Student: Arfaz Hossain	**Course:** Math 101 A04 Spring 2022
Instructor: Muhammad Awais	**Book:** Thomas' Calculus Early Transcendentals, 14e
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Evaluate the integral using any appropriate algebraic method or trigonometric identity.

$$\int \frac{12\,dx}{1 - \cos(3x)}$$

Before integrating, multiply the integrand by $\frac{1 + \cos(3x)}{1 + \cos(3x)}$, a form of 1.

$$\frac{12\,dx}{1 - \cos(3x)} \cdot \frac{1 + \cos(3x)}{1 + \cos(3x)} = \frac{12(1 + \cos(3x))dx}{1 - \cos^2(3x)} = \frac{12(1 + \cos(3x))dx}{\sin^2(3x)}$$

Separate the fractions of the integrand.

$$\frac{12(1 + \cos(3x))dx}{\sin^2(3x)} = \frac{12\,dx}{\sin^2(3x)} + \frac{12\cos(3x)dx}{\sin^2(3x)}$$

Now transform the integrand into basic integration formulas.

$$\frac{12\,dx}{\sin^2(3x)} = 12\csc^2(3x)dx.$$