

ANALYTIC GEOMETRY ASSIGNMENT

Instructions:

- 1) Draw and label a diagram, on grid paper, for each question.
- 2) Show complete solutions with calculations.
- 3) All answers should be left in exact form (no decimals), unless otherwise specified.

1. A triangle has vertices $A(-8, 6)$, $B(-5, -1)$, and $C(2, 2)$.
 - a) Calculate the exact length of each side and state the *type* of triangle.
 - b) Verify the triangle is also right-angled.

2. A circle with centre $C(4, -7)$ passes through the point $P(8, -2)$.
 - a) Calculate the exact length of the radius for the circle.
 - b) Determine the equation of the circle.
 - c) A chord of the circle has endpoints $R(0, -2)$ and $S(9, -3)$. Determine the equation of the right bisector to chord RS .
 - d) Verify that the centre of the circle is on the right bisector to the chord.

3. A quadrilateral has vertices $P(-3, 1)$, $Q(-1, -5)$, $R(11, 1)$ and $S(1, 3)$.
 - a) Verify that $PQRS$ is a trapezoid.
 - b) Determine the midpoint of each side. Label the midpoint of side PQ as T , the midpoint of side QR as U , the midpoint of side RS as V , and the midpoint of side PS as W .
 - c) Connect points T , U , V , and W to form a second quadrilateral. Verify that $TUVW$ is a parallelogram.
 - d) Connect the opposite vertices in quadrilateral $TUVW$ to form the diagonals. Calculate the length of each diagonal.
 - e) Verify that the longest diagonal of $TUVW$ is parallel to the longest side of $PQRS$ and that the length of the diagonal is half the sum of the lengths of the two parallel sides in $PQRS$.

4. A triangle has vertices $A(-5, -5)$, $B(1,5)$ and $C(9,-3)$.
 - a) Determine the equation of the median from A to BC .
 - b) Determine the equation of the right bisector to BC .
 - c) Determine the equation of the altitude from A to BC .
 - d) Determine the coordinates of the *circumcentre*.
 - e) Determine the **exact** distance between $D(10, 0)$ and BC (leave your answer in exact form – no decimals!).