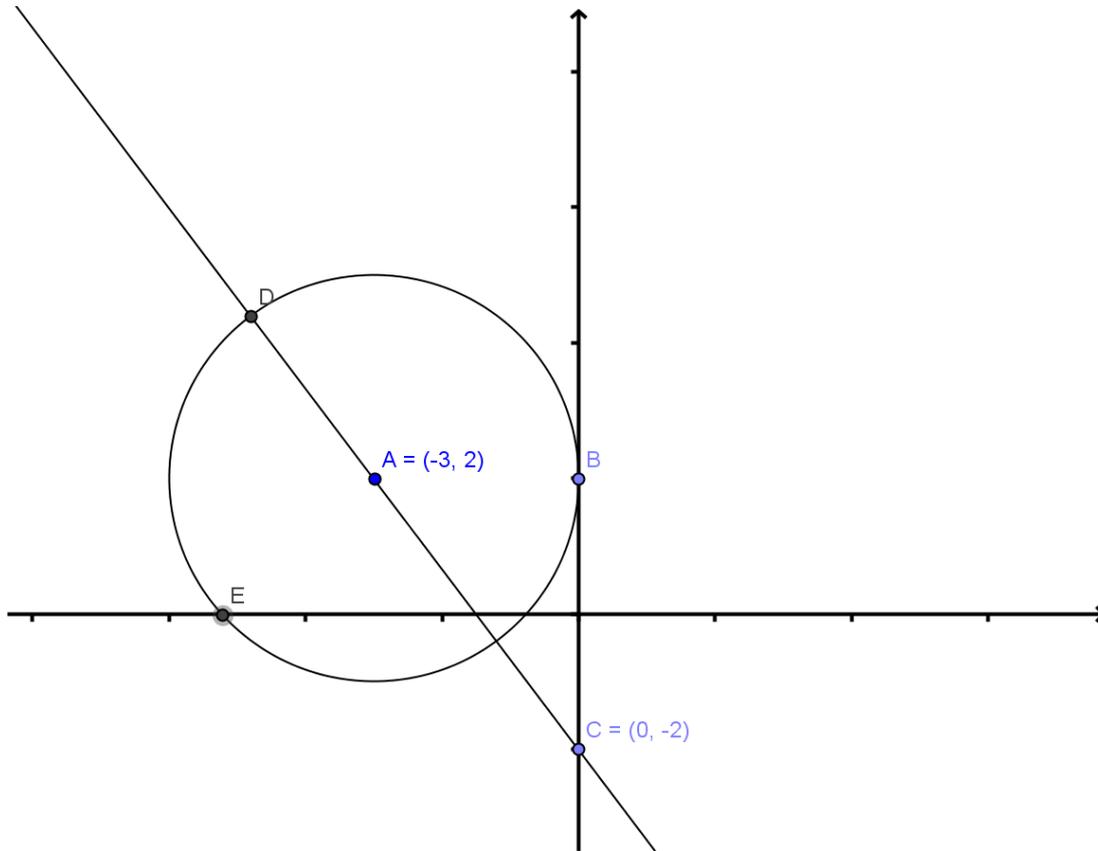


# SHARP

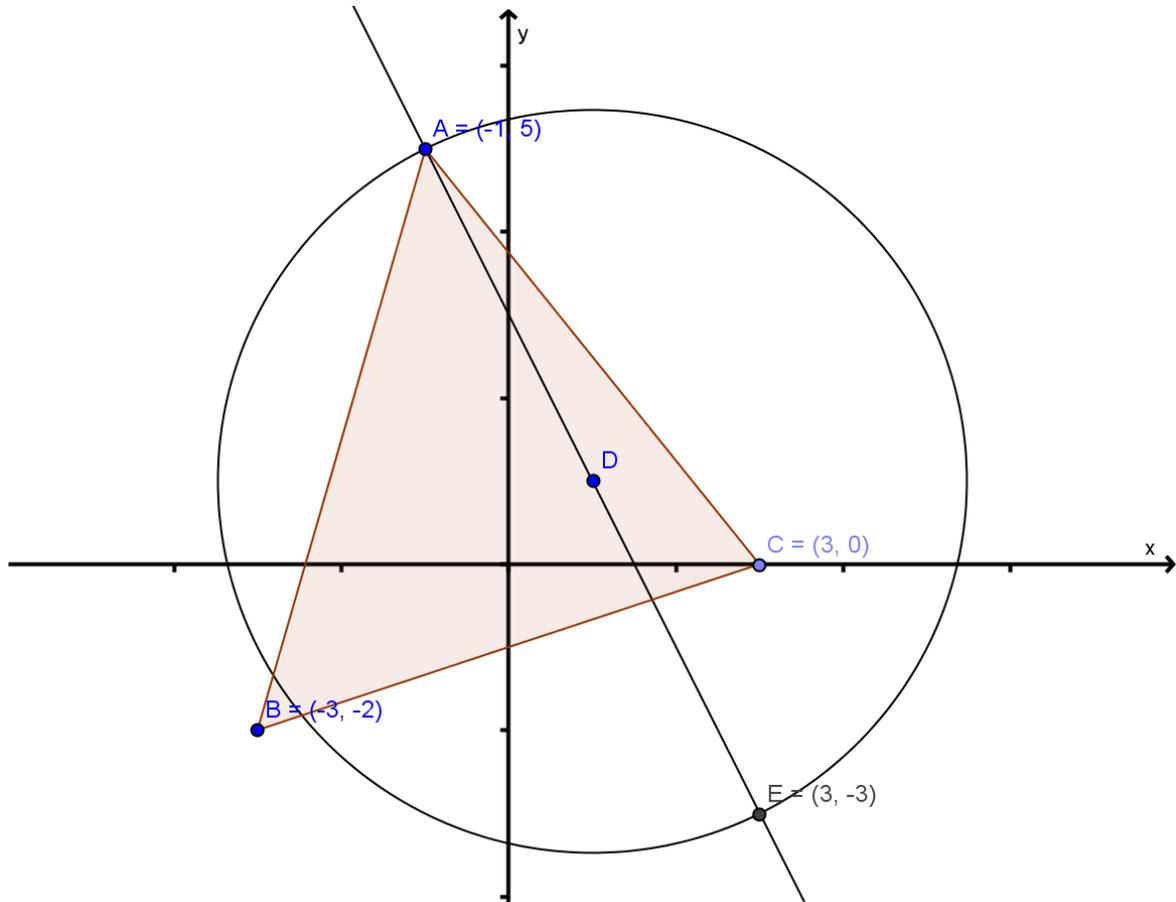
## Worksheet 8 – Analytical Geometry

1. Given below is the sketch of the circle with centre  $A(-3; 2)$  and the line running through the circle is the diameter of the circle. The circle cuts the  $y$ -axis once at  $B(0; 2)$ . The straight line  $D$  through the circle cuts the  $y$ -axis at  $-2$ .



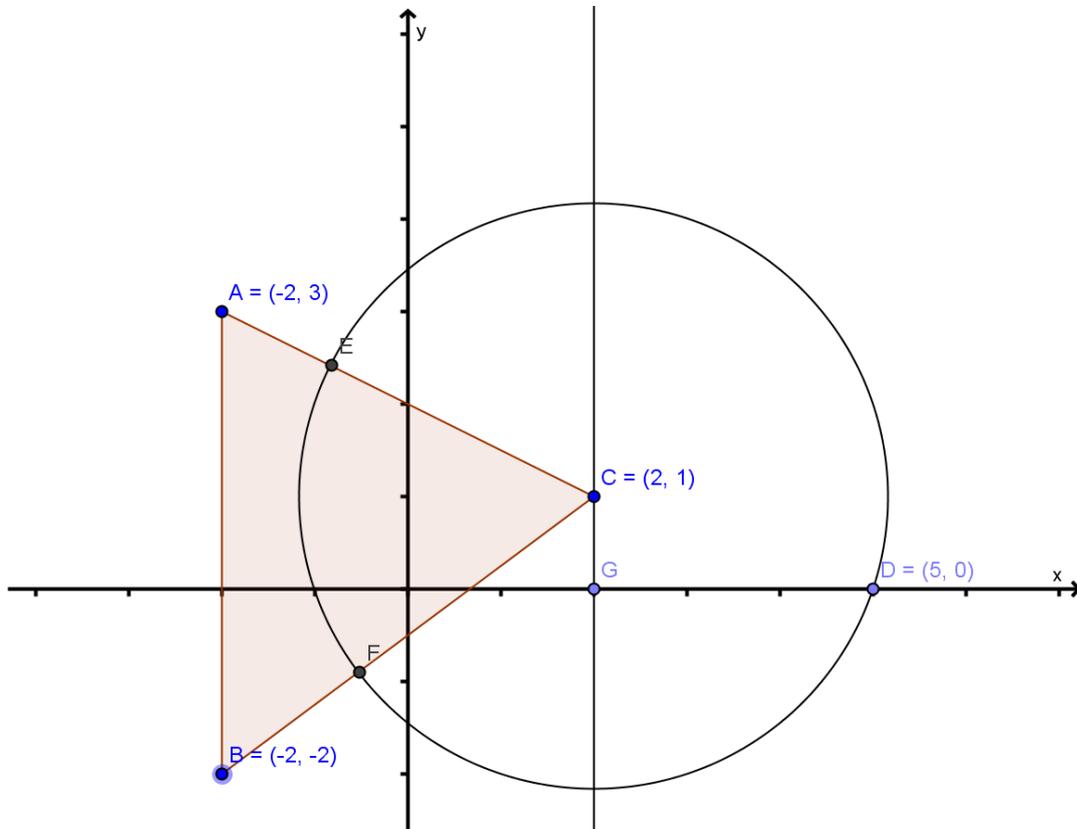
- Determine the equation of the diameter line.
- Determine the equation of the circle.
- Determine the coordinates of  $D$ .
- Determine the coordinates of  $E$ .
- Will the tangent at  $E$  be parallel to the line  $DAC$ ? (Show all your working.)
- Hence, or otherwise determine the equation of the tangent to the circle at  $E$ .

2. Given the sketch below with the centre of the circle at D. The diameter AE passes through the circle in a straight line with the points A (-1; 5) and E (3; -3). The triangle ABC also touches the circle at the point A.



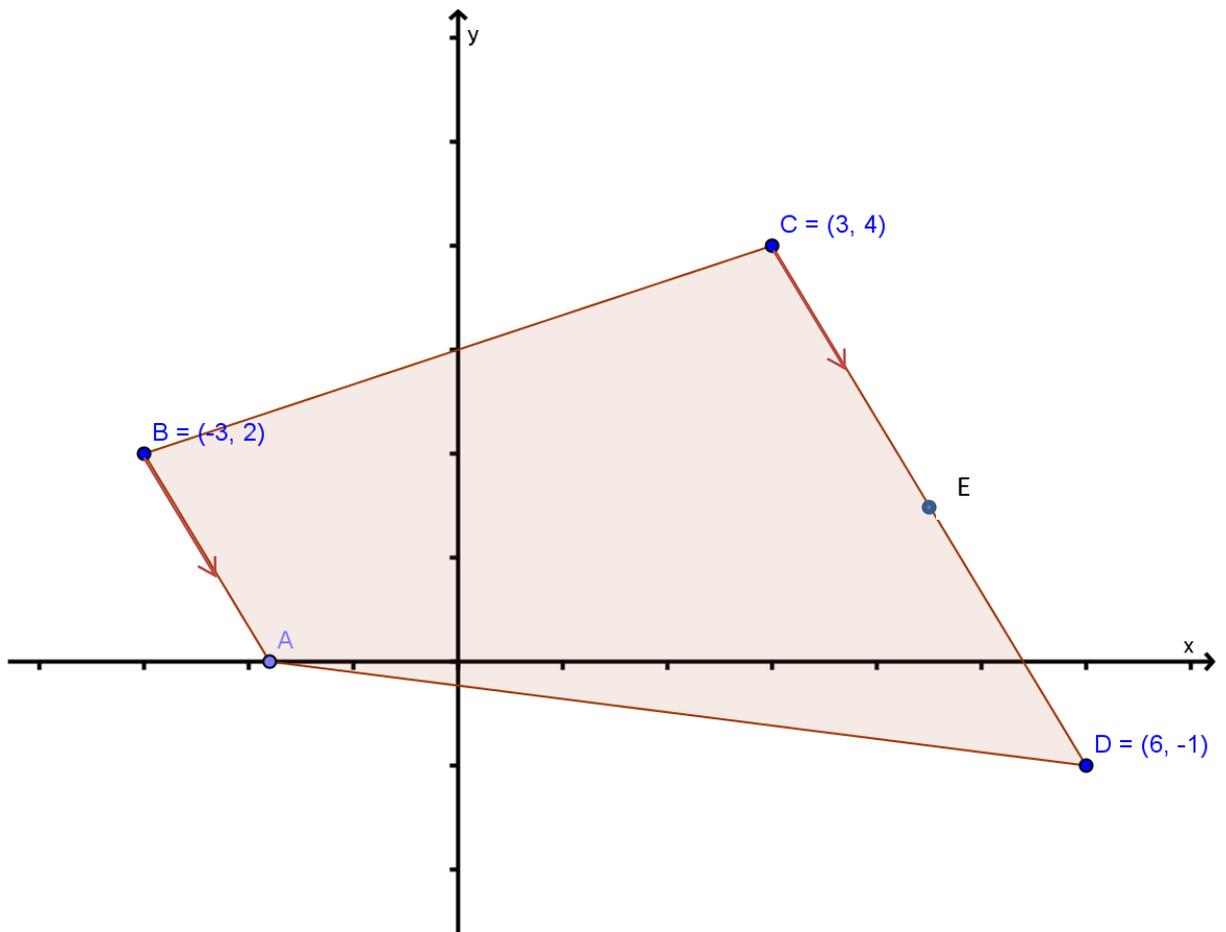
- Determine the coordinates of D, the centre of the circle.
- Hence or otherwise, determine the equation of the circle.
- Determine the equation of the straight line ADE.
- Determine whether the line that passes through BD is perpendicular to the line ADE.
- Determine the length of BC.
- Determine the equation of the tangent to the circle at A.
- Determine value of the angle  $\hat{BCA}$ .
- Determine the  $x$ - and  $y$ -intercepts of the circle.

3. Given the sketch below with the circle centre at  $C(2; 1)$ . The triangle  $ABC$  with points  $A(-2; 3)$  and  $B(-2; -2)$  passes through the circle at points  $E$  and  $F$ . The line  $CG$  is perpendicular to the  $x$ -axis.  $D(5; 0)$  is a point on the circle.



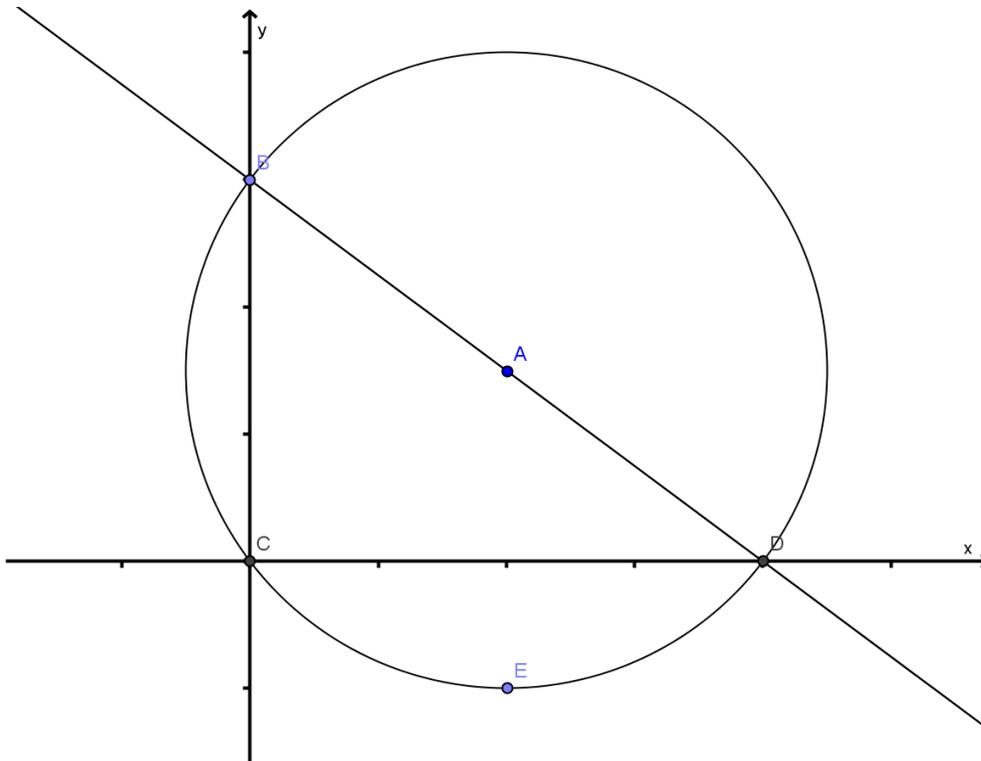
- Determine the equation of the circle.
  - Show that triangle  $ABC$  is an isosceles triangle.
  - Determine the equation of the lines  $AC$  and  $BC$ .
  - Are the lines in question (c) parallel or perpendicular to each other or neither of these? Show all your working out.
  - Show that line  $AB$  is parallel to line  $CG$ .
  - Are the points  $A$ ,  $C$  and  $D$  collinear? Show all your working out.
  - Determine the coordinates  $E$  and  $F$ .
4. Given the coordinates  $A(4; 3)$ ,  $B(7; b)$  and  $C(-1; 0)$  determine the value of  $b$  if:
- Line  $AB$  is perpendicular to line  $AC$ .
  - the points  $A$ ,  $B$  and  $C$  are collinear.

5. In the diagram below, ABCD is a trapezium with  $BA \parallel CD$  and point A on the  $x$ -axis, B at  $(-3; 2)$ , C at  $(3; 4)$  and D at  $(6; -1)$ .



- Determine the coordinates of A.
- Determine the equation of BC.
- Determine the midpoint E, of C and D.
- Is the line AE parallel to BC? Show all your working.
- If the line AE is not parallel to BC, determine the equation of the line that is parallel to BC and passes through point A.
- Determine point F, the point where the equation in question (e) passes through the line CD.
- Determine the angle of inclination of line CD.
- Determine the area of triangle AFD.

6. Given below is the sketch with circle centre A and the equation  $x^2 - 8x + y^2 - 6y = 0$ . B and C are the  $y$ -intercepts with the circle, D is the  $x$ -intercept with the circle. The line AE is perpendicular to the  $x$ -axis.



- Determine the coordinate A.
- Determine the B, C and D.
- Determine the coordinate E.
- Determine the equation of the line BD.
- Determine the equation of the line perpendicular to the line BD and passing through the point E.
- Determine the equation of the tangent to the circle at the point passing through E.
- Is the tangent in question (f) parallel to the line in question (e)?
- Determine whether the line ED is perpendicular to the line BD.
- Determine the angle of inclination of Line BD.