

if f is continuous function and if $F'(x) = f(x)$ for all real numbers x , then the anti-derivative from 1 to 3 $f(2x) = ?$

the anti-derivative from 1 to 3 $f(2x)$ equals:

$$\int_1^3 f(2x) dx$$

Let $2x = z$. Then $dx = \frac{dz}{2}$ and $3 \rightarrow 6, 1 \rightarrow 2$:

$$\int_1^3 f(2x) dx = \int_2^6 \frac{f(z) dz}{2}$$

$F'(x) = f(x)$ therefore $F'(z) = f(z)$

$$\frac{1}{2} \int_2^6 F'(z) dz = \frac{1}{2} (F(6) - F(2))$$

Answer: $\frac{1}{2} (F(6) - F(2))$