Answer on Question #70275 – Math – Geometry

Question

What are projections of helix ($a$cost, $a$sint, t) in all three coordinate planes xy-plane, yz-plane, xz-plane

Solution

1) projection of helix ($a$cost, $a$sint, t) in xy-plane is ($a$cost, $a$sint). The curve is x= $a$cost , y= $a$sint. If we take x^2+y^2, then we get $x^2+y^2 = (a\text{cost})^2+ (a\text{sint})^2=a^2((\text{cost})^2+ (\text{sint})^2)=a^2$. This is a circle of radius a: $x^2+y^2=a^2$
2) projection of helix ($a$cost, $a$sint, t) in xz-plane is ($a$cost, t). The curve is x= $a$cost , z= t. So, x= $a$cosz. This is a cosine function: x= $a$cosz
3) projection of helix ($a$cost, $a$sint, t) in yz-plane is ($a$sint, t). The curve is y= $a$sint , z= t. So, y= $a$sinz. This is a sine function: y= $a$sinz.

Answer: $x^2+y^2=a^2$, x= $a$cosz, y= $a$sinz.