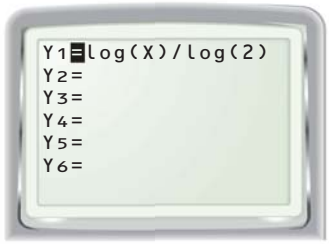
EXAMPLE 2 Solve a logarithmic inequality

Solve $\log_2 x \leq 2$.

Solution

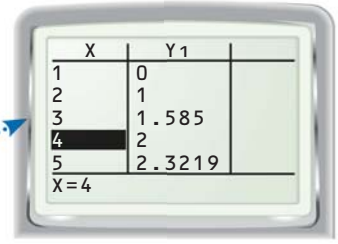
METHOD 1 Use a table

STEP 1 **Enter** the function $y = \log_2 x$ into a graphing calculator as $y = \dfrac{\log x}{\log 2}$.



STEP 2 **Use** the *table* feature to create a table of values. Identify the x-values for which $y \leq 2$. These x-values are given by $0 < x \leq 4$.

Make sure that the x-values are reasonable and in the domain of the function ($x > 0$).

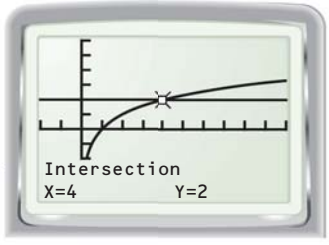


▶ The solution is $0 < x \leq 4$.

METHOD 2 Use a graph

Graph $y = \log_2 x$ and $y = 2$ in the same viewing window. Using the *intersect* feature, you can determine that the graphs intersect when $x = 4$.

The graph of $y = \log_2 x$ is on or below the graph of $y = 2$ when $0 < x \leq 4$.



▶ The solution is $0 < x \leq 4$.

PRACTICE

EXAMPLE 1 on p. 526 for Exs. 1–6

Solve the exponential inequality using a table and using a graph.

1. $3^x \leq 20$
2. $28\left(\frac{2}{3}\right)^x > 9$
3. $244(0.35)^x \geq 50$
4. $-63(0.96)^x < -27$
5. $95(1.6)^x \leq 1620$
6. $-284\left(\frac{9}{7}\right)^x > -135$

EXAMPLE 2 on p. 527 for Exs. 7–12

Solve the logarithmic inequality using a table and using a graph.

7. $\log_3 x \geq 3$
8. $\log_5 x < 2$
9. $\log_6 x + 9 \leq 11$
10. $2 \log_4 x - 1 > 4$
11. $-4 \log_2 x > -20$
12. $0 \leq \log_7 x \leq 1$

13. **FINANCE** You deposit \$1000 in an account that pays 3.5% annual interest compounded monthly. When is your balance at least \$1200?

14. **RATES OF RETURN** An investment that earns a rate of return r doubles in value in t years, where $t = \dfrac{\ln 2}{\ln (1 + r)}$ and r is expressed as a decimal. What rates of return will double the value of an investment in less than 10 years?