

# CAT 3

Basketball Court Shapes



# Introduction

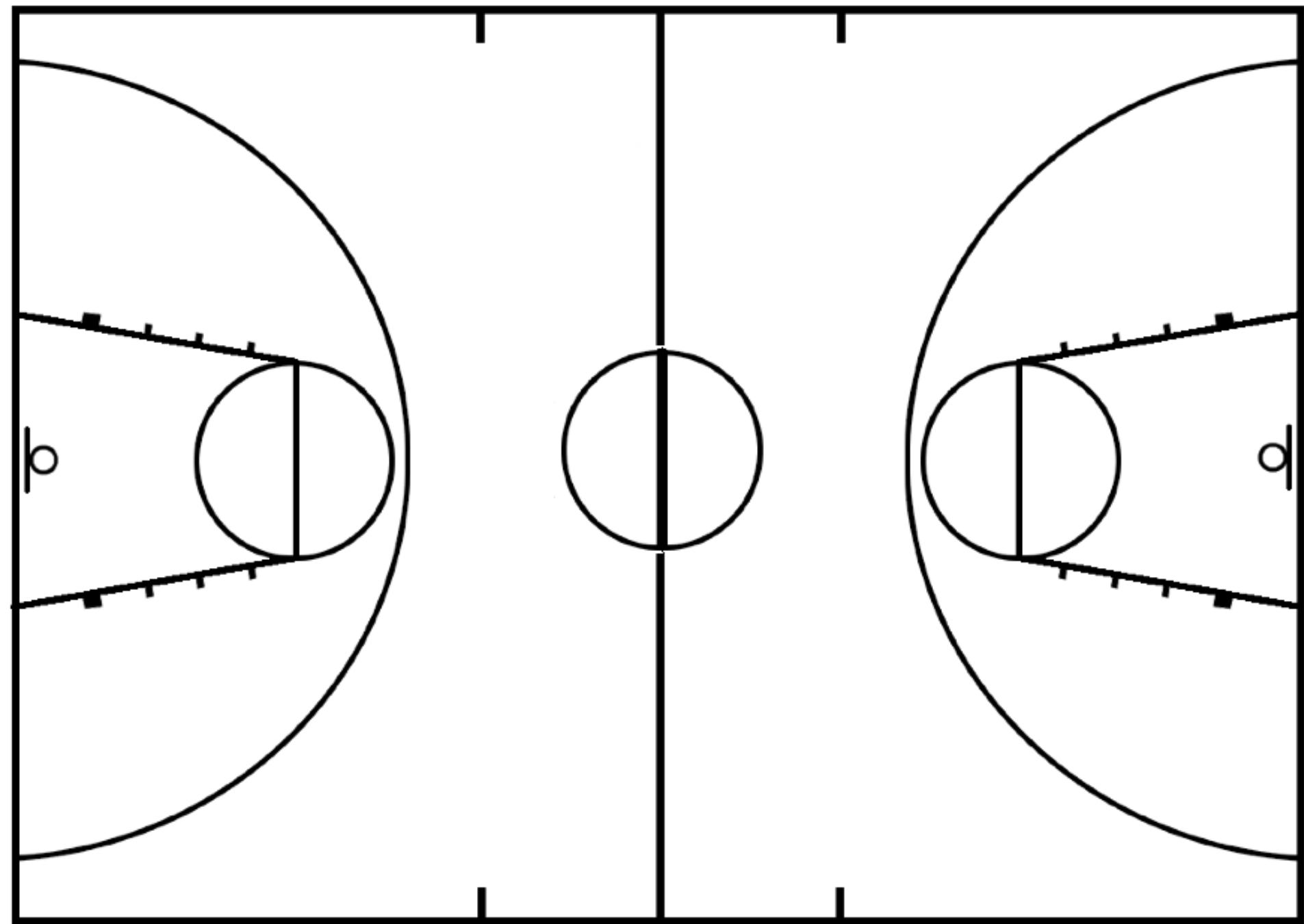
- In this CAT we are measuring different shapes in our basketball court to work out their perimeter and area. Then we will compare the measurements of our court to an international court.

# Aim

To measure the area and perimeter of various shapes on the school basketball court.

# Method

- First we filled out a glossary on mathematical terms.
- Next we measured the lines of the basketball court.
- Then we worked out the perimeter and area of the shapes we had measured.
- After that we got the measurements for a international size basketball court.
- We then worked out the area and perimeter of that.
- Finally we compared the measurements of the international size and the school court size.





Use the Basketball Court diagram to describe how many shapes you can see.

Name the shapes and state the formulas you need to discover the area.

# SHAPE

# FORMULA

Rectangle

Length x height

Circle

$\pi \times \text{diameter}$

Semi-circle

$0.5 \times \text{radius}^2 \times \pi$

Trapezium

$0.5 \times (\text{top} + \text{bottom}) \times \text{height}$



## What you are required to do!

“ You need to measure and record all measurements that you need to work out both the perimeter and area of the following things:

- the full court
- the 3 point line
- half court
- centre circle
- the key



28m

$$\begin{aligned}\text{Perimeter} &= 28\text{m} \times 2 + 15.10 \times 2 \\ &= 86.2\text{m}\end{aligned}$$

15.10m

$$\begin{aligned}\text{Area} &= 28 \times 15.10 \\ &= 422.8^2\text{m}\end{aligned}$$

15.10m

28m

Perimeter

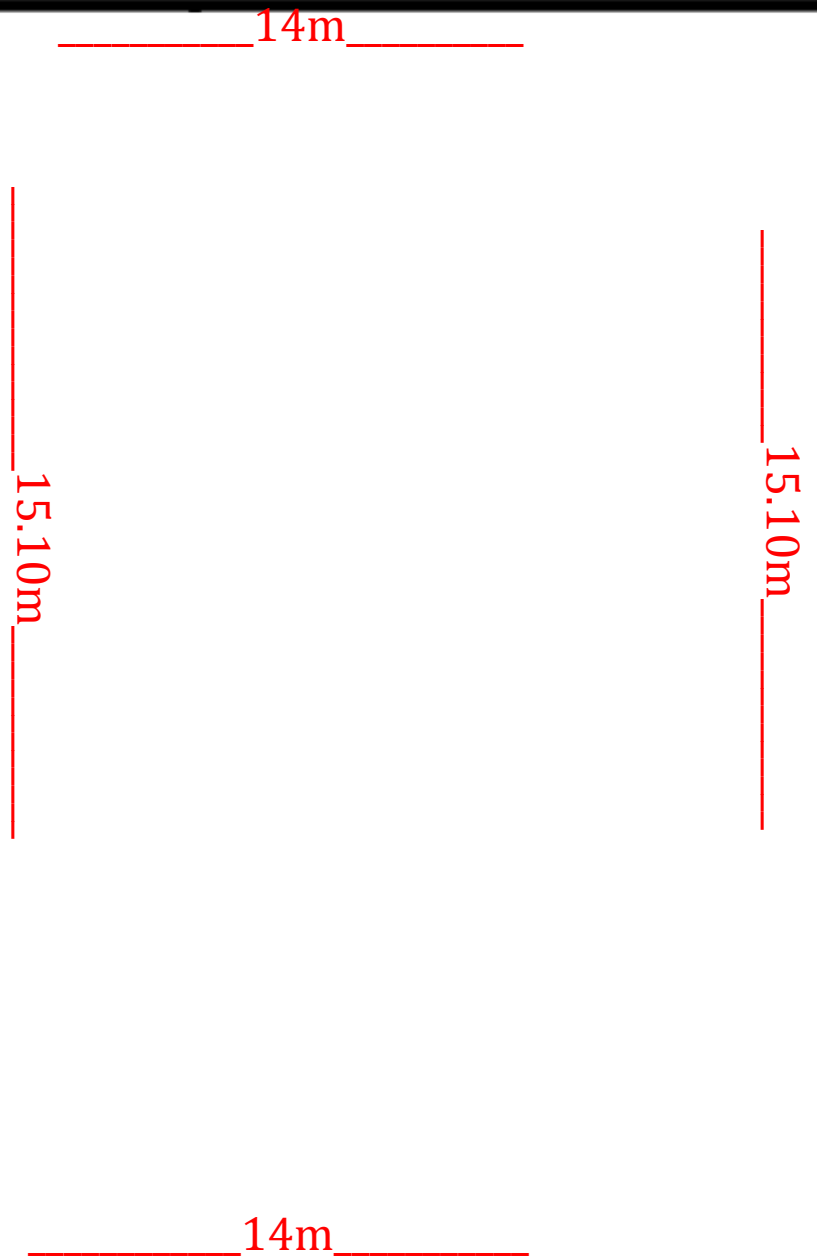
$$= 14 \times 2 + 15.10 \times 2$$

$$= 58.2\text{m}$$

Area

$$= 14 \times 15.10$$

$$= 211.4\text{m}$$







A diagram of a semicircle. A vertical red line segment on the left side represents the radius, labeled "9.84m". The semicircle is drawn with a thick black line, and its flat edge is on the left.

9.84m

Perimeter

$$= 0.5 \times \pi \times 9.84 + 9.84$$

$$= 25.3$$

Area

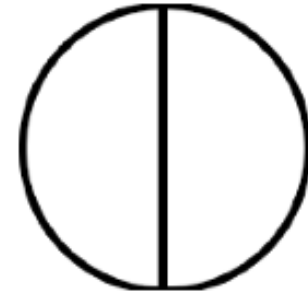
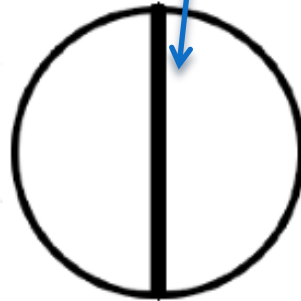
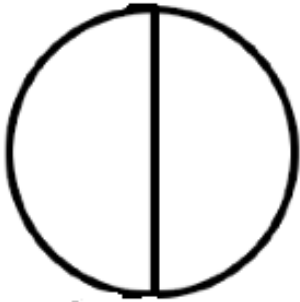
$$= 4.92^2 \times \pi$$

$$= 76.05 \text{m}^2$$

Perimeter  
 $= 3.54 \times \pi$

$= 11.12\text{m}$

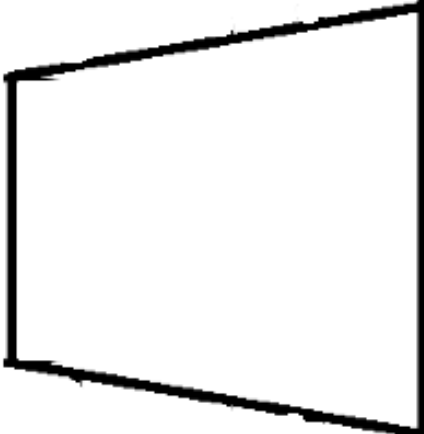
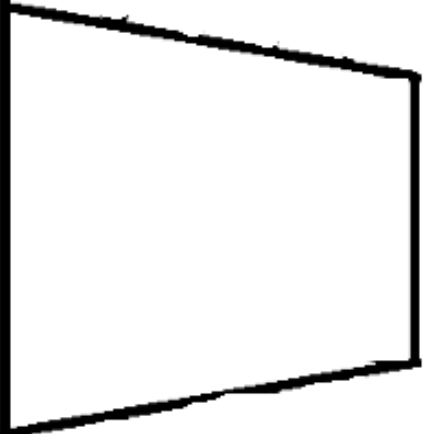
3.54m



Area  
 $= 1.77^2 \times \pi$

$= 9.84\text{m}^2$





Perimeter  
 $=6.06+ 5.4+5.4+3.54$   
 $=20.4\text{m}$

Area  
 $=0.5\times(6.06+3.54)\times 5.4$   
 $=25.92\text{m}^2$



## Fence?

You need to find how much fence that is needed to enclose the whole basketball court 4m high.

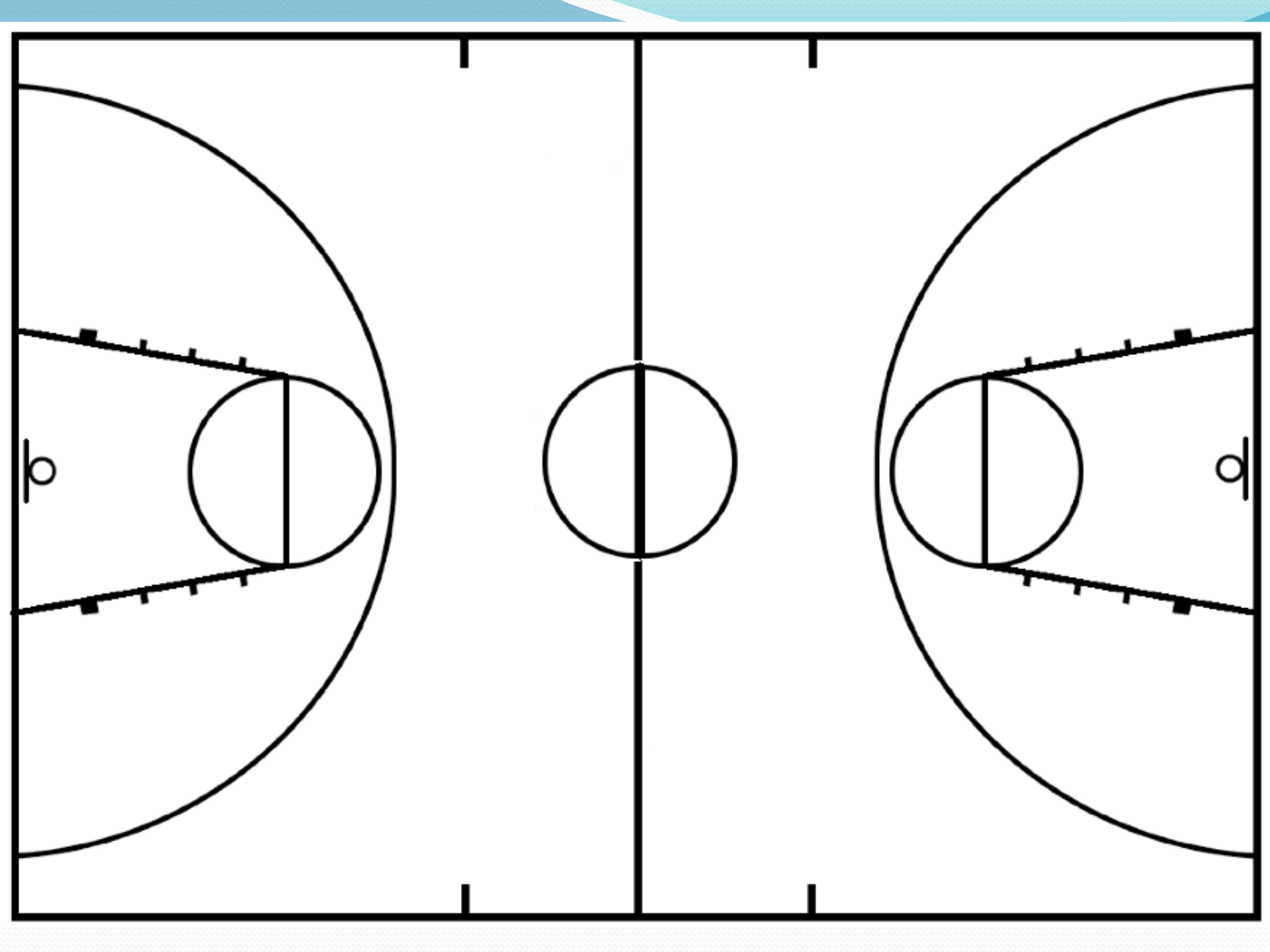
Answer=344.8m of fencing at a height of 1m each

Perimeter-86.2

$$=86.2 \times 4$$

$$=344.8$$







# Volume?

If you had to resurface the court to a depth of 0.5 meters, how much asphalt would you need?

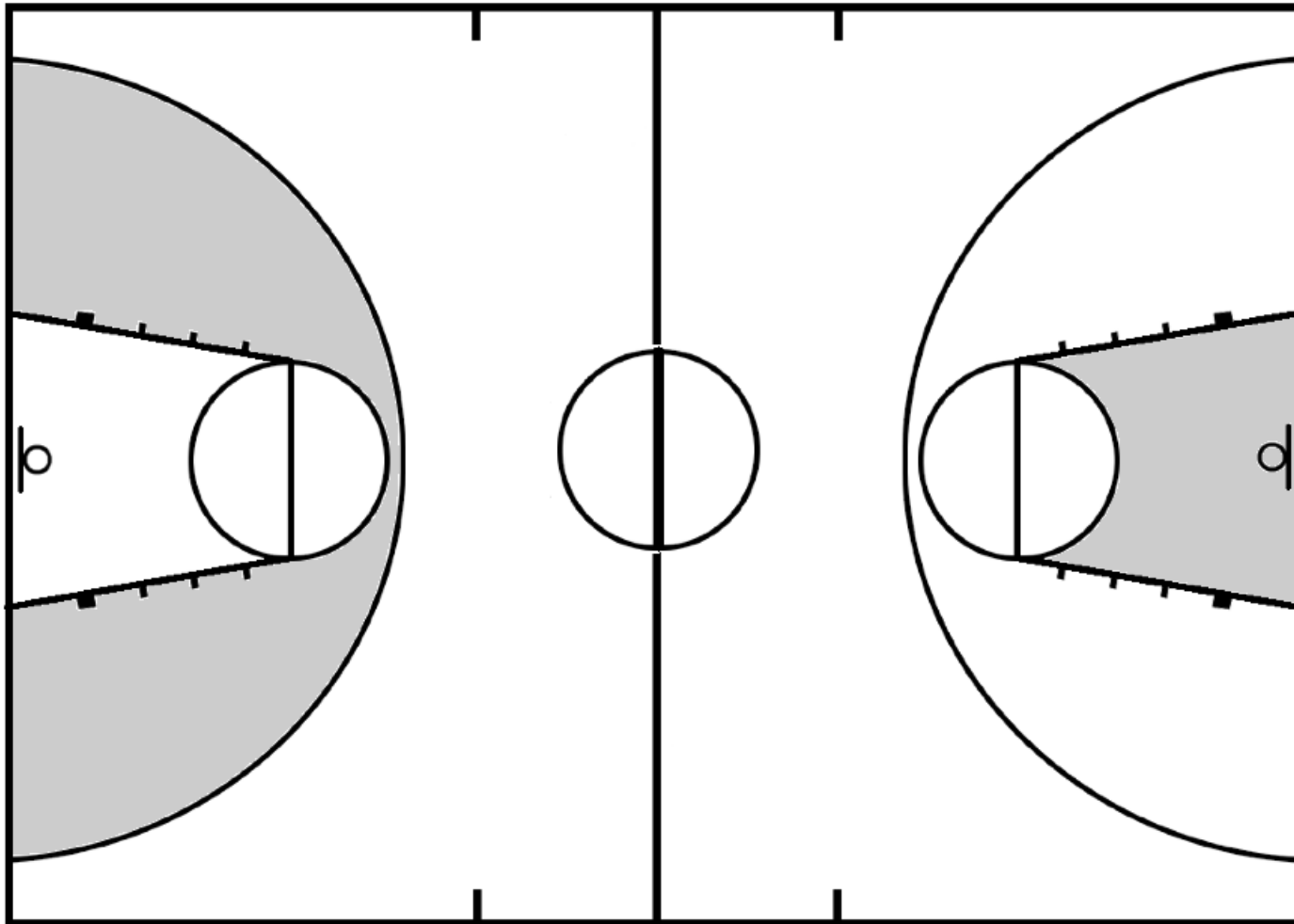
Answer=211.4m<sup>3</sup>

$$28 \times 15.10 \times 0.5$$

L x w x h



# Special Areas





## Working out AREA Shaded on the left

$$\text{Large Semi circle} = 76.05\text{m}^2$$

$$\text{Trapezium} = 25.92^2$$

$$\text{Small semi circle} = 4.92^2$$

$$\begin{aligned} &76.05 - (25.92 + 4.92) \\ &= 76.05 - 30.84 \\ &= 45.21\text{m}^2 \end{aligned}$$

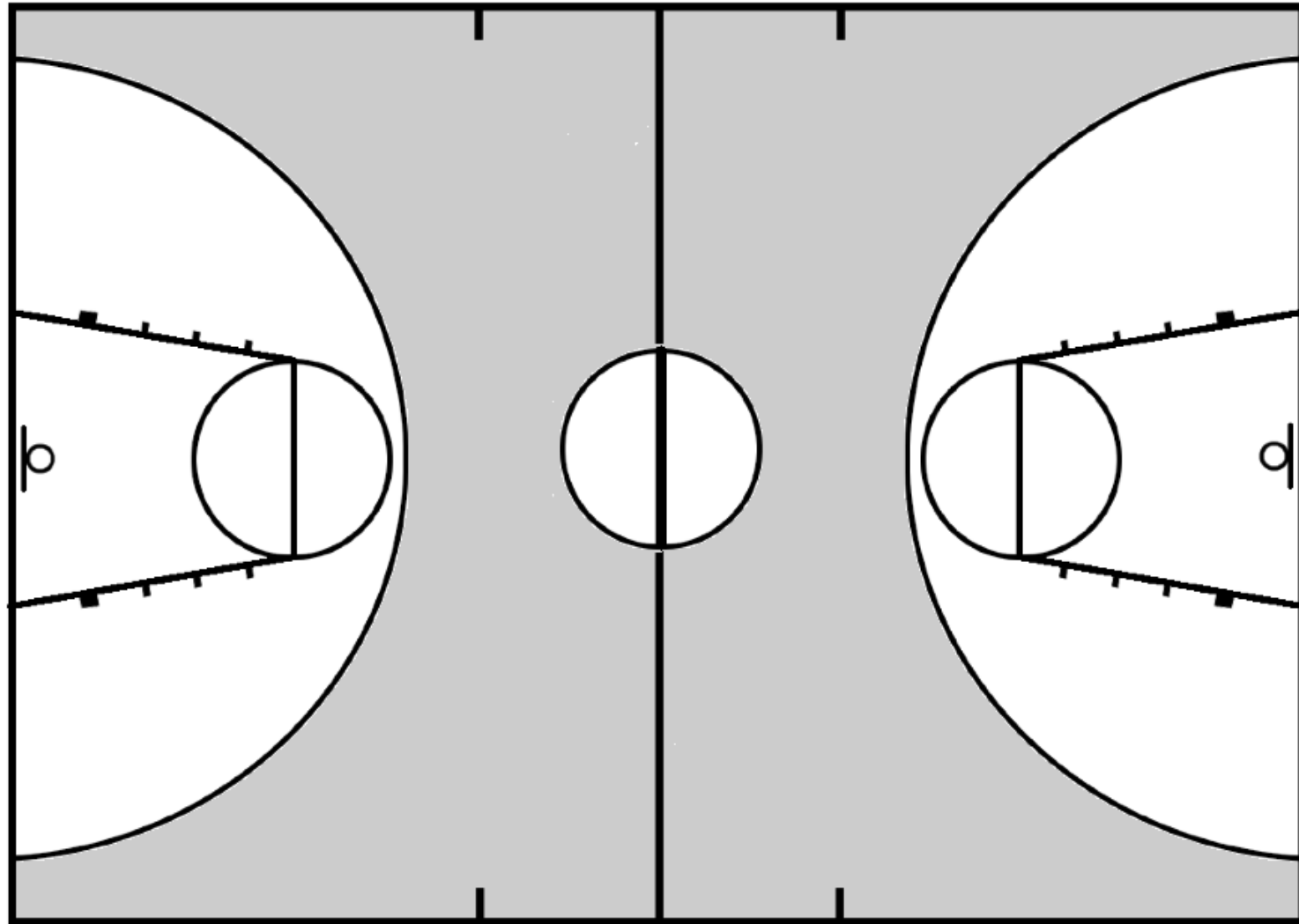
## Working out AREA Shaded on the left

$$\text{Trapezium} = 25.92^2$$

$$\text{Small semi circle} = 4.92^2$$

$$\begin{aligned} &= 25.92 - 4.92 \\ &= 21\text{m}^2 \end{aligned}$$

# Special Areas 2



# Working out AREA Shaded

$$\text{Whole rectangle} = 422.8$$

$$\text{Large Semi Circle} = 76.05 \times 2$$

$$\text{Small Semi Circle} = 4.92 \times 2$$

$$\begin{aligned} & (76.05 + 4.92) \times 2 \\ & = 161.94 \\ & = 422.8 - 161.94 \\ & = 260.86 \text{m}^2 \end{aligned}$$



# Comparison

“ You need to find information on the internet to compare the sizes of our outdoor court to the sizes of an official international basketball court size.

“ Are all the areas the same? (you will need to work out the area of the same parts of the court but using the international size)

Ans=No

“ Are all the distances (perimeter) the same?  
Ans=No



# Website used?

Add in the website that you found the dimensions for the international court:

[www.versacourt.com/pdf/InternationalCourtDiagram.pdf](http://www.versacourt.com/pdf/InternationalCourtDiagram.pdf)



Fill in the information in diagrams  
from your web information



28m

$$\begin{aligned} \text{Perimeter} &= 15 + 15 + 28 + 28 \\ &= 86\text{m} \end{aligned}$$

$$\begin{aligned} \text{Area} &= 28 \times 15 \\ &= 420\text{m}^2 \end{aligned}$$

15m

15m

28m

Perimeter

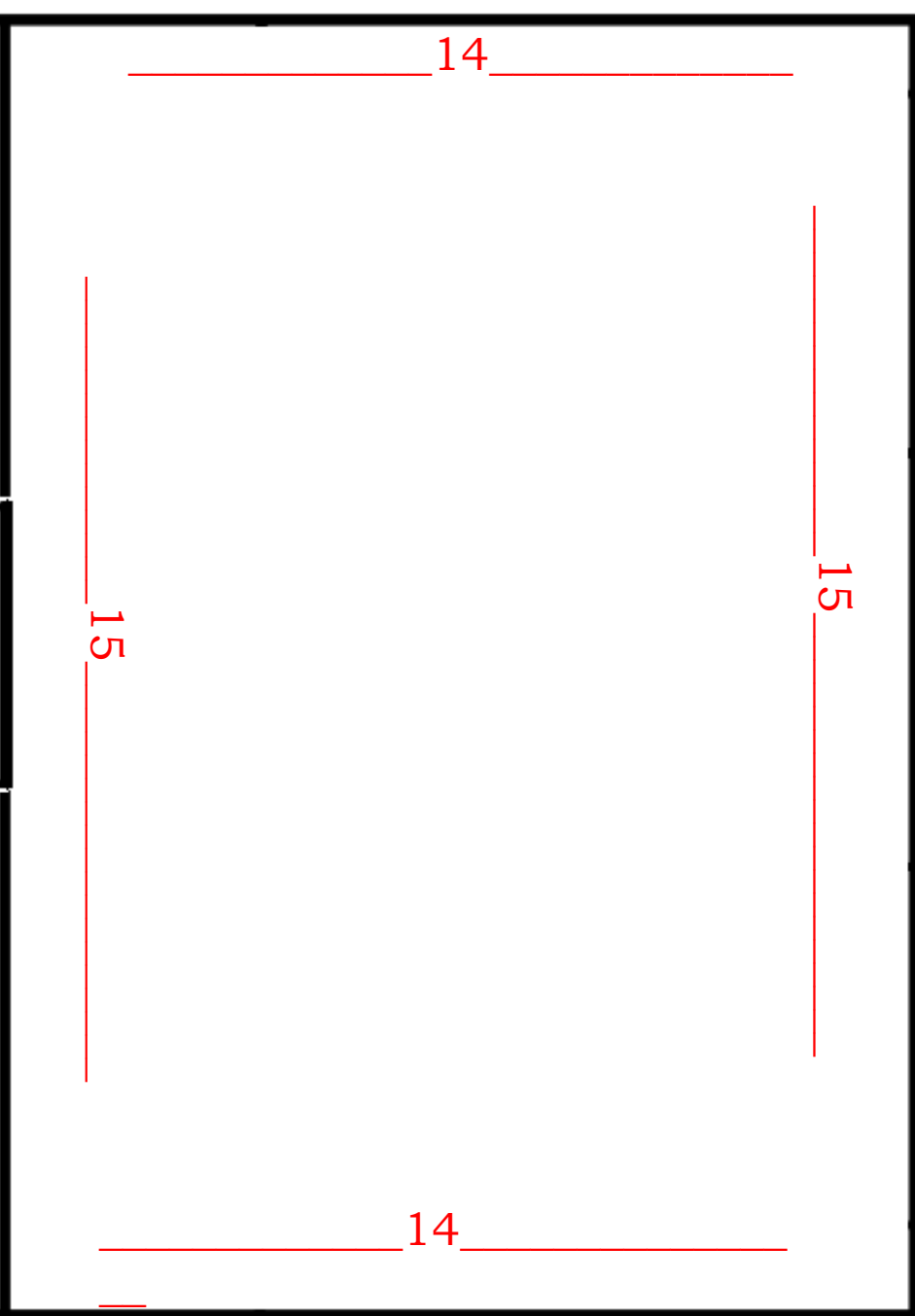
$$= 28 + 30$$

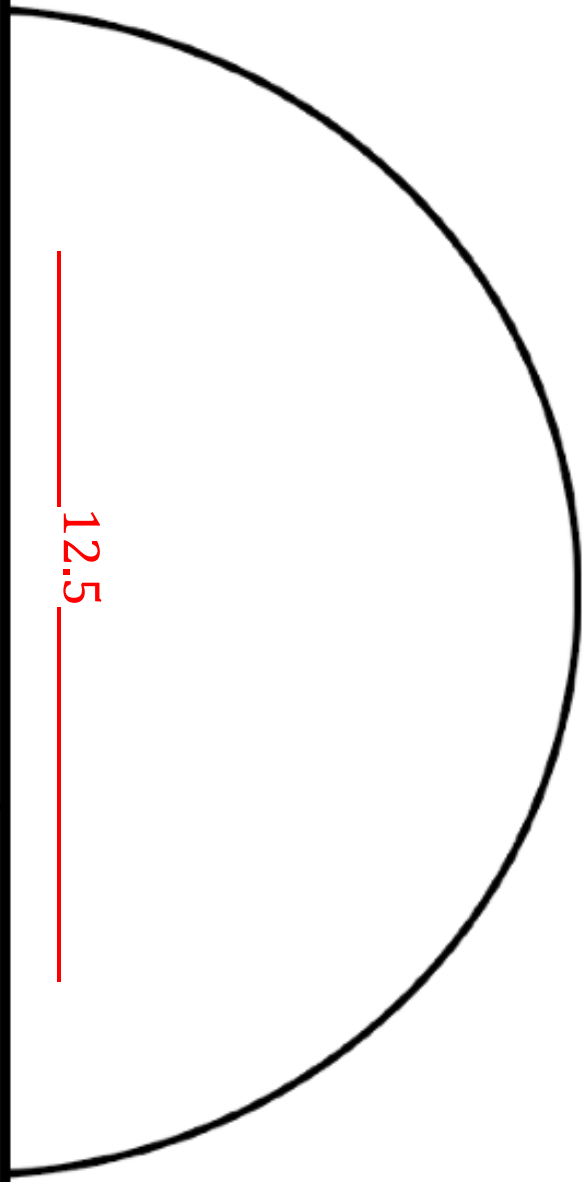
$$= 58\text{m}$$

Area

$$= 14 \times 15$$

$$= 210\text{m}^2$$





Perimeter

$$= 6.25 \times \pi + 12.5$$

$$= 32.13$$

Area

$$= 0.5 \times 12.5$$

$$= 6.25$$

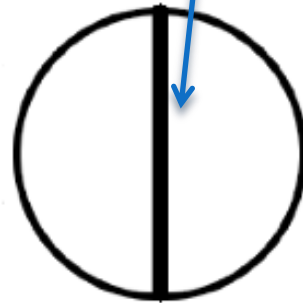
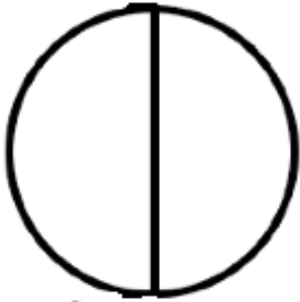
$$= 0.5 \times 6.25 \times \pi$$

$$= 61.36 \text{m}^2$$

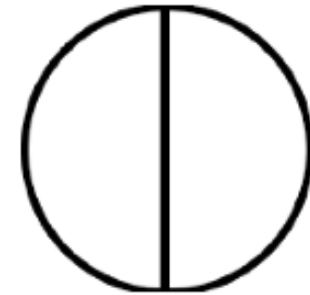


Perimeter  
 $=\pi \times 3.6$

$=11.31$



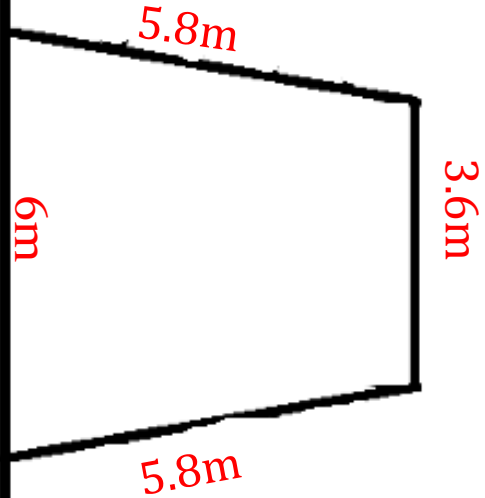
3.6m



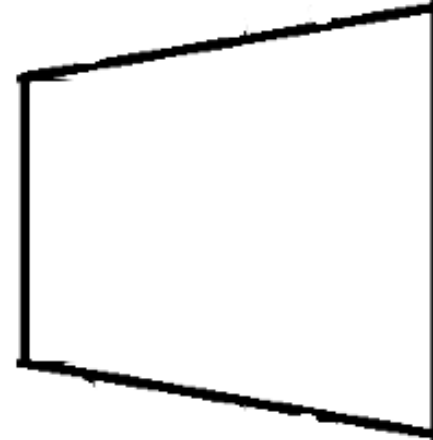
Area  
 $= 1.8^2 \times \pi$

$=10.18$

$$\begin{aligned} \text{Perimeter} &= 6 + 5.8 + 5.8 + 1.8 \\ &= 19.4\text{m} \end{aligned}$$



$$\begin{aligned} \text{Area} &= 0.5 \times (6 + 3.6) \times 5.8 \\ &= 27.84\text{m}^2 \end{aligned}$$



# Comparison

You need to compare the area/perimeter of both our court and the official size.



# Perimeter comparison

Shape	Size (our court)	Size (international court)
Large Rectangle	86.2m	86m
Small Rectangle	58.2m	58m
Middle Circle	11.12m	11.31m
Trapezium	20.4m	19.4m
Three Point Line	25.3m	32.13m

# Area comparison

Shape	Size (our court)	Size (international court)
Large Rectangle	420m <sup>2</sup>	420m <sup>2</sup>
Small Rectangle	210m <sup>2</sup>	210m <sup>2</sup>
Middle Circle	9.84m <sup>2</sup>	10.18m <sup>2</sup>
Trapezium	25.92m <sup>2</sup>	27.8m <sup>2</sup>
Three Point Line	76.05m <sup>2</sup>	61.36m <sup>2</sup>