3.3 Answer Key

Practice 3.3-1-1:

Identifying Exponential Functions: Identify the base of the exponential function. And find its value. Round to the nearest hundredth.

a. $f(x) = -4^3$
b. $f(x) = 4^3$
c. $f(x) = (-4)^3$
d. $f(x) = -4e^3$

Answer:

a. $f(x) = -4^3$ the base is 4.

$$f(x) = -\cdot 4 \cdot 4 \cdot 4 = -64$$

b. $f(x) = 4^3$ the base is 4.

$$f(x) = 4 \cdot 4 \cdot 4 = 64$$

c. $f(x) = (-4)^3$ the base is – 4.

$$f(x) = -4 \cdot -4 \cdot -4 = -64$$

d. $f(x) = -4e^3$ the base is e.

$$f(x) = -4 \cdot e \cdot e \cdot e = -80.34214769 \ldots \approx -80.34$$

Practice 3.3-2-1:

Graph the function.

$$f(x) = (\frac{1}{2})^x$$

a) Complete the table

x	f(x)	(x, y)
-1	$\left(\frac{1}{2}\right)^{-1} = 2$	(-1,2)
0	$\left(\frac{1}{2}\right)^{0} = 1$	(0,1)
1	$\left(\frac{1}{2}\right)^{1} = 0.5$	(1,0.5)

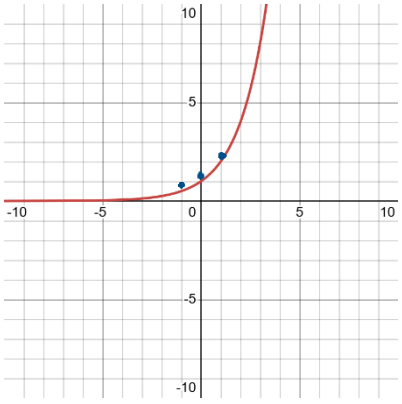
b) Can we use x=-2?
Yes

c) Can we use other x values?

Yes

d) Any x value that we cannot use? Why.
X can be any number, since no restrictions apply. Since X is neither in the denominator nor under an even root, there are no domain restrictions

e) Select the correct graph.



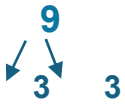
Practice 3.3-3-1:

Solve Elementary Exponential Equations.

$$9^{x+3} = \frac{1}{3}$$

Non-Prime Number Base — fraction and prime denominator

Step 1: To have $a^u = a^v$ We can reduce bases 9 to prime numbers and flip the fraction.



Based on the rule

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{n}$$

$$\frac{1}{3} = \left(\frac{1}{3}\right)^{1} = \left(\frac{3}{1}\right)^{-1} = 3^{-1}$$

Thus:

$$(3^2)^{x+3} = (3)^{-1}$$

Simplify the equation by using rule

$$(b^m)^n = b^{m \cdot n}$$

$$3^{(2)(x+3)} = (3)^{-1}$$

$$3^{2x+6} = 3^{-1}$$

Step 2: Since left and right bases are the same, we just need to compare the power.

$$2x+6=-1$$

Step 3: Solve for the variable.

$$2x= -1-6$$

$$2x=-7$$

$$x=\frac{-7}{2}$$