Integral Calculus: Homework (due by January 16 before class)

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0.1 Parallel or orthogonal?

Which of these distinct planes are parallel and which are orthogonal? (**5 points**)

$$\mathcal{Q} : x - \frac{3}{2}y + 3z = 6 \qquad \mathcal{R} : -2x + 3y - 6z = 1 \qquad \mathcal{S} : 3x + 4y + z = 3$$

0.2 Traces and Level Curves

Given the function $4z = x^2 + \dfrac{y^2}{4}$.

Exercise 0.1. Explain briefly what the shapes of $xy-$trace, $yz-$trace and $xz-$trace of the function $z = f(x, y)$ are, such as line, circles and parabolas. Sketch them. (**3 points**)

Exercise 0.2. Explain briefly what the shape of the level curves of the function $z = f(x, y)$ is, such as line, circles and parabolas. Sketch the level curves $f(x, y) = z_0$ with $z_0 = 1$ and $z_0 = 2$ (**2 points**)