First name: _____ Last name: _____   Student ID: _____

Analytic Geometry (2) Homework

1. For the circle $x^2 + y^2 = 81$, find:

a) The center

b) The radius

c) The x-intercepts

d) The y-intercepts

e) Graph the circle.

2. A triangle has vertices at D(4, 5), E(1, 8), and F(1, 2).
Show that the height from D is also the median from D.

3. Determine the radius of the circle, to the nearest tenth, given its centre (–7, –5) and a point on its circumference (3, 5). Write the equation of the circle.

4. Triangle ABC has vertices A(3, 4), B(-5, 2), and C(1, -4). Determine an equation for
a) The median from A to BC.
b) The altitude from A to BC.
c) The right bisector of AC.

5. Find the centroid, circumcentre, and orthocentre for question 4.

6. A new amusement park is going to be built near two major highways. On a coordinate grid of the area, with the scale 1 unit represents 1 km, the park is located at P(3, 4). Highway 2 is represented by the equation $y = 2x + 5$, and Highway 10 is represented by the equation $y = -0.5x + 2$. Determine the coordinates of the exits that must be built on each highway to result in the shortest road to the park.

7. A committee is choosing a site for a country fair. The site needs to be located the same distance from the two main towns in the country. On a map, these towns have coordinates (3, 10) and (13, 4). Determine an equation for the line that shows all the possible sites for the fair.

8. A truck with a wide load, proceeding slowly along a secondary road, is approaching a tunnel that is shaped like a semicircle. The maximum height of the tunnel is 5.25m. If the load is 8 m wide and 3.5 m high, will it fit through the tunnel? Show your calculations.

9. Determine the type of triangle that is formed by the lines $x + y = 11$, $x - y = 1$, and $x - 3y = 3$. Justify your decision.

10. A university has three student residences, which are located at points A(2, 2), B(10, 6), and C(4, 8) on a grid. The university wants to build a tennis court an equal distance from all three residences. Determine the coordinates of the tennis court.

11. Triangle LMN has vertices at L(3, 4), M(4, -3), and N(-4, -1). Use analytic geometry to determine the area of the triangle.

12. Find the shortest distance between the point P(-1, 3) to the line $x + y - 5 = 0$

13. Use the formula to find the distance from the point (3, - 4) to the line 4x + 3y = 10.