

Y10 Mathematics Knowledge Organiser

FOUNDATION PART 4: Geometry 1, Inequalities, Probability

Key Language

1	radius (plural: radii)	A line or distance from the centre of a circle to the edge
2	diameter	A line or distance straight across a circle, through the centre
3	circumference	The curved distance around the outside of a circle
4	arc	A section of the circumference of a circle
5	chord	A line across a circle (not through the centre)
6	tangent	A line that touches a circle at just one point
7	sector	A region of a circle enclosed by two radii
8	segment	A region of a circle enclosed by a chord and the circumference
9	outcome	Something that could happen e.g. 6 on a dice
10	event	A combination of outcomes e.g. even on a dice (2, 4 or 6)
11	mutually exclusive	Events are mutually-exclusive if they can't <i>both</i> happen e.g. 'rolling a 5 on a dice' and 'rolling an even number'
12	independent	Independent events do not affect each other
13	Pythagorean triple	Three integers that could be the sides of a right-angled triangle e.g. 3, 4, 5 or 5, 12, 13 (learn these two)
14	diagonal	A line across a shape, joining non-adjacent vertices

Circle formulae to learn

To find the area:

$$A = \pi r^2$$

($A = r^2 \times \pi$)

To find the circumference:

$$C = \pi d$$

($C = d \times \pi$)

$$\pi \approx 3.14$$

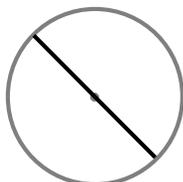
Know

Parts of a Circle

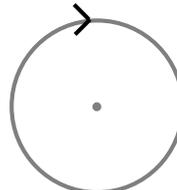
We've added two more to the collection this time:



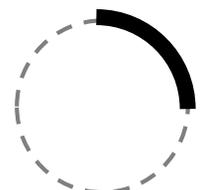
radius



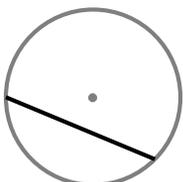
diameter



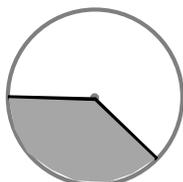
circumference



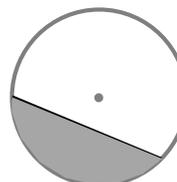
arc



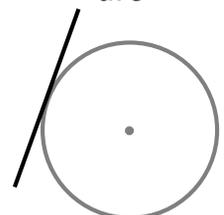
chord



sector



segment



tangent

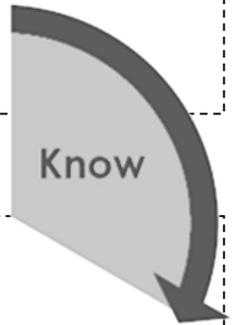
Arcs and sectors

To find the area of a sector:

$$\frac{\text{angle}}{360} \times \pi r^2$$

To find the length of an arc:

$$\frac{\text{angle}}{360} \times \pi d$$



Inequalities

Inequality symbols:

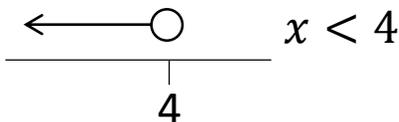
< less than

> greater than

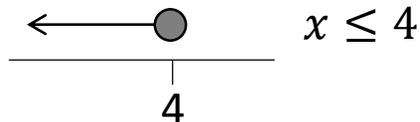
≤ less than or equal to

≥ greater than or equal to

Number lines:



$$x < 4$$



$$x \leq 4$$

Open circle for < or >

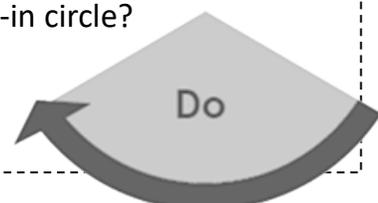
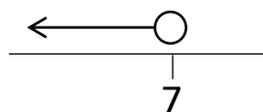
Filled-in circle for ≤ or ≥

PRACTICE QUESTIONS

Ten of these questions will be chosen, with very little change, to make the Knowledge Test. If you can confidently answer all of these, you will pass easily.

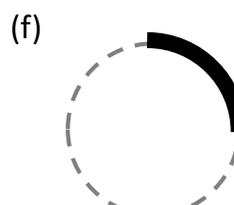
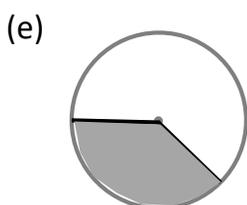
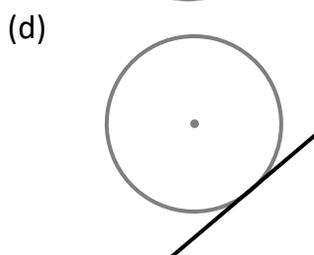
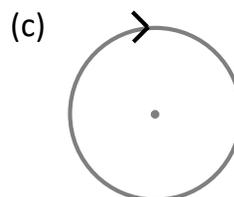
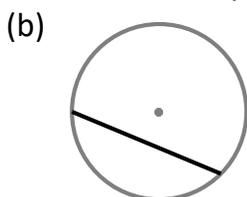
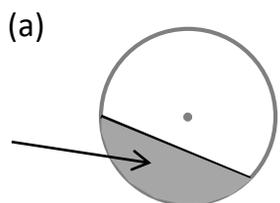
Use pages 1 and 2 to research and *learn* anything that you don't know yet.

- What is the name for the line right across a circle, through the centre?
- What is an arc?
- What line touches a circle at just one point?
(Questions like 1-3 could involve any of the parts of a circle)
- Which of these is a formula for the area of a circle:
A: $A = \pi d$ B: $A = \pi^2 r$ C: $A = \pi r^2$?
- Which of these is a formula for the circumference of a circle:
A: $C = \pi d$ B: $C = \pi r$ C: $C = \pi r^2$?
- What is the meaning of this symbol: < ?
- What is the meaning of this symbol: ≥ ?
- Draw the symbol that means 'less than or equal to'
- Draw the symbol that means 'greater than'
- On a number line, would $x < 8$ have an open circle, or a filled-in circle?
- Which of these inequalities could match the diagram on the right?
A: $x < 7$ B: $x \leq 7$ C: $x \geq 7$



PRACTICE QUESTIONS (continued)

12. Describe what we mean if we say that events are **mutually exclusive**.
13. Describe what we mean if we say that events are **independent**.
14. Write down a formula for the area of a circle.
15. Write down a formula for the circumference of a circle.
16. Write down a formula for the area of a sector.
17. Write down a formula for the length of an arc.
18. A dice is rolled. Write down the possible outcomes.
19. What word is used for a combination of outcomes (e.g. even number on a dice)
20. Give an example of a Pythagorean triple.
21. Add another integer to make this a Pythagorean triple: 12, 13, ...
22. What do we call a line across a shape, joining non-adjacent vertices?
23. Write down the name of each of these circle parts:



ANSWERS

1. diameter
2. part of the circumference of a circle
3. tangent
4. C: $A = \pi r^2$
5. A: $C = \pi d$
6. < means 'less than'
7. \geq means 'greater than or equal to'
8. \leq
9. >
10. $x < 8$ would have an open circle
11. A: $x < 7$ (it has an open circle)
12. They can't both happen
13. They don't affect each other
14. $A = \pi r^2$
15. $C = \pi d$
16. $\frac{\text{angle}}{360} \times \pi r^2$
17. $\frac{\text{angle}}{360} \times \pi d$
18. 1, 2, 3, 4, 5 or 6
19. event
20. e.g. 3, 4, 5 or 5, 12, 13
(There are lots more)
21. 5
22. Diagonal
23. (a) segment (b) chord
(c) circumference (d) tangent
(e) sector (f) arc

