

Name: \_\_\_\_\_

**Exercise 1 ~ 6 pts**

Give the equation of the smallest sphere that contains the points  $(0; 1; 0)$  and  $(12; 13; -6)$ .

- 2) Give the equation of the sphere centred at  $(-2; 0; 0)$  and tangent to  $d: \begin{cases} x = 4 + 3\lambda \\ y = -6\lambda \\ z = 22\lambda \end{cases}$

**Exercise 2 ~ 6 pts**

Consider the spheres  $s_1: (x + 7)^2 + y^2 + z^2 = 9$  and  $s_2: x^2 + (y - 24)^2 + z^2 = 49$ .

Determine the coordinates of a point that is at same distance from both spheres. Indicate that distance.

**Exercise 3 ~ 6 pts**

Give the equations of the planes that are perpendicular to the line  $\begin{cases} x = -\lambda \\ y = 1 + 2\lambda \\ z = 2\lambda \end{cases}$  and

tangent to the sphere  $x^2 + y^2 + z^2 + 16x - 10z + 8 = 0$ .

**Exercise 4 ~ 10 pts**

The point  $A(5; 2; 0)$  belongs to the intersection circle of the plane  $\pi: 3x + y - 5z + k = 0$  and the sphere  $s: (x + 1)^2 + y^2 + (z - 3)^2 = t$ .

- 1) Determine the values of the real numbers  $k$  and  $t$ .
- 2) Determine the radius and the centre of the intersection circle  $c = s \cap \pi$ .
- 3) Determine the equation of the line that contains  $A$  and that is tangent to the intersection circle. Illustrate that situation.