

$$9. \int_{x=1}^{x=\infty} \int_{y=0}^{y=\frac{2}{x}} (5y^4) dy dx$$

$$= 5 \int_{x=1}^{x=\infty} \left[\frac{1}{5} y^5 \right]_{y=0}^{y=\frac{2}{x}} dx$$

$$= 5 \cdot \frac{1}{5} \int_{x=1}^{x=\infty} \left[\left(\frac{2}{x}\right)^5 - (0)^5 \right] dx$$

$$= \int_{x=1}^{x=\infty} \frac{32}{x^5} dx$$

$$= 32 \int_{x=1}^{x=\infty} \frac{1}{x^5} dx$$

$$= 32 \int_{x=1}^{x=\infty} x^{-5} dx$$

$$= 32 \left[\frac{x^{-4}}{-4} \right]_{x=1}^{x=\infty}$$

$$= 32 \cdot \frac{1}{-4} \left[\frac{1}{x^4} \right]_{x=1}^{x=\infty}$$

$$= -8 \lim_{b \rightarrow \infty} \left[\frac{1}{x^4} \right]_{x=1}^{x=b}$$

$$= -8 \lim_{b \rightarrow \infty} \left[\frac{1}{b^4} - \frac{1}{1^4} \right]$$

$$= -8 \lim_{b \rightarrow \infty} \left[\frac{1}{b^4} - 1 \right]$$

$$= -8 \left[\frac{1}{\infty^4} - 1 \right]$$

$$= -8 [0 - 1]$$

$$= \textcircled{8}$$