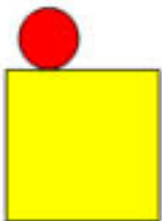


ROUND ABOUT



A circle rolls around the outside edge of a square so that its circumference always touches the edge of the square.

Describe the path (or locus) of the centre of the circle and its length.

SOLUTION

As the circle rolls along each edge the centre moves parallel to the edge a distance equal to the length of the edge of the square. At the corners the point of contact on the circle stays still and the circle turns through 90° with the centre describing a quarter circle.

The locus of the centre of the circle is like a square with rounded corners and the length of the locus is equal to the perimeter of the square plus the circumference of the circle.

NOTES FOR TEACHERS

Why do this activity?

This activity helps to develop visualisation and reinforces ideas about circles.

Intended Learning Objectives (Grades 8 to 10)

To practise visualisation and to review properties of circles.

Possible approach

You could ask learners to imagine the circle rolling around the square without slipping and to describe the path of the centre without drawing on paper or 'in the air'.

Then, learners could try this out practically with square and circular objects (e.g. a square made from 4 rulers or sticks and a coin).

There is no calculation involved here, simply a general answer that always applies for any circular and square objects.

Key questions

What path does the centre of the circle take as it travels along one side of the shape?

What shape will the path of the centre be as it goes round a corner?

Possible extension

Describe the locus of the centre when a circle rolls around other polygons.

Learner's could also do 'Not so square fence'

<https://aiminghigh.aimssec.ac.za/grades-9-to-10-not-so-square-fence/>

Possible support

Try the interactivity on the NRICH website <http://nrich.maths.org/2159>