Name & Surname: _____ Class: _____ Date: _____

Circles: Perimeter and Area

Circumference, area and composite shapes

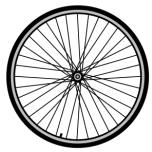
About 50 minutes Level ★★★☆☆



Circles: key rules

Use **pi** = 3.14 for this worksheet. The **radius** goes from the centre to the edge, the **diameter** goes right across through the centre.

- **Circumference** = pi × diameter = 2 × pi × radius. It is the **perimeter** of the circle.
- **Area** = pi × radius². Halve the **diameter** first if you are given it.
- For **composite** shapes, add or subtract parts. For a **semicircle**, halve the full circle and add the **diameter** for perimeter.



TASK A

/4

Practise written methods for decimal numbers.

1

	3	.	1	4
+	2	.	8	6

2

	1	2	.	5	6
−		4	.	7	1

3

		3	1	4
×				7

4

4) 628

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Round and Round

Practise circumferences and perimeters of circles.

Key words

circumference: distance around a circle

diameter: distance across a circle through the centre

radius: distance from centre to edge of a circle

pi: about 3.14, used for circles

perimeter: total distance around a shape

semicircle: half of a circle

TASK B

/12

Find circumferences and perimeters. Use pi = 3.14.

WARM UP

1. Work out the **circumference** of a circle with **diameter** 10 cm.

Answer: _____

2. Work out the **circumference** of a circle with **radius** 7 cm.

Answer: _____

3. A circle has **radius** 5 cm. Work out its **diameter**.

Answer: _____

4. Work out the **circumference** of a circle with **radius** 3 cm.

Answer: _____

PRACTISE

5. Work out the **circumference** of a circle with **radius** 2.5 cm.

Answer: _____

6. A **semicircle** has **diameter** 8 cm. Work out the length of its **curved** edge.

Answer: _____

7. A **semicircle** has **diameter** 20 cm. Work out its **perimeter**, including the straight edge.

Answer: _____

8. Explain how you know whether to use **diameter** or **radius** in C = πd.

Answer: _____

PROBLEM SOLVING

9. A bicycle wheel has **diameter** 70 cm. How far does it travel in one **turn**?

Answer: _____

10. A circular fence has **radius** 10 m. Work out how much **fencing** is needed to go round it once.

Answer: _____

11. A **quarter-circle** has **radius** 4 m. Its two straight edges are against walls. Work out the length of the **curved** edge.

Answer: _____

12. A student says the **perimeter** of a circle with **radius** 6 cm is 18.84 cm. Explain how you know the student is wrong.

Answer: _____

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Covering Circle Area

Practise areas of circles and composite shapes.

TASK C /12

Find areas of circles and composite shapes. Use pi = 3.14.

WARM UP

1 Work out the **area** of a circle with **radius** 2 cm.

Answer: _____

2 Work out the **area** of a circle with **radius** 10 cm.

Answer: _____

3 Work out the **area** of a circle with **radius** 5 cm.

Answer: _____

4 Work out the **area** of a **quarter-circle** with **radius** 4 cm.

Answer: _____

PRACTISE

5 A circle has **diameter** 12 cm. Work out its **area**.

Answer: _____

6 Work out the **area** of a **semicircle** with **radius** 6 cm.

Answer: _____

7 A **rectangle** is 10 cm by 4 cm. A **semicircle** of **diameter** 4 cm is cut out. Work out the remaining **area**.

Answer: _____

8 Explain how you know you must square the **radius**, not the **diameter**, in $A = \pi r^2$.

Answer: _____

PROBLEM SOLVING

9 A circular lawn has **radius** 7 m. Work out its **area**.

Answer: _____

10 A **composite** shape is an 8 cm by 6 cm **rectangle** with a **semicircle** of **diameter** 6 cm joined to one 6 cm side. Work out its total **area**.

Answer: _____

11 A circular tablecloth has **diameter** 2 m. Work out its **area**.

Answer: _____

12 A student says doubling the **radius** doubles the **area**. Explain how you know this is wrong, using **radius** 2 cm and 4 cm.

Answer: _____

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Shapes Together Today

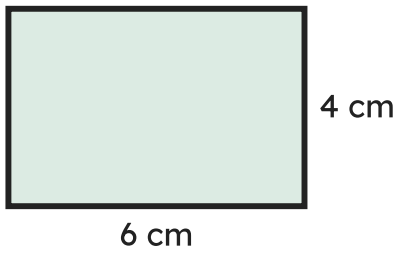
Find areas and perimeters, then judge those statements.

TASK D

/5

Work out the area, perimeter or circumference of each shape.

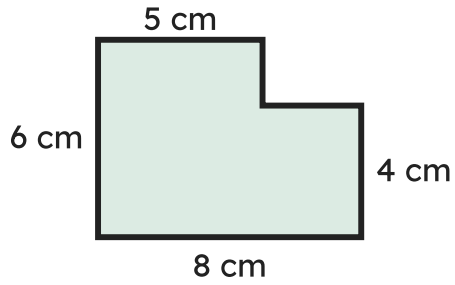
1



Area: _____ **cm²**

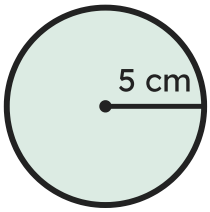
Perimeter: _____ **cm**

2



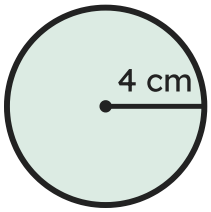
Area: _____ **cm²**

3



Area: _____ **cm²**

4



Circumference: _____ **cm**

TASK E

/4

Decide if each statement is always, sometimes or never true.

Statement	Always	Sometimes	Never
You multiply the **radius** by 2 to get the **diameter**.			
Convince me: _____			
To find the **area** you can put the **diameter** straight into $A = \pi r^2$.			
Convince me: _____			
Doubling the **radius** doubles the **area**.			
Convince me: _____			
Circumference is the **perimeter** of a circle.			
Convince me: _____			

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Show Your Thinking

Follow the worked methods, then make up your own questions.

TASK F /2

Follow each worked example, then try the similar question.

WORKED EXAMPLE

Work out the perimeter of a semicircle with diameter 10 cm. Use pi = 3.14.

1. Curved edge = half of pi × d: 3.14 × 10 ÷ 2 = 15.7 cm
2. Add straight edge: 15.7 + 10 = 25.7 cm

Answer: 25.7 cm

YOUR TURN

Work out the perimeter of a semicircle with diameter 12 cm. Use pi = 3.14.

Answer: _____

WORKED EXAMPLE

Work out the area of a circle with diameter 10 cm. Use pi = 3.14.

1. Radius = 10 ÷ 2 = 5 cm
2. Area = pi × r^2 = 3.14 × 5^2 = 78.5 cm^2

Answer: 78.5 cm^2

YOUR TURN

Work out the area of a circle with diameter 6 cm. Use pi = 3.14.

Answer: _____

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Circles: Perimeter and Area

TASK G

The answer is given. What could the question be?

The answer is: **37.68 cm**

What could the question be?

The answer is: **50.24 cm²**

What could the question be?

The answer is: **25.7 cm**

What could the question be?

How did I do?

Circle a face for each line.

I can find the circumference of a circle.

I can find the area of a circle.

I can solve perimeter and area problems with composite shapes.

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Answer sheet: Circles: Perimeter and Area

Task A

1. 3.14 + 2.86 = 6.00
2. 12.56 − 4.71 = 7.85
3. 314 × 7 = 2198
4. 628 ÷ 4 = 157

Task B

1. 31.4 cm
2. 43.96 cm
3. 10 cm
4. 18.84 cm
5. 15.7 cm
6. 12.56 cm
7. 51.4 cm
8. C = πd uses the diameter, so if you are given the radius you must double it first.
9. 219.8 cm
10. 62.8 m
11. 6.28 m
12. The student has used 6 cm as the diameter. The diameter is 12 cm, so the circumference is 3.14 × 12 = 37.68 cm.

Task C

1. 12.56 cm^2
2. 314 cm^2
3. 78.5 cm^2
4. 12.56 cm^2
5. 113.04 cm^2
6. 56.52 cm^2
7. 33.72 cm^2
8. The formula uses radius, so you must halve the diameter first, otherwise the area will be 4 times too big.
9. 153.86 m^2
10. 62.13 cm^2
11. 3.14 m^2
12. Radius 2 cm gives 12.56 cm^2 and radius 4 cm gives 50.24 cm^2, which is 4 times bigger, not double, because the radius is squared.

Task D

1. area = 24 cm^2, perimeter = 20 cm
2. area = 42 cm^2
3. area = 78.5 cm^2 (25π)
4. circumference = 25.1 cm (8π)

Task E

1. Always (d = 2r, for example r = 5 cm gives d = 10 cm.)
2. Never (You must halve first. For d = 10 cm, r = 5 cm and A = 78.5 cm^2, not 314 cm^2.)
3. Never (The area is 4 times bigger because $2^2 = 4$, for example 12.56 cm^2 becomes 50.24 cm^2.)
4. Always (Both mean the distance around, for example C = πd.)

Task F

1. 30.84 cm
2. 28.26 cm^2

Task G

Answers will vary, e.g. 37.68 cm → What is the circumference of a circle with radius 6 cm? Use pi = 3.14. 50.24 cm^2 → What is the area of a circle with radius 4 cm? Use pi = 3.14. 25.7 cm → What is the perimeter of a semicircle with diameter 10 cm? Use pi = 3.14.

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