

$$\begin{aligned}
 & \textcircled{1} \quad \log_2 16 \\
 & \quad \quad \quad 4 \\
 & \quad \quad \quad \rightarrow \log_2 2^4 \\
 & \quad \quad \quad 4(\log_2 2) \\
 & \quad \quad \quad 4(1) \\
 & \quad \quad \quad 4
 \end{aligned}$$

$$\begin{aligned}
 & \ln \sqrt{e} \\
 & \ln e^{1/2} \\
 & \frac{1}{2}(\ln e) \\
 & \quad \quad \frac{1}{2}
 \end{aligned}$$

$$\log_a a = 1$$

$$\begin{aligned}
 \ln e &= 1 \\
 \ln 1 &= 0
 \end{aligned}$$

$$\log_8 1 = 0$$

Expand

$$\begin{aligned}\log \frac{\sqrt{x+1}}{x-1} &= \log \sqrt{x+1} - \log(x-1) \\ &= \frac{1}{2} \log(x+1) - \log(x-1)\end{aligned}$$

Condense

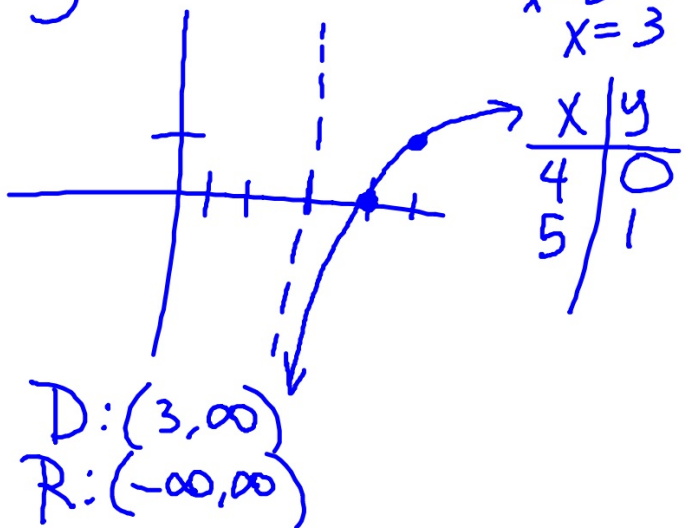
$$\ln 6 + \ln x - \ln y - 2\ln z$$

$$\ln 6 + \ln x - \ln y - \ln z^2$$

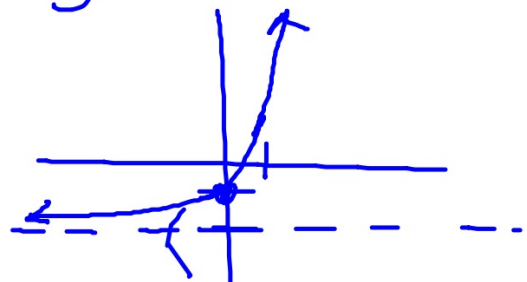
$$\ln \frac{6x}{yz^2}$$

D + R

$$y = \log_2(x-3)$$



$$y = e^x - 2$$



D: $(-\infty, \infty)$
R: $(-2, \infty)$

Rewrite in exponential form.

$$\log_2 32 = 5$$
$$32 = 2^5$$

$$\log 2^x = \log 10$$

$$x \log 2 = \log 10$$

$$x = \frac{\log 10}{\log 2} \neq \log 5$$

$$x = \log_2 10$$

$$\begin{aligned} 13.) \log_4 9 &= 1.6 \\ \log_4 11 &= 1.7 \\ \log_4 6 &= 1.3 \end{aligned}$$

$$\log_4 6^2 = 2 \log_4 6 \\ 2(1.3)$$

$$\begin{aligned} \text{find } \log_4 36 &= \log_4 (6 \cdot 6) = \log_4 6 + \log_4 6 \\ &= 1.3 + 1.3 \\ &= 2.6 \end{aligned}$$

$$\begin{aligned} \log_4 36 &= \log_4 (9 \cdot 4) = \log_4 9 + \log_4 4 \\ &= 1.6 + 1 = 2.6 \end{aligned}$$

Solve

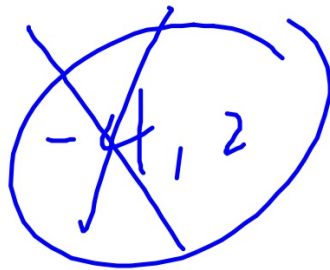
$$\log_2 x + \log_2(x+2) = 3$$

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

$$x^2 + 2x = 8$$

$$x^2 + 2x - 8 = 0$$

$$(x+4)(x-2) = 0$$



$$\log_9 3$$

$$\log_{3^2} 3$$

$$(3^2)^x = 3^1$$

$$x = \frac{1}{2}$$

$$3 + 4 \cdot e^x = 9$$

$$4e^x = 6$$

$$\ln e^x = \ln \frac{3}{2}$$

$$x \cdot \ln e = \ln \frac{3}{2}$$

$$x = \ln \frac{3}{2}$$

$$\ln \sqrt{x-1} = 4$$

$$\frac{1}{2} \ln(x-1) = 4$$

$$\ln(x-1) = 8$$

$$x-1 = e^8$$

$$x = e^8 + 1$$