1 Solve the equation

$$2^{-x} = 16.$$

(Show at least one intermediate step.)

I want to make 16 an exponential expression with base 2; since $16 = 2 \cdot 2 \cdot 2 \cdot 2$, I can do this:

$$2^{-x} = 16;$$

$$2^{-x} = 2^4$$
;

$$-x = 4$$
;

$$x = -4$$
.

2 Evaluate $\log_{1/2} 16$. (Show at least one intermediate step not using a calculator.)

This logarithm is the unique solution x to the equation $(1/2)^x = 16$. Like Problem 1, I solve this by getting everything with base 2:

$$\left(\frac{1}{2}\right)^x = 16;$$

$$\frac{1}{2^x} = 2^4;$$

$$2^{-x} = 2^4$$
;

$$-x = 4$$
;

$$x = -4$$
.

Therefore,

$$\log_{1/2} 16 = 4.$$

3 Find the domain of the function f given by

$$f(x) = \ln(x+4).$$

(Show at least one intermediate step.)

I can only take the logarithm of a positive number:

$$x+4>0;$$

$$x > -4$$
.

Therefore,

$$\operatorname{dom} f = \{x \mid x > -4\}.$$