

Circles: Parts, Perimeter & Pi

Contents

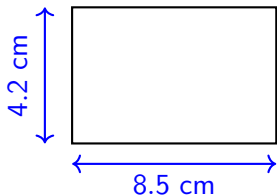
Questions and short answers

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Worked solutions

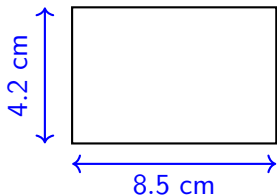
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Starter 1



1. $13 + 9 = ?$
2. $5.8 - 1.9 = ?$
3. $6 \times 8 = ?$
4. $4 \times 3.5 = ?$
5. Round 3.14159 to 2 decimal places.
6. A pencil is 12.8 cm long. How many millimetres is this? _____
5. Find the perimeter of the rectangle shown.
6. The perimeter of a square is 26 cm. What is the length of one side?
7. The perimeter of an equilateral triangle is 12.9 cm. Find the length of one side, and then the perimeter of a regular hexagon with the same side length.

Starter 1



1. $13 + 9 = 22$
2. $5.8 - 1.9 = 3.9$
3. $6 \times 8 = 48$
4. $4 \times 3.5 = 14$
5. Round 3.14159 to 2 decimal places. 3.14
6. A pencil is 12.8 cm long. How many millimetres is this? 128 mm
5. Find the perimeter of the rectangle shown. 25.4 cm
6. The perimeter of a square is 26 cm. What is the length of one side? 6.5 cm
7. The perimeter of an equilateral triangle is 12.9 cm. Find the length of one side, and then the perimeter of a regular hexagon with the same side length. 4.3 cm; hexagon: 25.8 cm

Worked Solution: Starter 1, Question 1

Question: $13 + 9$.

Worked Solution: Use $9 = 10 - 1$: $13 + 9 = 13 + 10 - 1 = 23 - 1 = \underline{\quad}$.

Worked Solution: Starter 1, Question 1

Question: $13 + 9$.

Worked Solution: Use $9 = 10 - 1$: $13 + 9 = 13 + 10 - 1 = 23 - 1 = 22$.

Worked Solution: Starter 1, Question 2

Question: $5.8 - 1.9$.

Worked Solution: Subtract 2 and add back 0.1:

$$5.8 - 1.9 = 5.8 - 2 + 0.1 = 3.8 + 0.1 = \underline{\quad}.$$

Worked Solution: Starter 1, Question 2

Question: $5.8 - 1.9$.

Worked Solution: Subtract 2 and add back 0.1:

$$5.8 - 1.9 = 5.8 - 2 + 0.1 = 3.8 + 0.1 = 3.9.$$

Worked Solution: Starter 1, Question 3

Question: 6×8 .

Worked Solution: Six groups of eight: $6 \times 8 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 1, Question 3

Question: 6×8 .

Worked Solution: Six groups of eight: $6 \times 8 = 48$.

Worked Solution: Starter 1, Question 4

Question: 4×3.5 .

Worked Solution: Split $3.5 = 3 + 0.5$:

$$4 \times 3.5 = 4 \times 3 + 4 \times 0.5 = 12 + 2 = \underline{\quad}.$$

Worked Solution: Starter 1, Question 4

Question: 4×3.5 .

Worked Solution: Split $3.5 = 3 + 0.5$:

$$4 \times 3.5 = 4 \times 3 + 4 \times 0.5 = 12 + 2 = 14.$$

Worked Solution: Starter 1, Question 5

Question: Round 3.14159 to 2 decimal places.

Worked Solution: The second decimal digit is 4, and the next digit is $1 < 5$, so leave the 4 unchanged: $3.14159 \approx \underline{\hspace{1cm}}$.

Worked Solution: Starter 1, Question 5

Question: Round 3.14159 to 2 decimal places.

Worked Solution: The second decimal digit is 4, and the next digit is $1 < 5$, so leave the 4 unchanged: $3.14159 \approx 3.14$.

Worked Solution: Starter 1, Question 6

Question: A pencil is 12.8 cm long. How many millimetres is this?

Worked Solution: Since $1 \text{ cm} = 10 \text{ mm}$,
 $12.8 \text{ cm} = 12.8 \times 10 = \underline{\hspace{2cm}}$.

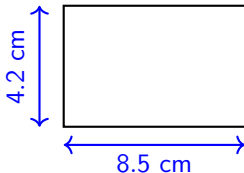
Worked Solution: Starter 1, Question 6

Question: A pencil is 12.8 cm long. How many millimetres is this?

Worked Solution: Since $1 \text{ cm} = 10 \text{ mm}$,
 $12.8 \text{ cm} = 12.8 \times 10 = 128 \text{ mm}$.

Worked Solution: Starter 1, Question 7

Question: Find the perimeter of the rectangle shown.

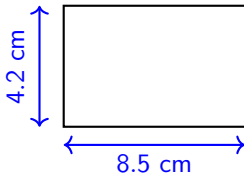


Worked Solution: Perimeter

$$= 2(\text{length} + \text{width}) = 2(8.5 + 4.2) = 2(12.7) = \underline{\hspace{2cm}}.$$

Worked Solution: Starter 1, Question 7

Question: Find the perimeter of the rectangle shown.



Worked Solution: Perimeter

$$= 2(\text{length} + \text{width}) = 2(8.5 + 4.2) = 2(12.7) = 25.4 \text{ cm}.$$

Worked Solution: Starter 1, Question 8

Question: The perimeter of a square is 26 cm. What is the length of one side?

Worked Solution: A square has 4 equal sides, so $s = \frac{26}{4} = \underline{\hspace{2cm}}$.

Worked Solution: Starter 1, Question 8

Question: The perimeter of a square is 26 cm. What is the length of one side?

Worked Solution: A square has 4 equal sides, so $s = \frac{26}{4} = 6.5 \text{ cm}$.

Worked Solution: Starter 1, Question 9

Question: The perimeter of an equilateral triangle is 12.9 cm. Find the length of one side, and then the perimeter of a regular hexagon with the same side length.

Worked Solution: An equilateral triangle has 3 equal sides:

$$s = \frac{12.9}{3} = \underline{\hspace{2cm}}.$$

A regular hexagon has 6 equal sides: $P = 6 \times 4.3 = \underline{\hspace{2cm}}.$

Worked Solution: Starter 1, Question 9

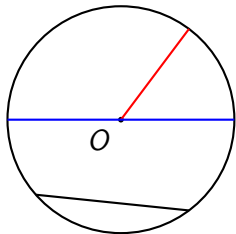
Question: The perimeter of an equilateral triangle is 12.9 cm. Find the length of one side, and then the perimeter of a regular hexagon with the same side length.

Worked Solution: An equilateral triangle has 3 equal sides:

$$s = \frac{12.9}{3} = 4.3 \text{ cm.}$$

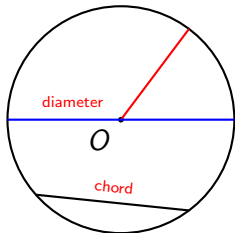
A regular hexagon has 6 equal sides: $P = 6 \times 4.3 = 25.8 \text{ cm.}$

Starter 2



1. $24 \div 6$
2. $72 \div 8$
3. Double 15.5
4. Halve 31.4
5. How many centimetres in 1.2 metres?
6. True or false? $2.5 \times 4 = 10$
5. On the diagram, which line is the **diameter**?
How is it different from a chord?
6. If the radius of a circle is 7 cm, what is its diameter?
7. The diameter of a circle is 18 mm. Find its radius. _____
8. A chord of length 8 cm is drawn inside a circle of radius 5 cm. Is the chord a diameter? Why, or why not?.

Starter 2



1. $24 \div 6 = 4$
2. $72 \div 8 = 9$
3. Double $15.5 = 31$
4. Halve $31.4 = 15.7$
5. How many centimetres in 1.2 metres? 120 cm
6. True or false? $2.5 \times 4 = 10$ **True**
5. On the diagram, which line is the **diameter**?
How is it different from a chord? **A diameter passes through the centre.**
6. If the radius of a circle is 7 cm, what is its diameter? 14 cm
7. The diameter of a circle is 18 mm. Find its radius. 9 mm
8. A chord of length 8 cm is drawn inside a circle of radius 5 cm. Is the chord a diameter? Why, or why not?. **No; a diameter would be 10 cm.**

Worked Solution: Starter 2, Question 1

Question: $24 \div 6$.

Worked Solution: Since $6 \times 4 = 24$, $24 \div 6 = \underline{\quad}$.

Worked Solution: Starter 2, Question 1

Question: $24 \div 6$.

Worked Solution: Since $6 \times 4 = 24$, $24 \div 6 = 4$.

Worked Solution: Starter 2, Question 2

Question: $72 \div 8$.

Worked Solution: Since $8 \times 9 = 72$, $72 \div 8 = \underline{\quad}$.

Worked Solution: Starter 2, Question 2

Question: $72 \div 8$.

Worked Solution: Since $8 \times 9 = 72$, $72 \div 8 = 9$.

Worked Solution: Starter 2, Question 3

Question: Double 15.5.

Worked Solution: $2 \times 15.5 = 15.5 + 15.5 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 2, Question 3

Question: Double 15.5.

Worked Solution: $2 \times 15.5 = 15.5 + 15.5 = 31.$

Worked Solution: Starter 2, Question 4

Question: Halve 31.4.

Worked Solution: $31.4 \div 2 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 2, Question 4

Question: Halve 31.4.

Worked Solution: $31.4 \div 2 = 15.7$.

Worked Solution: Starter 2, Question 5

Question: How many centimetres in 1.2 metres?

Worked Solution: $1 \text{ m} = 100 \text{ cm}$, so $1.2 \text{ m} = 1.2 \times 100 = \underline{\hspace{2cm}}$.

Worked Solution: Starter 2, Question 5

Question: How many centimetres in 1.2 metres?

Worked Solution: $1 \text{ m} = 100 \text{ cm}$, so $1.2 \text{ m} = 1.2 \times 100 = 120 \text{ cm}$.

Worked Solution: Starter 2, Question 6

Question: True or false? $2.5 \times 4 = 10$.

Worked Solution: $2.5 \times 4 = 10$, so the statement is ____.

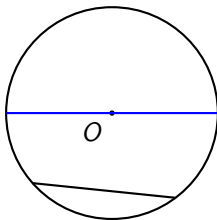
Worked Solution: Starter 2, Question 6

Question: True or false? $2.5 \times 4 = 10$.

Worked Solution: $2.5 \times 4 = 10$, so the statement is **True**.

Worked Solution: Starter 2, Question 7

Question: On the diagram, which line is the **diameter**? How is it different from a chord?

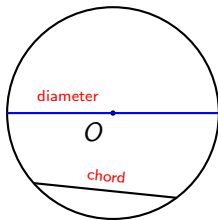


Worked Solution: The blue line is
that

. A diameter is a chord

Worked Solution: Starter 2, Question 7

Question: On the diagram, which line is the **diameter**? How is it different from a chord?



Worked Solution: The blue line is **the diameter**. A diameter is a chord that **passes through the centre**.

Worked Solution: Starter 2, Question 8

Question: If the radius of a circle is 7 cm, what is its diameter?

Worked Solution: Diameter $d = 2r = 2(7) = \underline{\hspace{2cm}}$.

Worked Solution: Starter 2, Question 8

Question: If the radius of a circle is 7 cm, what is its diameter?

Worked Solution: Diameter $d = 2r = 2(7) = 14$ cm.

Worked Solution: Starter 2, Question 9

Question: The diameter of a circle is 18 mm. Find its radius.

Worked Solution: Radius $r = \frac{d}{2} = \frac{18}{2} = \underline{\hspace{1cm}}$.

Worked Solution: Starter 2, Question 9

Question: The diameter of a circle is 18 mm. Find its radius.

Worked Solution: Radius $r = \frac{d}{2} = \frac{18}{2} = 9 \text{ mm}$.

Worked Solution: Starter 2, Question 10

Question: A chord of length 8 cm is drawn inside a circle of radius 5 cm. Is the chord a diameter? Why, or why not?

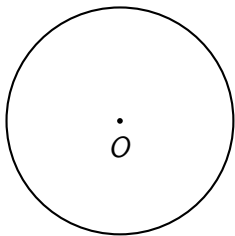
Worked Solution: A diameter would have length $2r = 2(5) = \underline{\hspace{2cm}}$. Since the chord is only 8 cm,

Worked Solution: Starter 2, Question 10

Question: A chord of length 8 cm is drawn inside a circle of radius 5 cm. Is the chord a diameter? Why, or why not?

Worked Solution: A diameter would have length $2r = 2(5) = 10$ cm. Since the chord is only 8 cm, it is not a diameter; a diameter would be 10 cm.

Starter 3



1. 3.2×5

2. 1.8×4

3. $45 \div 10$

4. $90 \div 100$

5. What is $\frac{1}{4}$ of 360° ?

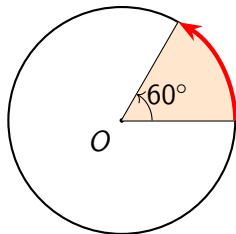
6. Copy the diagram, and draw with labels:

► A sector

► A tangent

► An arc

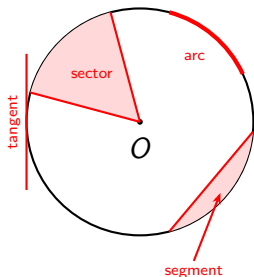
► A segment



7. If the radius is 6 cm, what is the whole circumference? (Use $\pi \approx 3.14$)

8. For the sector shown, what fraction of the circumference is the arc length? Calculate the arc length if the whole circle has a circumference of 24cm.

Starter 3



1. $3.2 \times 5 = 16$

2. $1.8 \times 4 = 7.2$

3. $45 \div 10 = 4.5$

4. $90 \div 100 = 0.9$

5. What is $\frac{1}{4}$ of 360° ? 90°

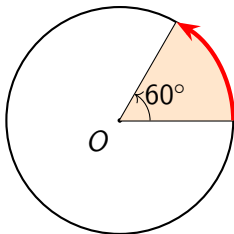
6. Copy the diagram, and draw with labels:

► A sector

► A tangent

► An arc

► A segment



7. If the radius is 6 cm, what is the whole circumference? (Use $\pi \approx 3.14$) 37.68 cm

8. For the sector shown, what fraction of the circumference is the arc length? Calculate the arc length if the whole circle has a circumference of 24cm. $\frac{1}{6}$; 4 cm

Worked Solution: Starter 3, Question 1

Question: 3.2×5 .

Worked Solution: Split $3.2 = 3 + 0.2$:

$$3.2 \times 5 = 3 \times 5 + 0.2 \times 5 = 15 + 1 = \underline{\quad}.$$

Worked Solution: Starter 3, Question 1

Question: 3.2×5 .

Worked Solution: Split $3.2 = 3 + 0.2$:

$$3.2 \times 5 = 3 \times 5 + 0.2 \times 5 = 15 + 1 = 16.$$

Worked Solution: Starter 3, Question 2

Question: 1.8×4 .

Worked Solution: $1.8 \times 4 = 1 \times 4 + 0.8 \times 4 = 4 + 3.2 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 3, Question 2

Question: 1.8×4 .

Worked Solution: $1.8 \times 4 = 1 \times 4 + 0.8 \times 4 = 4 + 3.2 = 7.2$.

Worked Solution: Starter 3, Question 3

Question: $45 \div 10$.

Worked Solution: Dividing by 10 moves the digits one place to the right: $45 \div 10 = \underline{\quad}$.

Worked Solution: Starter 3, Question 3

Question: $45 \div 10$.

Worked Solution: Dividing by 10 moves the digits one place to the right: $45 \div 10 = 4.5$.

Worked Solution: Starter 3, Question 4

Question: $90 \div 100$.

Worked Solution: Dividing by 100 moves the digits two places to the right: $90 \div 100 = \underline{\quad}$.

Worked Solution: Starter 3, Question 4

Question: $90 \div 100$.

Worked Solution: Dividing by 100 moves the digits two places to the right: $90 \div 100 = 0.9$.

Worked Solution: Starter 3, Question 5

Question: What is $\frac{1}{4}$ of 360° ?

Worked Solution: $\frac{1}{4} \times 360^\circ = \frac{360^\circ}{4} = \underline{\hspace{1cm}}.$

Worked Solution: Starter 3, Question 5

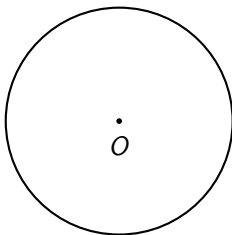
Question: What is $\frac{1}{4}$ of 360° ?

Worked Solution: $\frac{1}{4} \times 360^\circ = \frac{360^\circ}{4} = 90^\circ$.

Worked Solution: Starter 3, Question 6

Question: Copy the diagram, and draw with labels: a sector, an arc, a tangent, and a segment.

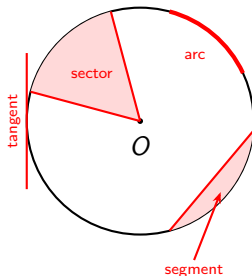
Worked Solution: The labelled parts are shown below.



Worked Solution: Starter 3, Question 6

Question: Copy the diagram, and draw with labels: a sector, an arc, a tangent, and a segment.

Worked Solution: The labelled parts are shown below.



Worked Solution: Starter 3, Question 7

Question: If the radius is 6 cm, what is the whole circumference? Use $\pi \approx 3.14$.

Worked Solution: $C = 2\pi r \approx 2(3.14)(6) = \underline{\hspace{2cm}}$.

Worked Solution: Starter 3, Question 7

Question: If the radius is 6 cm, what is the whole circumference? Use $\pi \approx 3.14$.

Worked Solution: $C = 2\pi r \approx 2(3.14)(6) = 37.68 \text{ cm}$.

Worked Solution: Starter 3, Question 8

Question: For the sector shown, what fraction of the circumference is the arc length? Calculate the arc length if the whole circle has a circumference of 24 cm.

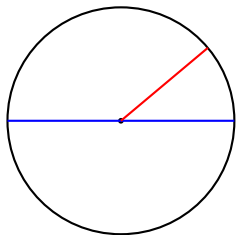
Worked Solution: The sector angle is 60° , so the fraction is $\frac{60}{360} = \underline{\quad}$.
The arc length is therefore $\frac{1}{6} \times 24 = \underline{\quad}$.

Worked Solution: Starter 3, Question 8

Question: For the sector shown, what fraction of the circumference is the arc length? Calculate the arc length if the whole circle has a circumference of 24 cm.

Worked Solution: The sector angle is 60° , so the fraction is $\frac{60}{360} = \frac{1}{6}$. The arc length is therefore $\frac{1}{6} \times 24 = 4 \text{ cm}$.

Starter 4



1. 12×3
2. 4×3.14
3. $6.28 \div 2$
4. $9.42 \div 3$
5. Round 3.14159265 to 3 decimal places.
6. Double 3.14
7. halve 12.56
8. Copy and label on the diagram: centre, radius, diameter, circumference.
9. Draw a chord on the diagram shorter than the radius
10. Draw a chord on the diagram longer than the radius
11. If the diameter is 8 cm, what is:
 - ▶ the radius?
 - ▶ the circumference? ($\pi \approx 3.14$)

Starter 4

1. $12 \times 3 = 36$

2. $4 \times 3.14 = 12.56$

3. $6.28 \div 2 = 3.14$

4. $9.42 \div 3 = 3.14$

5. Round 3.14159265 to 3 decimal places. 3.142

6. Double 3.14 = 6.28 7. halve 12.56 = 6.28

8. Copy and label on the diagram: centre, radius, diameter, circumference.

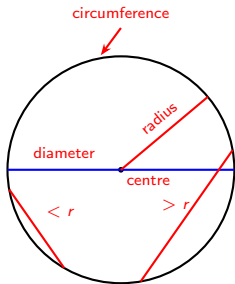
9. Draw a chord on the diagram shorter than the radius

10. Draw a chord on the diagram longer than the radius

11. If the diameter is 8 cm, what is:

► the radius? 4 cm

► the circumference? ($\pi \approx 3.14$) 25.12 cm



Worked Solution: Starter 4, Question 1

Question: 12×3 .

Worked Solution: $12 \times 3 = 10 \times 3 + 2 \times 3 = 30 + 6 = \underline{\quad}$.

Worked Solution: Starter 4, Question 1

Question: 12×3 .

Worked Solution: $12 \times 3 = 10 \times 3 + 2 \times 3 = 30 + 6 = 36$.

Worked Solution: Starter 4, Question 2

Question: 4×3.14 .

Worked Solution: $4 \times 3.14 = 4 \times 3 + 4 \times 0.14 = 12 + 0.56 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 4, Question 2

Question: 4×3.14 .

Worked Solution: $4 \times 3.14 = 4 \times 3 + 4 \times 0.14 = 12 + 0.56 = 12.56$.

Worked Solution: Starter 4, Question 3

Question: $6.28 \div 2$.

Worked Solution: Half of 6.28 is 3.14, so $6.28 \div 2 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 4, Question 3

Question: $6.28 \div 2$.

Worked Solution: Half of 6.28 is 3.14, so $6.28 \div 2 = 3.14$.

Worked Solution: Starter 4, Question 4

Question: $9.42 \div 3$.

Worked Solution: Since $3 \times 3.14 = 9.42$, $9.42 \div 3 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 4, Question 4

Question: $9.42 \div 3$.

Worked Solution: Since $3 \times 3.14 = 9.42$, $9.42 \div 3 = 3.14$.

Worked Solution: Starter 4, Question 5

Question: Round 3.14159265 to 3 decimal places.

Worked Solution: The third decimal digit is 1, and the next digit is 5, so round up: $3.14159265 \approx \underline{\hspace{1cm}}$.

Worked Solution: Starter 4, Question 5

Question: Round 3.14159265 to 3 decimal places.

Worked Solution: The third decimal digit is 1, and the next digit is 5, so round up: $3.14159265 \approx 3.142$.

Worked Solution: Starter 4, Question 6

Question: Double 3.14.

Worked Solution: $2 \times 3.14 = \underline{\hspace{1cm}}$.

Worked Solution: Starter 4, Question 6

Question: Double 3.14.

Worked Solution: $2 \times 3.14 = 6.28$.

Worked Solution: Starter 4, Question 7

Question: Halve 12.56.

Worked Solution: $12.56 \div 2 = \underline{\hspace{1cm}}$.

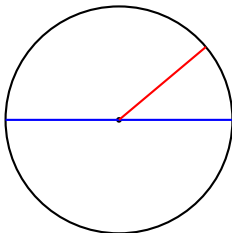
Worked Solution: Starter 4, Question 7

Question: Halve 12.56.

Worked Solution: $12.56 \div 2 = 6.28$.

Worked Solution: Starter 4, Question 8

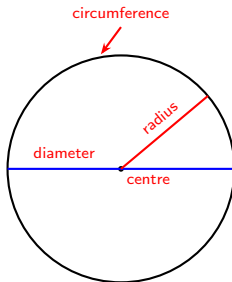
Question: Copy and label on the diagram: centre, radius, diameter, circumference.



Worked Solution: The labels are shown in red. The centre is O , the radius is half the diameter, the diameter passes through the centre, and the circumference is the distance around the circle.

Worked Solution: Starter 4, Question 8

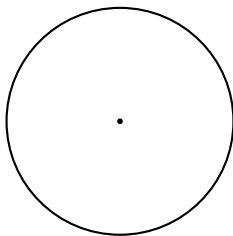
Question: Copy and label on the diagram: centre, radius, diameter, circumference.



Worked Solution: The labels are shown in red. The centre is O , the radius is half the diameter, the diameter passes through the centre, and the circumference is the distance around the circle.

Worked Solution: Starter 4, Question 9

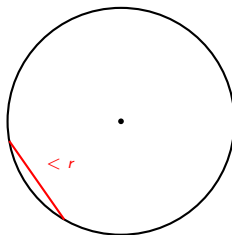
Question: Draw a chord on the diagram shorter than the radius.



Worked Solution: One possible chord is drawn below; it is labelled $< r$.

Worked Solution: Starter 4, Question 9

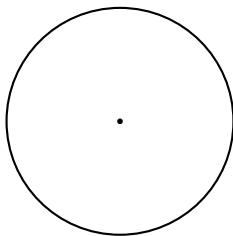
Question: Draw a chord on the diagram shorter than the radius.



Worked Solution: One possible chord is drawn below; it is labelled $< r$.

Worked Solution: Starter 4, Question 10

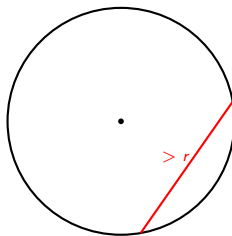
Question: Draw a chord on the diagram longer than the radius.



Worked Solution: One possible chord is drawn below; it is labelled $> r$.

Worked Solution: Starter 4, Question 10

Question: Draw a chord on the diagram longer than the radius.



Worked Solution: One possible chord is drawn below; it is labelled $> r$.

Worked Solution: Starter 4, Question 11

Question: If the diameter is 8 cm, what is the radius and the circumference? Use $\pi \approx 3.14$.

Worked Solution: Radius $r = \frac{8}{2} = \underline{\hspace{2cm}}$.

Circumference $C = \pi d \approx 3.14 \times 8 = \underline{\hspace{2cm}}$.

Worked Solution: Starter 4, Question 11

Question: If the diameter is 8 cm, what is the radius and the circumference? Use $\pi \approx 3.14$.

Worked Solution: Radius $r = \frac{8}{2} = 4$ cm.

Circumference $C = \pi d \approx 3.14 \times 8 = 25.12$ cm.