Problem 1. Section 1.5 #234

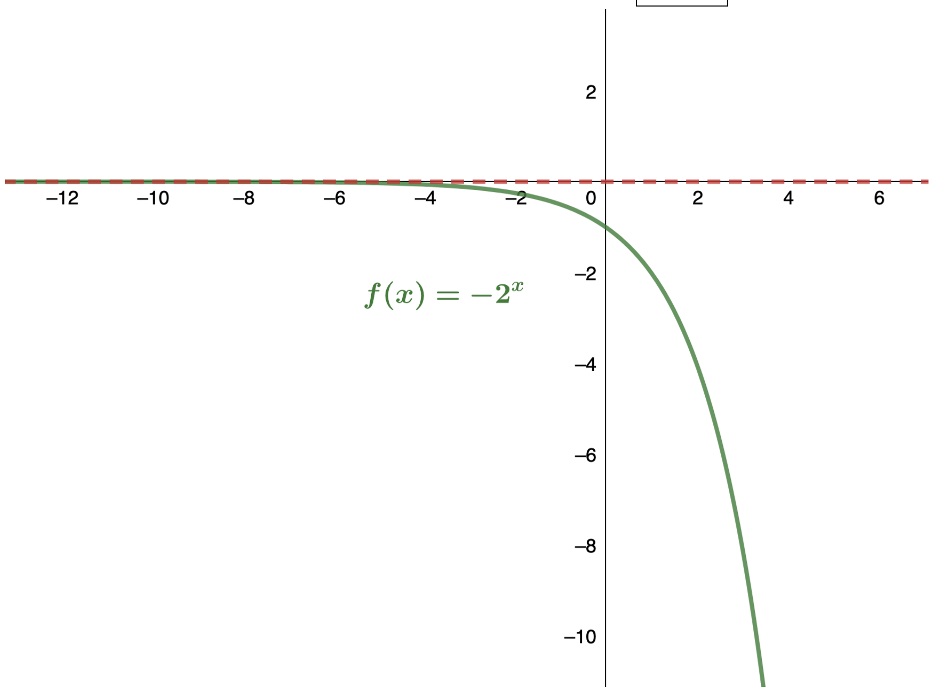
For the following exercises, match the exponential equation to the correct graph.

The given function is $\boxed{\text{f: } y = 1 - 5^x}$.

Problem 2. Section 1.5 #240

For the following exercises, sketch the graph of the exponential function. Determine the domain, range, and horizontal asymptote.

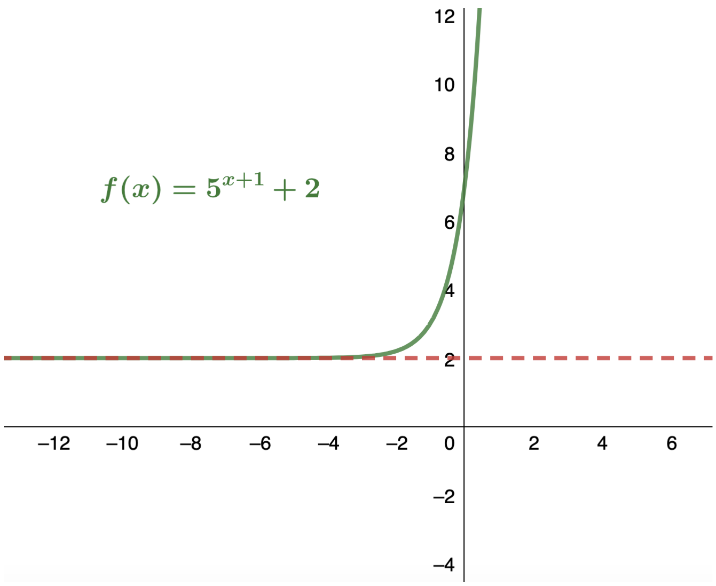
We know that $f(x) = -2^x$. The asymptote is $\boxed{y = 0}$.



Problem 3. Section 1.5 #244

For the following exercises, sketch the graph of the exponential function. Determine the domain, range, and horizontal asymptote.

We know that $f(x) = 5^{x+1} + 2$. The asymptote is $\boxed{y = 2}$.



Problem 4. Section 1.5 #252

For the following exercises, write the equation in equivalent exponential form.

Here we have $\log_9(3) = 0.5$.

Therefore, $\boxed{9^{0.5} = 3}$.

Problem 5. Section 1.5 #262

For the following exercises, write the equation in equivalent logarithmic form.

Here we have $b^3 = 45$.

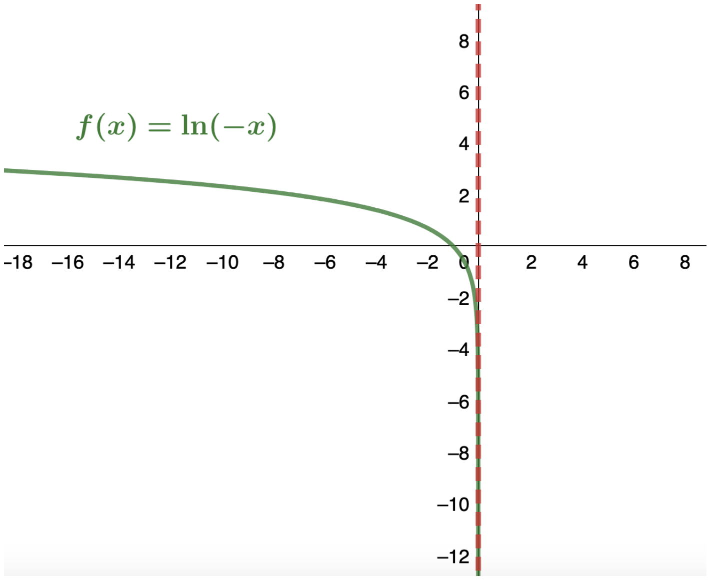
Therefore, $\boxed{\log_b(45) = 3}$.

Problem 6. Section 1.5 #266

For the following exercises, sketch the graph of the logarithmic function. Determine the domain, range, and vertical asymptote.

Given that $f(x) = \ln(-x)$, the domain is $\boxed{(-\infty, 0)}$ and the range is $\boxed{(-\infty, +\infty)}$.

Moreover, the vertical asymtote is $\boxed{x = 0}$.



Problem 7. Section 1.5 #274

For the following exercises, use properties of logarithms to write the expressions as a sum, difference, and/or product of logarithms.

The original expression is $\log_4(\frac{\sqrt[3]{xy}}{64})(*)$.
Hence we get

$$\begin{aligned}(*) &= \log_4(\sqrt[3]{xy}) - \log_4(64) && (1)\\ &= \frac{1}{3}\log_4(xy) - 3 && (2)\\ &= \frac{1}{3}\log_4(x) + \frac{1}{3}\log_4(y) - 3 && (3)\end{aligned}$$

The answer is $\boxed{\frac{1}{3}\log_4(x) + \frac{1}{3}\log_4(y) - 3}$.

Problem 8. Section 1.5 #282

For the following exercises, solve the exponential equation exactly.

We have $4 \cdot 2^{3x} - 20 = 0$.

Therefore, $2^{3x} = 5$ and $3x = \log_2(5)$.

The solution is $\boxed{x = \frac{\log_2(5)}{3}}$.

Problem 9. Section 1.5 #290

For the following exercises, solve the logarithmic equation exactly, if possible.

We have $\log_4(x+2) - log_4(x-1) = 0$.

That is, $\log_4(\frac{x+2}{x-1}) = 0$ and hence
$\frac{x+2}{x-1} = 1$.

There is $\boxed{\text{no solution}}$ to the equation.

Problem 10. Section 1.5 #296

For the following exercises, use the change-of-base formula and either base 10 *or base* e *to evaluate the given expressions. Answer in exact form only.*

The original expression is $\log_2(\pi)$.

Using base 10, we have $\boxed{\frac{\log(\pi)}{\log(2)}}$.

Using base e, we have $\boxed{\frac{\ln(\pi)}{\ln(2)}}$.

Problem 11. Section 1.5 #302

An investment is compounded monthly, quarterly, or yearly and is given by the function $A = P(1+\frac{j}{n})^{nt}$, *where* A *is the value of the investment at time* t,P *is the initial principle that was invested,* j *is the annual interest rate, and* n *is the number of time the interest is compounded per year. Given a yearly interest rate of* 3.5% *and an initial principle of* \$100,000, *find the amount* A *accumulated in* 5 *years for interest that is compounded a. daily, b., monthly, c. quarterly, and d. yearly.*

a. $A = 10^5(1+\frac{35}{1000\cdot 365})^{365\cdot 5}$. That is, the value of the investment is $\boxed{10^5(1+\frac{7}{73000})^{1825}}$.

b. $A = 10^5(1+\frac{35}{1000\cdot 12})^{12\cdot 5}$. That is, the value of the investment is $\boxed{10^5(1+\frac{7}{2400})^{60}}$.

c. $A = 10^5(1+\frac{35}{1000\cdot 4})^{4\cdot 5}$. That is, the value of the investment is $\boxed{10^5(1+\frac{7}{800})^{20}}$.

d. $A = 10^5(1+\frac{35}{1000\cdot 1})^{1\cdot 5}$. That is, the value of the investment is $\boxed{10^5(1+\frac{7}{200})^{5}}$.