

Practice Problems on Section 1.6

1. Sketch the graph of $f(x)$ using transformations:

a) $f(x) = -2 \ln x + 3$

b) $f(x) = -2 \ln(x + 3)$

c) $f(x) = \log_2(5x)$

d) $f(x) = \log_{1/2}(5x)$

2. Simplify:

a) $2^{3 \log_4 x}$

b) $8^{-5/3}$

c) $\frac{\log_2 x + \log_3 x}{\log_2 5 + \log_3 5}$

d) $\log_9 \frac{1}{2} - \log_9 \frac{1}{3} - \log_9 \frac{1}{6}$

e) $\log_2 5 \cdot \log_5 8$

3. Find the domain of $f(x)$.

a) $f(x) = \ln(x^2 - x)$

b) $f(x) = e^{-\sqrt{x}}$

c) $f(x) = \sqrt{\ln x - 1}$

d) $f(x) = x^3 \cdot e^{\ln x}$

e) $f(x) = \frac{x}{e^x - 1}$

4. Find the inverse $f^{-1}(x)$ of the function $f(x)$, where $f(x)$ is given by:

a) $f(x) = \sqrt[5]{x+2}$

b) $f(x) = \frac{2x+1}{5-x}$

c) $f(x) = 2^{3-x}$

d) $f(x) = x^2 - 3x, x \leq -1$

e) $f(x) = 2^{\sqrt[3]{x-1}}$

5. Find $f^{-1}(a)$, if

a) $f(x) = \sqrt[3]{x^7 + 7x}, a = 2$

b) $f(x) = \frac{6x^5}{x^2 + 1}, a = -3$

c) $f(x) = x + \ln x, a = e^2 + 2$

d) $f(x) = e^x + \cos x, x \geq -\pi, a = 2$

6. Solve the equations:

a) $\log_2(2x-5) = 3$

b) $2^{(x^2)} = 4^x$

c) $\log_2 x + \log_2(x-7) = 3$

d) $\log_2(x^2) = \log_4 x$

e) $e^{2x} - 2e^x = 3$