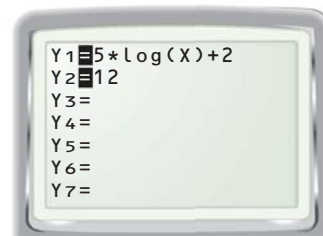


METHOD 2

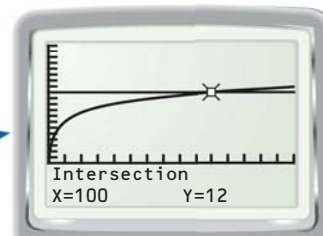
Using a Graph You can also use a graph to solve the equation $5 \log D + 2 = 12$.

STEP 1 Enter the functions $y = 5 \log x + 2$ and $y = 12$ into a graphing calculator.



STEP 2 Graph the functions. Use the *intersect* feature to find the intersection point of the graphs. The graphs intersect at (100, 12).

Use a viewing window of $0 \leq x \leq 150$ and $0 \leq y \leq 20$.



► To reveal stars with a magnitude of 12, a telescope must have an objective lens with a diameter of 100 millimeters.

PRACTICE

EXPONENTIAL EQUATIONS Solve the equation using a table and using a graph.

- $8 - 2e^{3x} = -14$
- $7 - 10^{5-x} = -9$
- $e^{5x-8} + 3 = 15$
- $1.6(3)^{-4x} + 5.6 = 6$

LOGARITHMIC EQUATIONS Solve the equation using a table and using a graph.

- $\log_2 5x = 2$
- $\log(-3x + 7) = 1$
- $4 \ln x + 6 = 12$
- $11 \log(x + 9) - 5 = 8$

9. **ECONOMICS** From 1998 to 2003, the United States gross national product y (in billions of dollars) can be modeled by $y = 8882(1.04)^x$ where x is the number of years since 1998. Use a table and a graph to find the year when the gross national product was \$10 trillion.

10. **WRITING** In Method 1 of Problem 1 on page 523, explain how you could use a table to find the solution of $4^x = 11$ more precisely.

11. **WHAT IF?** In Problem 2 on page 524, suppose the telescope can reveal stars of magnitude 14. Find the diameter of the telescope's objective lens using a table and using a graph.

12. **FINANCE** You deposit \$5000 in an account that pays 3% annual interest compounded quarterly. How long will it take for the balance to reach \$6000? Solve the problem using a table and using a graph.

13. **OCEANOGRAPHY** The density d (in grams per cubic centimeter) of seawater with a salinity of 30 parts per thousand is related to the water temperature T (in degrees Celsius) by the following equation:

$$d = 1.0245 - e^{0.1226T - 7.828}$$

For deep water in the South Atlantic Ocean off Antarctica, $d = 1.0241 \text{ g/cm}^3$. Use a table and a graph to find the water's temperature.