

## Area and Circumference of a Circle - Worksheet

### Skill

**Group A - Calculate the area of a circle** (You must include the units.)

Give your answer to 1 decimal place.

- |                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|
| 1) A radius of $1\text{cm}$   | 2) A diameter of $1\text{cm}$ | 3) A radius of $12\text{cm}$  |
| 4) A diameter of $2\text{cm}$ | 5) A radius of $5\text{cm}$   | 6) A radius of $\pi\text{cm}$ |

Give your answer in terms of  $\pi$ .

- |                             |                               |                               |
|-----------------------------|-------------------------------|-------------------------------|
| 7) A radius of $3\text{cm}$ | 8) A diameter of $3\text{cm}$ | 9) A radius of $\pi\text{cm}$ |
|-----------------------------|-------------------------------|-------------------------------|

Give your answer to 3 significant figures.

- |                                 |                                  |                                   |
|---------------------------------|----------------------------------|-----------------------------------|
| 10) A radius of $0.13\text{km}$ | 11) A diameter of $0.5\text{mm}$ | 12) A diameter of $13.41\text{m}$ |
|---------------------------------|----------------------------------|-----------------------------------|

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**Group B - Calculate the circumference of a circle** (You must include the units.)

Give your answer to 1 decimal place.

- |                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|
| 1) A radius of $1\text{cm}$   | 2) A diameter of $1\text{cm}$ | 3) A radius of $12\text{cm}$  |
| 4) A diameter of $2\text{cm}$ | 5) A radius of $5\text{cm}$   | 6) A radius of $\pi\text{cm}$ |

Give your answer in terms of  $\pi$ .

- |                             |                               |                               |
|-----------------------------|-------------------------------|-------------------------------|
| 7) A radius of $3\text{cm}$ | 8) A diameter of $3\text{cm}$ | 9) A radius of $\pi\text{cm}$ |
|-----------------------------|-------------------------------|-------------------------------|

Give your answer to 3 significant figures.

- |                                 |                                  |                                   |
|---------------------------------|----------------------------------|-----------------------------------|
| 10) A radius of $0.13\text{km}$ | 11) A diameter of $0.5\text{mm}$ | 12) A diameter of $13.41\text{m}$ |
|---------------------------------|----------------------------------|-----------------------------------|

## Area and Circumference of a Circle - Worksheet

### Group C - Calculate the radius/diameter of a circle.

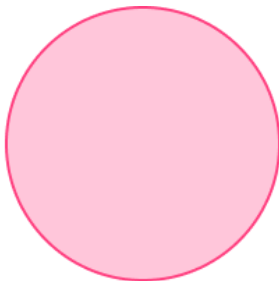
Give all answers correct to 2 decimal places.

Calculate the radius of a circle given that:

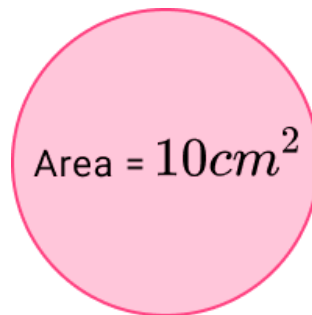
- 1) The circumference is  $6\pi\text{cm}$     2) The area is  $10\text{cm}^2$     3) The area is  $20\text{cm}^2$   
4) The circumference is  $12\text{cm}$     5) The area is  $64\text{cm}^2$     6) The area is  $32\text{cm}^2$

Calculate the diameter if a circle given that:

- 7) The circumference is  $6\pi\text{cm}$     8) The area is  $10\text{cm}^2$     9) The area is  $100\text{mm}^2$



Circumference =  $6\pi\text{ cm}$

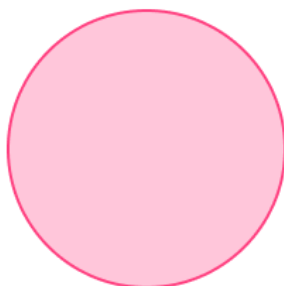


Area =  $10\text{cm}^2$



Area =  $100\text{mm}^2$

- 10) The circumference is  $3.2\text{cm}$     11) The area is  $9.45\text{cm}^2$     12) The area is  $0.0081\text{km}^2$



Circumference =  $3.2\text{cm}$



Area =  $9.45\text{cm}^2$



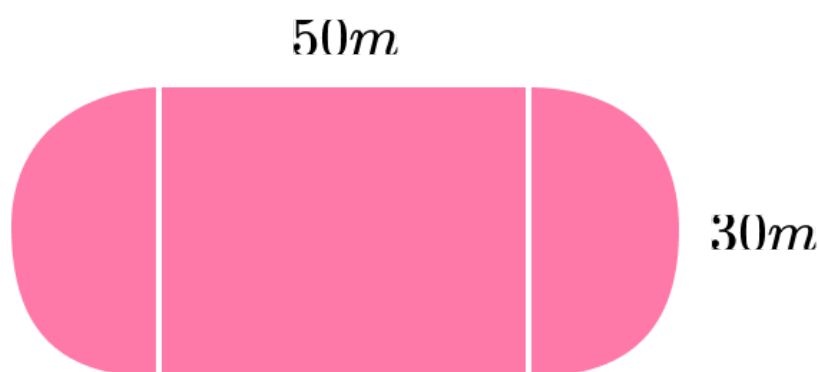
Area =  $0.0081\text{km}^2$

## Area and Circumference of a Circle - Worksheet

### Applied

Give all answers to 1 decimal place where necessary.

- 1) (a) A circular plaque has a diameter of  $6\text{cm}$ . It is cut from a square piece of metal with a side length of  $6\text{cm}$ . What percentage of the metal is wasted?
- (b) The wheel of a bicycle has a diameter of  $62\text{cm}$ .  
The wheel makes 100 complete rotations.  
How far has the bicycle travelled?  
Give your answer in metres.
- (c) A wheel travels  $50\text{m}$ .  
The radius of the wheel is  $7.5\text{cm}$ .  
How many complete revolutions has the wheel made?
- (d) A local sports centre has a running track.  
The running track is made up of two straits and two bends which are semi circles (see below).

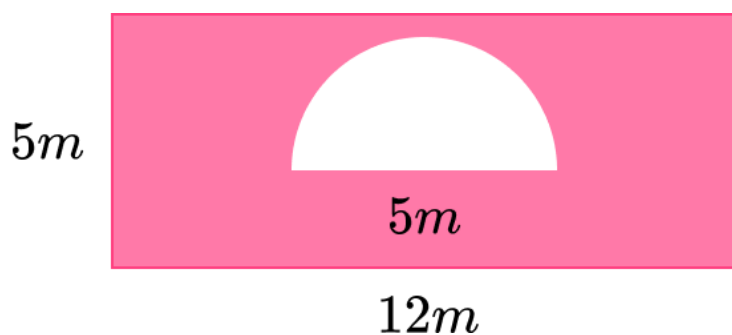


What is the distance around the running track?

- (e) What is the area of the inside of the running track in question 1d?

## Area and Circumference of a Circle - Worksheet

- 2) (a) What is the area of a circle with a radius of  $6\text{cm}$ ?  
Give your answer in terms of  $\pi$ .
- (b) What is the circumference of a circle with a radius of  $6\text{cm}$ ?  
Give your answer in terms of  $\pi$ .
- 3) (a) A circle has a circumference of  $15\text{cm}$ . What is its radius?  
Give your answer correct to two decimal places.
- (b) Find the area of the same circle.  
Give your answer correct to two decimal places.
- 4) (a) A circle has an area of  $12\text{cm}^2$ . What is its diameter?  
Give your answer correct to two decimal places.
- (b) Find the circumference of the same circle.  
Give your answer correct to two decimal places.
- 5) James wants to paint a wall. He buys some paint. Each tin of paint costs £1.99 and covers  $5\text{m}^2$ . The wall is rectangular but has a semi circle window. How much will the wall cost to paint?



## Area and Circumference of a Circle - Exam Questions

1) (a) What is the value of  $\pi$  correct to 2 decimal places? .....  
(1)

(b) What is the area of a circle with a radius of  $4.5\text{cm}$ . .....  
Give your answer correct to 2 decimal places. (2)

(c) What is the area of a circle with a diameter of .....  
 $4.5\text{cm}$ . Give your answer correct to 2 decimal .....  
places. (2)  
(5 marks)

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2) (a) The circumference of a circle is  $45\text{cm}$ . Work out the .....  
area of the circle. Give your answer correct to the .....  
nearest integer. (4)

(b) The diameter of a circle is  $15\text{cm}$ . Work out the area .....  
of the circle. Give your answer in terms of  $\pi$ . .....  
(4)  
(8 marks)

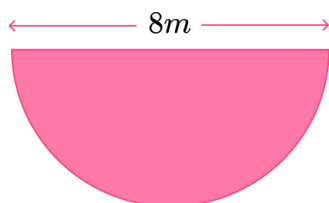
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3) A square has a side length of  $12\text{cm}$ . A .....  
circle has a radius of  $6\text{cm}$ . .....  
(5 marks)

Find the difference between the area of the  
two shapes. Give your answer correct to 2  
decimal places.

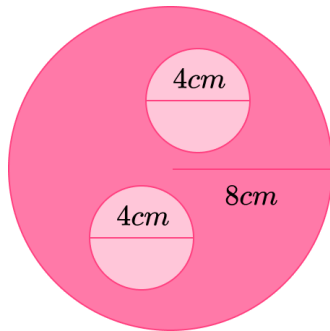
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4) Find the perimeter of this semi circle. Give .....  
your answer correct to 2 decimal places. (3 marks)



## Area and Circumference of a Circle - Exam Questions

- 5) In the diagram below the large circle has a radius of  $8\text{cm}$ . The two smaller circles have a diameter of  $4\text{cm}$  each.



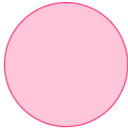


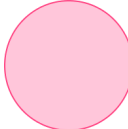


- (a) What is the radius of the smaller circle? .....  
Give your answer correct to one decimal place. (2)
- (b) What is the area of the shaded shape? Give .....  
your answer correct to one decimal place. (4)  
**6 marks**

- 
- 6) The area of a circle is  $17.3\text{cm}^2$ . .....  
(4 marks)
- Work out the circumference of the circle  
Give your answer correct to the nearest integer.

## Area and Circumference of a Circle - Answers


	Question	Answer
	Skill Questions	
Group A	<p>Calculate the area of a circle.</p> <p>1) A radius of <math>1cm</math></p> <p>2) A diameter of <math>1cm</math></p> <p>3) A radius of <math>12cm</math></p> <p>4) A diameter of <math>2cm</math></p> <p>5) A radius of <math>5cm</math></p> <p>6) A radius of <math>\pi cm</math></p> <p>Give your answer in terms of <math>\pi</math>.</p> <p>7) A radius of <math>3cm</math></p> <p>8) A diameter of <math>3cm</math></p> <p>9) A radius of <math>\pi cm</math></p> <p>Give your answer to 3 significant figures.</p> <p>10) A radius of <math>0.13km</math></p> <p>11) A diameter of <math>0.5mm</math></p> <p>12) A diameter of <math>13.41m</math></p>	<p>Give your answer to 1 decimal place.</p> <p>1) <math>3.1cm^2</math></p> <p>2) <math>0.8cm^2</math></p> <p>3) <math>452.4cm^2</math></p> <p>4) <math>3.1cm^2</math></p> <p>5) <math>78.5cm^2</math></p> <p>6) <math>31.0cm^2</math></p> <p>7) <math>9\pi cm^2</math></p> <p>8) <math>2.25\pi cm^2</math> oe</p> <p>9) <math>\pi^3 cm^2</math></p> <p>10) <math>0.0531ck</math></p> <p>11) <math>0.196mm^2</math></p> <p>12) <math>141m^2</math></p>
Group B	<p>Calculate the circumference of a circle.</p> <p>1) A radius of <math>1cm</math></p> <p>2) A diameter of <math>1cm</math></p> <p>3) A radius of <math>12cm</math></p> <p>4) A diameter of <math>2cm</math></p> <p>5) A radius of <math>5cm</math></p> <p>6) A radius of <math>\pi cm</math></p> <p>Give your answer in terms of <math>\pi</math>.</p> <p>7) A radius of <math>3cm</math></p> <p>8) A diameter of <math>3cm</math></p> <p>9) A radius of <math>\pi cm</math></p> <p>Give your answer to 3 significant figures.</p> <p>10) A radius of <math>0.13km</math></p> <p>11) A diameter of <math>0.5mm</math></p> <p>12) A diameter of <math>13.4m</math></p>	<p>Give your answer to 1 decimal place.</p> <p>1) <math>6.3cm</math></p> <p>2) <math>3.1cm</math></p> <p>3) <math>75.4cm</math></p> <p>4) <math>6.3cm</math></p> <p>5) <math>31.4cm</math></p> <p>6) <math>19.7cm</math></p> <p>7) <math>6\pi cm</math></p> <p>8) <math>3\pi m</math></p> <p>9) <math>2\pi^2 cm</math></p> <p>10) <math>0.817km</math></p> <p>11) <math>1.57mm</math></p> <p>12) <math>42.1m</math></p>

## Area and Circumference of a Circle - Answers

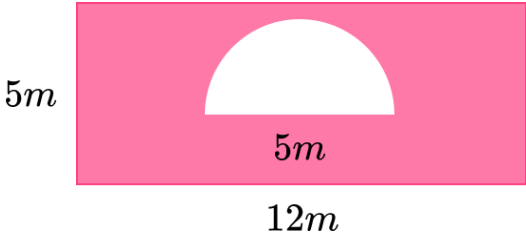
<p><b>Group C</b></p>	<p>Calculate the radius of a circle given that:</p> <p><b>1)</b> The circumference is <math>6\pi cm</math></p> <p><b>2)</b> The area is <math>10cm^2</math></p> <p><b>3)</b> The area is <math>20cm^2</math></p> <p><b>4)</b> The circumference is <math>12cm</math></p> <p><b>5)</b> The area is <math>64cm^2</math></p> <p><b>6)</b> The area is <math>32cm^2</math></p> <p><b>7)</b> The circumference is <math>6\pi cm</math></p> <div style="text-align: center;">   Circumference = <math>6\pi cm</math> </div> <p><b>8)</b> The area is <math>10cm^2</math></p> <div style="text-align: center;">   Area = <math>10cm^2</math> </div> <p><b>9)</b> The area is <math>100mm^2</math></p> <div style="text-align: center;">   Area = <math>100mm^2</math> </div> <p><b>10)</b> The circumference is <math>3.2cm</math></p> <div style="text-align: center;">   Circumference = <math>3.2cm</math> </div> <p><b>11)</b> The area is <math>9.45cm^2</math></p> <div style="text-align: center;">   Area = <math>9.45cm^2</math> </div> <p><b>12)</b> The area is <math>0.0081km^2</math></p> <div style="text-align: center;">   Area = <math>0.0081km^2</math> </div>	<p>Give all answers correct to 2 decimal places.</p> <p><b>1)</b> <math>3.00cm</math></p> <p><b>2)</b> <math>1.78cm</math></p> <p><b>3)</b> <math>2.52cm</math></p> <p><b>4)</b> <math>1.91cm</math></p> <p><b>5)</b> <math>4.51cm</math></p> <p><b>6)</b> <math>3.19cm</math></p> <p><b>7)</b> <math>6.00cm</math></p> <p><b>8)</b> <math>3.57cm</math></p> <p><b>9)</b> <math>11.28cm</math></p> <p><b>10)</b> <math>1.02cm</math></p> <p><b>11)</b> <math>3.47cm</math></p> <p><b>12)</b> <math>0.10km</math></p>
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## Area and Circumference of a Circle - Answers

	Question	Answer
	Applied Questions	
1)	<p><b>(a)</b> A circular plaque has a diameter of <math>6\text{cm}</math>. It is cut from a square piece of metal with a side length of <math>6\text{cm}</math>. What percentage of the metal is wasted? The wheel of a bicycle has a diameter of <math>62\text{cm}</math>.</p> <p><b>(b)</b> The wheel makes 100 complete rotations. How far has the bicycle travelled? Give your answer in metres.</p> <p><b>(c)</b> A wheel travels <math>50\text{m}</math>. The radius of the wheel is <math>7.5\text{cm}</math>. How many complete revolutions has the wheel made?</p> <p><b>(d)</b> A local sports centre has a running track. The running track is made up of two straits and two bends which are semi circles (see below).</p> <div style="text-align: center;">  </div> <p>What is the distance around the running track?</p> <p><b>(e)</b> What is the area of the inside of the running track in question 1d?</p>	<p><b>(a)</b> Square = <math>36\text{cm}^2</math> Circle = <math>9\pi</math> Wasted = <math>36 - 9\pi</math> <math>21.5\%</math></p> <p><b>(b)</b> <math>C = 62\pi</math> <math>100 \times 62\pi</math> <math>19477\text{cm}</math> <math>194.8\text{m}</math></p> <p><b>(c)</b> <math>C = 15\pi\text{cm}</math> <math>5000\text{cm} \div 15\pi</math> <math>106.1</math> 106 complete revolutions</p> <p><b>(d)</b> <math>50 + 50 + 30\pi</math> <math>194.2\text{m}</math></p> <p><b>(e)</b> <math>1500 + 225\pi</math> <math>2206.9\text{m}^2</math></p>

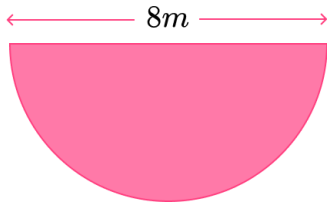
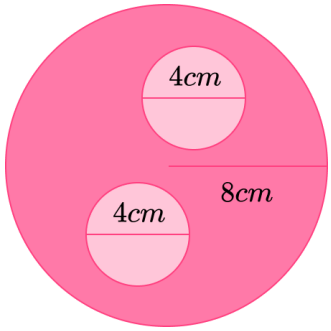
## Area and Circumference of a Circle - Answers

2)	<p>(a) What is the area of a circle with a radius of <math>6\text{cm}</math>? Give your answer in terms of <math>\pi</math>.</p> <p>What is the circumference of a circle with a radius of <math>6\text{cm}</math>? Give your answer in terms of <math>\pi</math>.</p> <p>(b)</p>	<p>(a) <math>36\pi\text{cm}^2</math></p> <p>(b) <math>12\pi\text{cm}</math></p>
3)	<p>(a) A circle has a circumference of <math>15\text{cm}</math>. What is its radius? Give your answer correct to two decimal places.</p> <p>(b) Find the area of the same circle. Give your answer correct to two decimal places.</p>	<p>(a) <math>2.39\text{cm}</math> oe</p> <p>(b) <math>17.95\text{cm}^2</math> oe</p>
4)	<p>(a) A circle has an area of <math>12\text{cm}^2</math>. What is its diameter? Give your answer correct to two decimal places.</p> <p>(b) Find the circumference of the same circle. Give your answer correct to two decimal places.</p>	<p>(a) <math>3.91\text{cm}</math></p> <p>(b) <math>12.25\text{cm}</math></p>
5)	<p>James wants to paint a wall. He buys some paint. Each tin of paint costs £1.99 and covers <math>5\text{m}^2</math>. The wall is rectangular but has a semi circle window. How much will the wall cost to paint?</p> <div style="text-align: center;">  </div>	$5 \times 12 = 60$ $\pi \times 2.5^2 = 6.25\pi$ $60 - (6.25\pi \div 2)$ $50.1825$ $50.1825 \div 5$ $10.0365\text{m}^2$ <p>11 tins needed</p> $11 \times 1.99$ $\text{£}21.89$

## Area and Circumference of a Circle - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	What is the value of $\pi$ correct to 2 decimal places?	(a) 3.14	(1)
(b)	What is the area of a circle with a radius of 4.5 cm. Give your answer correct to 2 decimal places.	(b) $\pi \times 4.5 \times 4.5$ oe 63.6	(2)
(c)	What is the area of a circle with a diameter of 4.5 cm. Give your answer correct to 2 decimal places.	(c) $\pi \times 2.25 \times 2.25$ oe 15.9	(2)
2) (a)	The circumference of a circle is 45cm. Work out the area of the circle. Give your answer correct to the nearest integer	(a) $45 \div 2\pi$ or 7.162 $\pi \times "7.162" \times "7.162"$ ft 161.1456 allow 161.144 – 161.146 161	(4)
(b)	The diameter of a circle is 15cm. Work out the area of the circle. Give your answer in terms of $\pi$	(b) $15 \div 2$ or 7.5 seen $\pi \times 7.5 \times 7.5$ 56.25 or $\frac{225}{4}$ seen $56.25\pi$ or $\frac{225\pi}{4}$ oe	(4)
3)	A square has a side length of 12 cm.  A circle has a radius of 6 cm.  Find the difference between the area of the two shapes.  Give your answer correct to 2 decimal places.	Square Area = 144 Circle Area $\pi \times 6 \times 6$ oe  144 – 36 $\pi$  30.90266 30.090	(5)

## Area and Circumference of a Circle - Mark Scheme

<b>4)</b>	<p>Find the perimeter of this semi circle. Give your answer correct to 2 decimal places.</p> 	<p><math>(\pi \times 8) \div 2</math> oe e.g. <math>4\pi</math> seen "<math>4\pi</math>" <math>\div 8</math> 20.57</p>	<b>(3)</b>
<b>5)</b>	<p>In the diagram below the large circle has a radius of 8 cm. The two smaller circles have a diameter of 4 cm each.</p> 		
<b>(a)</b>	<p>What is the radius of the smaller circle? Give your answer correct to one decimal place.</p>	<p><b>(a)</b> <math>\pi \times 2 \times 2</math> oe 12.6</p>	<b>(2)</b>
<b>(b)</b>	<p>What is the area of the shaded shape? Give your answer correct to one decimal place.</p>	<p><b>(b)</b> Whole circle <math>\pi \times 8 \times 8</math> oe e.g. <math>64\pi</math> <math>64\pi - "12.57" - "12.57"</math> ft 175.9219 175.9</p>	<b>(4)</b>

## Area and Circumference of a Circle - Mark Scheme

<b>6)</b>	<p>The area of a circle is <math>17.3\text{cm}^2</math>. Work out the circumference of the circle.</p> <p>Give your answer correct to the nearest integer.</p>	<div style="text-align: center;"> <math display="block">\sqrt{\frac{17.3}{\pi}}</math> </div> <p>Radius of the circle is 2.3466... Or correct diameter given (4.693...)</p> <p><math>\pi \times 2.35 \times 2</math> oe 14.765... allow 14.74 – 14.77</p> <p>15</p>	<b>(4)</b>
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