Exploring Properties of Geometric Figures

Learning Goal

- Investigate intersections of lines or line segments within triangles and circles.

Triangle Summary

In an equilateral triangle, the medians, perpendicular bisectors, and altitudes intersect at the same point.

Triangle Centre	Intersecting Lines	Usefulness
Centroid	Medians	Centre of balance
Circumcentre	Perpendicular bisectors	Centre of triangle (same distance from all vertices)
Orthocentre	Altitudes	Not useful, although the altitude (or height) can be used to calculate the area of the triangle.

Shortcut for finding the coordinates of the centroid:

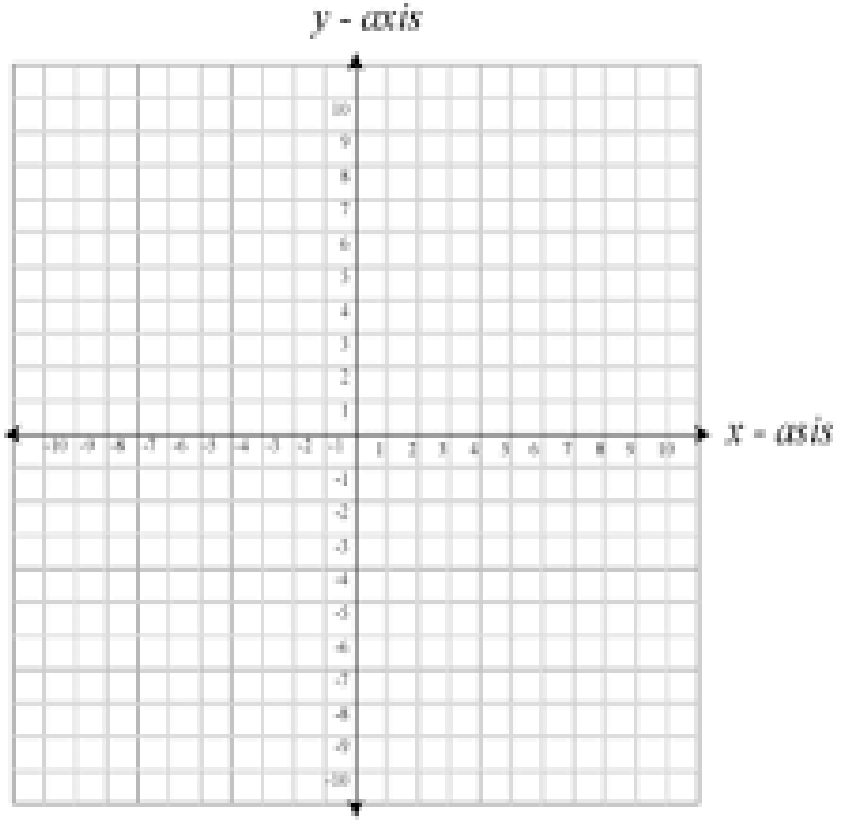
$$\text{Centroid} = C\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

Circle Summary

- When two chords intersect, the products of their segments are equal.

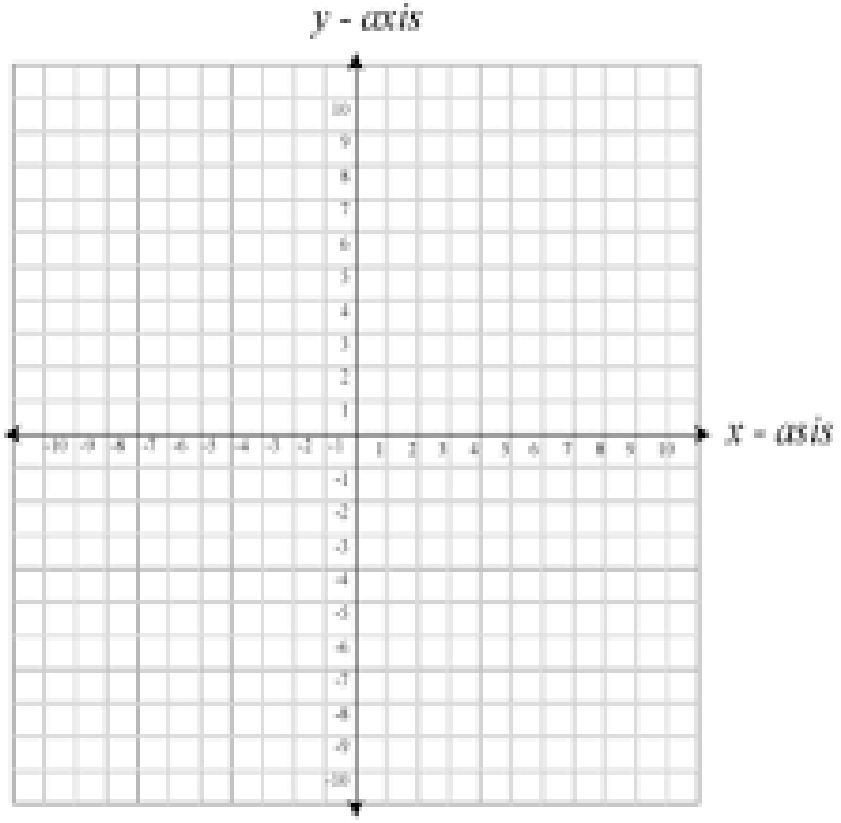
Example 1

- ΔSTU has vertices S(-2, 2), T(4, 0), & U(-2, -3). Find the area of this triangle.



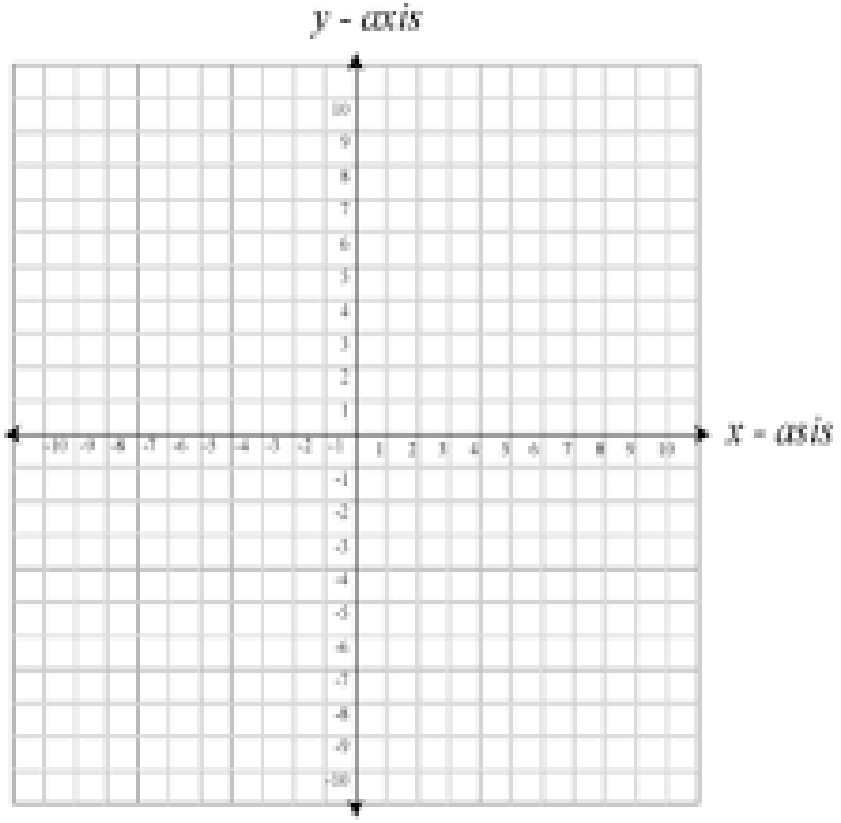
Example 2

- ΔPQR has vertices P(-6, 9), Q(6, 1), & R(-6, -7). Find the coordinates of the centroid.



Example 3

- ΔJKL has vertices J(-2, 5), K(5, -2), and L(-8, -7). Find the coordinates of the circumcentre.



Reinforcement

- Page 113 #1 – 4