# fibre

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Given a function $f\colon X \longrightarrow Y$, a *fibre* is an inverse image of an element of $Y$. That is given $y \in Y$, $f^{-1}(\{y\}) = \{x \in X \mid f(x) = y\}$ is a fibre.

**Example:** Define $f\colon \mathbb{R}^2 \longrightarrow \mathbb{R}$ by $f(x, y) = x^2 + y^2$. Then the fibres of $f$ consist of concentric circles about the origin, the origin itself, and empty sets depending on whether we look at the inverse image of a positive number, zero, or a negative number respectively.

**Example:** Suppose $M$ is a manifold, and $\pi\colon TM \to M$ is the canonical projection from the tangent bundle $TM$ to $M$. Then fibres of $\pi$ are the tangent spaces $T_x(M)$ for $x \in M$.