

**Ex 53:** 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:

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

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

Total cost = Perimeter × Cost per meter =  $200 \times 15$ 

 $= 3\,000\,\mathrm{dollars}$ 

So, the total cost to install the lights is 3000 dollars.

**Ex 54:** 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:

Perimeter = 
$$(2 \times l) + (2 \times w)$$
  
=  $(2 \times 40) + (2 \times 25)$   
=  $80 \text{ m} + 50 \text{ m}$   
=  $130 \text{ m}$ 

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

Total  $cost = Perimeter \times Cost per meter$ 

$$= 130 \times 8$$
$$= 1\,040\,\text{dollars}$$

So, the total cost to create the flower border is 1040 dollars.

**Ex 55:** 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?

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:

Total children = Perimeter  $\times$  Children per meter

 $= 200 \times 2$ = 400 children

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

## E LENGTH OF AN ARC

#### E.1 FINDING THE LENGTH OF ARCS





Answer:

Ex 56:

• Determine the fraction of the circle that the arc represents:

Fraction = 
$$\frac{\text{central angle}}{360}$$
  
=  $\frac{90}{360}$   
=  $\frac{1}{4}$ 

• Multiply the full circumference by the fraction to find the arc length:

Arc length = Fraction  $\times$  Circumference

$$= \frac{1}{4} \times 2 \times \pi \times 2.5$$
  

$$\approx 3.9 \,\mathrm{cm} \quad (\text{use calculator})$$





### 3.1 cm (round at 1 decimal place)

Answer:

• Determine the fraction of the circle that the arc represents:

Fraction = 
$$\frac{\text{central angle}}{360}$$
  
=  $\frac{45}{360}$   
=  $\frac{1}{8}$ 

• Multiply the full circumference by the fraction to find the arc length:

Arc length = Fraction  $\times$  Circumference

$$= \frac{1}{8} \times 2 \times \pi \times 4$$
  

$$\approx 3.1 \,\mathrm{cm} \quad (\text{use calculator})$$





4.2 m (round to 1 decimal place)

Answer:

• Determine the fraction of the circle that the arc represents:

Fraction = 
$$\frac{\text{central angle}}{360}$$
  
=  $\frac{60}{360}$   
=  $\frac{1}{6}$ 

• Multiply the full circumference by the fraction to find the arc length:

Arc length = Fraction  $\times$  Circumference

$$= \frac{1}{6} \times 2 \times \pi \times 4$$
  
\$\approx 4.2 m (use calculator)



Answer:

P = quarter of the circle's circumference + two radii

$$=\frac{1}{4}\times 2\times \pi \times 3 + 2\times 3$$

 $\approx 10.7 \,\mathrm{cm}$  (rounded to 1 decimal place)

So, the perimeter of the quarter circle is approximately 10.7 cm.





P = 15.4 cm (round to 1 decimal place)

Answer:



(+)

9.4 km (round to 1 decimal place)

Answer:

• Determine the fraction of the circle that the arc represents:

$$Fraction = \frac{\text{central angle}}{360}$$
$$= \frac{180}{360}$$
$$= \frac{1}{2}$$

• Multiply the full circumference by the fraction to find the arc length:

Arc length = Fraction 
$$\times$$
 Circumference

 $= \frac{1}{2} \times 2 \times \pi \times 3$  $= \frac{1}{2} \times 6\pi$  $\approx 9.4 \,\mathrm{km} \quad \text{(use calculator)}$ 

### **E.2 FINDING PERIMETER OF CIRCULAR SECTORS**

$$P = 10.7$$
 cm (round at 1 decimal place)

P = half of the circle's circumference + diameter

 $=\frac{1}{2}\times2\times\pi\times3+2\times3$ 

 $\approx 15.4\,{\rm cm}$  ~ (rounded to 1 decimal place)

So, the perimeter of the half circle is approximately 15.4 cm.







Answer:



P = three quarters of the circle's circumference + two radii

 $=\frac{3}{4}\times 2\times \pi \times 3 + 2\times 3$ 

 $\approx 20.1 \,\mathrm{cm}$  (rounded to 1 decimal place)

So, the perimeter of the three-quarter circle is approximately 20.1 cm.

**Ex 63:** Find the perimeter of the one-third circle:





Answer:

P =one third of the circle's circumference + two radii

 $=\frac{1}{3}\times 2\times \pi \times 3 + 2\times 3$ 

 $\approx 10.1\,{\rm cm}$  ~ (rounded to 1 decimal place)

So, the perimeter of the one-third circle is approximately 10.1 cm.

## F PERIMETER OF COMPOSITE FIGURES

# F.1 FINDING THE PERIMETER OF COMPOSITE FIGURES

**Ex 64:** Find the perimeter of the star:



 ${\it Answer:}$  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:

$$P = 8 \times 5$$
$$= 40 \,\mathrm{cm}$$

So, the perimeter of the star is 40 cm.

Ex 65: Find the perimeter of the composite figure:



Answer:



(\*<u>+</u>)

Ex 66: Find the perimeter of the composite :



**Ex 67:** Find the perimeter of the figure:



Answer:



So, the perimeter of the composite figure is 10 cm. Ex 68: Find the perimeter of the figure



Answer:



P = 2 + 2.8 + (10 - 2) + 7 + (10 - 2) + 2.8 + 2 + 7= 39.6 m

# F.2 FINDING THE PERIMETER OF COMPOSITE FIGURES





P = 45.7 m (round to 1 decimal place)

Answer:

• The diameter of the circle is 10 m. So the radius is  $10 \div 2 = 5$  m.





$$P =$$
three sides + length of semicircle

$$= 3 \times 10 + \frac{1}{2} \times 2 \times \pi \times 5$$
  
\$\approx 45.7 cm

So, the perimeter of the composite figure is approximately 45.7 m.

Find the perimeter of the composite figure:



P = 17.1 m (round to 1 decimal place)

Answer: Radius of the large circle  $= 2 \times 1.5 = 3$  cm.

P =half the perimeter of the large circle

+ half the perimeter of the small circle +  $2\times1.5$ 

$$=\frac{2\pi\times3}{2}+\frac{2\pi\times1.5}{2}+2\times1.5~\mathrm{cm}$$
  $\approx17.1~\mathrm{cm}$ 

**Ex 71:** Find the perimeter of the composite figure:



P = 31.4 m (round to 1 decimal place)

Answer: Radius of the small circle  $= 5 \div 2 = 2.5$  cm.

- P =half the perimeter of the large circle
  - $+ 2 \times$  half the perimeter of the small circle 1 1

$$= \frac{1}{2} \times 2\pi \times 5 + 2 \times \frac{1}{2} \times 2\pi \times 2.5$$
  

$$\approx 31.4 \text{ cm}$$

#### F.3 BUILDING EXPRESSIONS

 $\mathbf{MCQ}\ \mathbf{72:}\ \ \mathbf{Write}\ \mathbf{a}\ \mathbf{formula}\ \mathbf{for}\ \mathbf{the}\ \mathbf{perimeter}\ \mathbf{of}\ \mathbf{the}\ \mathbf{figure:}$ 

 $\square P = 4x$  $\square P = x$  $\square P = 3x$  $\square P = 2 \text{ cm}$ 

Answer:

$$P = x + x + x + x$$
$$= 4x$$







Answer:

$$P = x + x + x + x + x = 5x$$

#### MCQ 74: Write a formula for the perimeter of the figure:





Answer:

P = 2x + 2x + x= 5x









 $\Box P = 2x + 2\pi x$ 

 $\boxtimes \ P = 2x + \pi x$ 

Answer: The radius of each circle is  $\frac{x}{2}$ .

P =two sides + perimeter of two semicircles

$$= 2x + 2 \times \left(\frac{1}{2} \times 2 \times \pi \times \frac{x}{2}\right)$$
$$= 2x + \pi x$$

So, the correct answer is  $P = 2x + \pi x$ .

