Integrate with respect to t: $\int \sec^2 x\ dx = \int \frac{1}{cos^2(x)}dx =$

we can use that $1 = sin^2(x) + cos^2(x)$ and get:

$= \int \frac{sin^2(x)+cos^2(x)}{cos^2(x)}dx = \int \frac{-(-sin(x))*sinx+cos(x)*cos(x)}{cos^2(x)}dx =$

but $(cos(x))' = -sin(x),\ (sin(x))' = cos(x)$ and we get:

$= \int \frac{-(cos(x))'*sin(x)+(sin(x))'*cos(x)}{cos^2(x)}dx = \int (\frac{sinx}{cosx})'dx = \frac{sinx}{cosx} + c = tanx + c$

here we use rule of fraction differentiation $\frac{-(cos(x))'*sin(x)+(sin(x))'*cos(x)}{cos^2(x)} = (\frac{sinx}{cosx})'$

So correct answer D.