Express in logarithmic form.

1. 42 = 16 2. 8-3 = $\frac{1}{512}$ 3. $27^{\frac{1}{3}}=3$ 4. ($\frac{1}{3})^{4}=\frac{1}{81}$

Solve for the unknown.

5. log61296 = p 6. log4 $\sqrt{e }$ = $\frac{1}{2}$ 7. log9$(\frac{1}{81})$ = i 8. log9x = -2

Determine the value of each of the following.

9. log264 10. log162 11. log1/464 12. log16$\sqrt{2}$

Express each of the following as a single logarithm.

13. log 8 - log 2 14. log 2 + log 5 15. log4 + 2log4 16. log12 -$ \frac{2}{3} $log343

Solve.

17. The local government projects that the town will grow at a constant rate of four percent per year. At this rate, how many years will it take the town's population to double?