

Solve each equation.

1. $3^x = 29$

$\log_3 29 = x$

$3.065 = x$

2. $\log_{100} x = \frac{5}{2}$

$100^{5/2} = x$

$(10^2)^{5/2} = x$

$10^5 = x$

$100,000 = x$

3. $\log_x \frac{1}{6} = \frac{1}{2}$

$(x^{1/2})^2 = (1/6)^2$

$x = 1/36$

4. $2\log_{81} \frac{1}{27} = x$

$-1.5 = x$

5. $5e^{2x} + 10 = 50$

$5e^{2x} = 40$

$e^{2x} = 8$

$\ln 8 = 2x$

$1.04 = x$

6. $9^{4x+2} = 27^x$

$(3^2)^{4x+2} = 3^{3x}$

$3^{8x+4} = 3^{3x}$

$8x+4 = 3x$

$4 = -5x$

$-4/5 = x$

7. $18^{2x} - 3 = 1448$

$18^{2x} = 1451$

$\log_{18} 1451 = 2x$

$1.259 = x$

8. $\ln(2x+1) + 2 = 5$

$\ln(2x+1) = 3$

$e^3 = 2x+1$

$x = 9.543$

9. $2\log_5(4x) = 4$

$\log_5 4x = 2$

$5^2 = 4x$

$25 = 4x$

$x = \frac{25}{4}$

10. $9^{4x+2} = 27^x$

$3^{2(4x+2)} = 3^{3x}$

$3^{8x+4} = 3^{3x}$

$8x+4 = 3x$

$4 = -5x$

$-4/5 = x$

Simplify.

11. $4\log_8 \frac{1}{32} + 4\log_4 64$

$4(-\frac{5}{3}) + 4(3)$

$-\frac{20}{3} + 12$

$\frac{16}{3}$

$8^x = \frac{1}{32}$

$8^x = 2^{-5}$

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

$3x = -5$

$x = -5/3$

12. $(\log_2 16)(\log_3 27)(\log_4 32)$

$4 \cdot 3 \cdot \frac{5}{2}$

30

$4^x = 32$

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

$2x = 5$

$x = \frac{5}{2}$

$$13. 2\log_2 \frac{1}{8} + \frac{1}{3}\log_4 32$$

$$2(-3) + \frac{1}{3}\left(\frac{5}{2}\right)$$

$$-6 + \frac{5}{6}$$

$$\boxed{\frac{-31}{6}}$$

$$4^x = 32$$

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

$$2x = 5$$

$$x = \frac{5}{2}$$

$$14. \log_4 16 + \log_4 8 - \log_4 2$$

$$2 + \frac{3}{2} - \frac{1}{2}$$

$$\boxed{3}$$

$$4^x = 8$$

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

$$2x = 3$$

$$15. \sqrt{8} \cdot \sqrt[3]{4}$$

$$8^{1/2} \cdot 4^{1/3}$$

$$2^{3/2} \cdot 2^{2/3}$$

$$2^{9/6} \cdot 2^{4/6}$$

$$\boxed{2^{13/6}}$$

$$16. \left(\frac{x^5}{y^6}\right)^7 \left(\frac{y^8}{x^9}\right)^{10}$$

$$\frac{x^{35}}{y^{42}} \cdot \frac{y^{80}}{x^{90}}$$

$$\boxed{\frac{y^{38}}{x^{55}}}$$

$$17. \left(\frac{u}{v^{-1}}\right)^0 \left(\frac{u^{-1}}{v^2}\right)^2 (uv^2)^{-1}$$

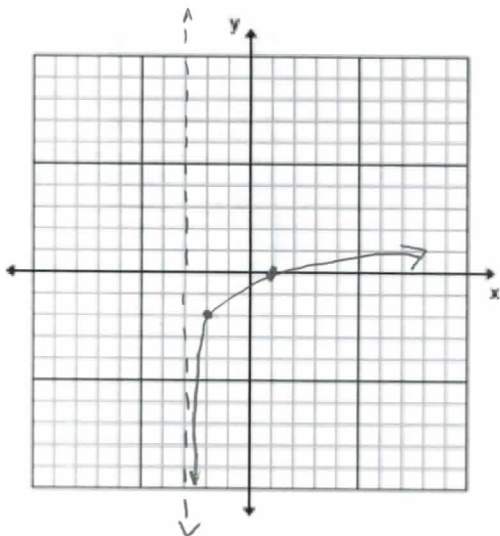
$$\frac{u^{-2}}{v^4} \cdot \frac{1}{uv^2}$$

$$\boxed{\frac{1}{u^3 v^6}}$$

Sketch the graph and state the domain, range, and any transformations of the function.

18.

$$f(x) = \log_2(x+3) - 2$$



Domain: $(-3, \infty)$

Range: $(-\infty, \infty)$

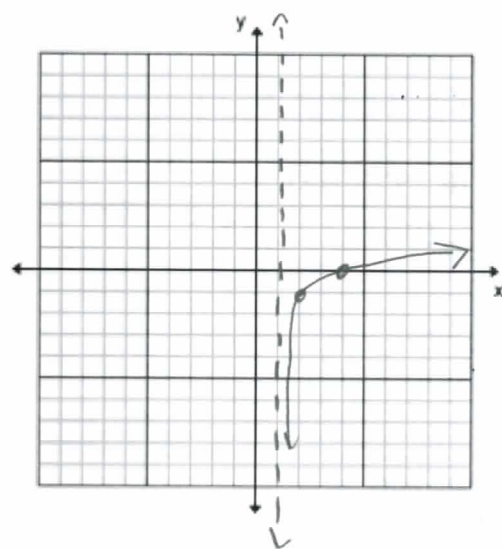
Asymptote: $x = -3$

Critical Point: $(-2, -2)$

left 3, down 2

19.

$$f(x) = \log_3(x-1) - 1$$



Domain: $(1, \infty)$

Range: $(-\infty, \infty)$

Asymptote: $x = 1$

Critical Point: $(2, -1)$

right 1, down 1