

Solutions

Combine:

1. $\log_7 x + \log_7 y + \log_7 z^3$

$$= \log_7 (xyz^3)$$

2. $\log_6 4 + \log_6 9 = \log_6 (4 \cdot 9) = \log_6 (36) = 2$

3. ~~$\log_8 x + \log_4 2y$~~ -

4. $\log_6 144 - \log_6 4 = \log_6 \left(\frac{144}{4} \right) = \log_6 36 = 2$

5. $\log_8 x^5 - \log_8 2x^3 = \log_8 \left(\frac{x^5}{2x^3} \right) = \log_8 (x^2)$

Simplify :

$$6. \log_8 8^{3x+1} = 3x+1$$

$$7. 2^{\log_2 27} = 27$$

Solve :

$$8. 3^{4x} = 27$$

$$3^{4x} = 3^3$$

$$4x = 3 \Rightarrow x = \frac{3}{4}$$

$$9. 8^x = 2 \Rightarrow \left(\frac{3}{2}\right)^x = 2$$

$$2^{3x} = 2^1$$

$$3x = 1$$

$$x = \frac{1}{3}$$

$$10. 5^{x-2} = 125$$

$$5^{x-2} = 5^3$$

$$x-2=3 \Rightarrow \boxed{x=5}$$

$$11. \log_3(x-5) = 2$$

$$3^2 = x-5$$

$$9 = x-5$$

$$x = 14$$

$$12. \log 45x - \log 3 = 1$$

$$\log \frac{45x}{3} = 1$$

$$\log 15x = 1$$

$$10^1 = 15x$$

$$x = \frac{10}{15} = \frac{2}{3} \quad]$$

$$13. \log_4 x^2 = 2$$

$$4^2 = x^2$$

$$16 = x^2 \Rightarrow x = \pm 4$$