

Teaching Mathematics with Technology - An exploration with Geogebra

Week 3 – Indicative lesson outlines

Basic Proportionality Theorem

A lesson on circles

Circles

- We will look at a sequential exploration of ideas
- Illustrating sample sketches that can be used for the different concepts
- Geogebra as a support to visual proof

Circles – an exploration

- Circle as a locus of points equidistant from a centre
- Different measures associated with a circle
- The relationship between the angles formed at the centre and the arcs and sectors
- How do lines intersect with circles
 - Secants
 - Tangents
 - Chords

Circles – an exploration

- Circle as an *n-sided* polygon
- Select theorems on circles
 - Circle through three collinear points
 - Radius perpendicular to tangent at the point of intersection
 - Theorems related to chords

What are the key concepts we have seen

- The idea of locus to explain a circle
- The “magic” of ratios associated with the circle
- The relationship between the angles in the centre and the area measures associated
- Visualizing a circle in a two-dimensional plane
 - Through non-collinear points
 - As an n -sided polygon, n tending to infinity
- How the chord, secant and tangent are related
- Steps in logical proofs

For further exploration

- Download the underlying files
 - 1. Introduction to circles.ggb
 - 2. Introducing common measures in a circle.ggb
 - 3. Angles in a circle.ggb
 - 4. Dividing a circle into arcs and sectors.ggb
 - 4a. Dividing a circle into arcs and sectors - to show ratios.ggb
 - 5. Introduction to secant and tangent.ggb
 - 6. Circle through 3 points.ggb

For further exploration

- Download the underlying files
 - 6a. Circle through 3 points proof.ggb
 - 7. Polygon tending to circle.ggb
 - 8. Tangent is perpendicular to radius.ggb
 - 9. Equal chords and distance from center.ggb
 - 10. Equidistant chords (alternate construction).ggb
 - 11. Chord length and perpendicular distance from centre.ggb
 - 12. Perpendicular from center to chord divides the chord.ggb