if 2^x=3^y=12^z then x+2y/xy = ? without using log

First:

$$2^x = 3^y = 12^z$$
$$3^y = 12^z$$
$$3^y = 2^{2z} \cdot 3^z$$
$$2^{2z} = \frac{3^y}{3^z}$$
$$2^{2z} = 3^{y-z} \quad (1)$$

Second:

$$2^x = 3^y \quad | \, multiply\ by\ 2z$$
$$2^{2xz} = 3^{2yz}$$

Use equation (1):

$$3^{(y-z)x} = 3^{2yz}$$
$$(y-z)x = 2yz$$
$$x = \frac{2yz}{y-z} \quad (2)$$

Third:

$$\frac{x+2y}{xy} = \frac{1}{y} + \frac{2}{x}$$

Use equation (2):

$$\frac{x+2y}{xy} = \frac{1}{y} + \frac{2}{\frac{2yz}{y-z}}$$
$$\frac{x+2y}{xy} = \frac{1}{y} + \frac{y-z}{yz}$$

Reduce right side to a common denominator:

$$\frac{x+2y}{xy} = \frac{z}{yz} + \frac{y-z}{yz}$$
$$\frac{x+2y}{xy} = \frac{z+y-z}{yz}$$
$$\frac{x+2y}{xy} = \frac{y}{yz}$$
$$\frac{x+2y}{xy} = \frac{1}{z}$$