Review Exercise Set 6

Exercise 1: Evaluate the exponential function at the given value.

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

a) \( x = -2 \)  \hspace{1cm} b) \( x = \frac{1}{2} \)

Exercise 2: Use transformation techniques to match the function with its graph.

\[ f(x) = -2^{-x+3} + 3 \]
Exercise 3: Use transformation techniques to shift the horizontal asymptote and y-intercept of the base function.

\[ f(x) = 4^{x+1} - 1 \]

Exercise 4: Use transformation techniques to shift the horizontal asymptote and y-intercept of the base function.

\[ f(x) = 3 - 3^{x^2} \]
Exercise 5: If $5,000 was deposited into an account paying 4% interest compounded quarterly, how much will be in the account in 6 years?
Review Exercise Set 6 Answer Key

Exercise 1: Evaluate the exponential function at the given value.

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

a) \( x = -2 \)
\[ f(-2) = -3^{2(-2)-1} = -3^{-4-1} = -3^{-5} = -\frac{1}{3^5} = -\frac{1}{243} \]

b) \( x = \frac{1}{2} \)
\[ f\left(\frac{1}{2}\right) = -3^{2\left(\frac{1}{2}\right)-1} = -3^{1-1} = -3^0 = -1 \]

Exercise 2: Use transformation techniques to match the function with its graph.

\[ f(x) = -2^{1-2x} + 3 \]
Exercise 2 (Continued):

\[ f(x) = -2^{1-2x} + 3 \] is graph c.

\[
f(x) = -2^{1-2x} + 3 \\
= -2^{2x+1} + 3 \\
= -2^{-2(x+\frac{1}{2})} + 3 \\
= -\left[ 2^{-2(x+\frac{1}{2})} - 3 \right]
\]

Transformations of f(x)

\[ f(x) = 2^x \]
\[ f(x) = 2^{x-1/2} \]
shift to the right 1/2 unit

\[ f(x) = 2^{x-1/2} \]
\[ f(x) = 2^{-3(x-1/2)} \]
reflect horizontally about \( x = 1/2 \)
Exercise 2 (Continued):

\[ f(x) = 2^{-(x-\frac{1}{2})} \]
\[ f(x) = 2^{-2(x-\frac{1}{2})} \]

stretch vertically by factor of 2

\[ f(x) = 2^{-(x-\frac{1}{2})} - 3 \]

shift down 3 units

\[ f(x) = -[2^{-2(x-\frac{1}{2})} - 3] \]

reflect vertically about x-axis
Exercise 3: Use transformation techniques to shift the horizontal asymptote and y-intercept of the base function.

\[ f(x) = 4^{x+1} - 1 \]
Exercise 4: Use transformation techniques to shift the horizontal asymptote and y-intercept of the base function.

\[ f(x) = 3 - 3^{x^2} \]
\[ f(x) = -3^{x^2} + 3 \]
\[ f(x) = -[3^{x^2} - 3] \]
Exercise 5: If $5,000 was deposited into an account paying 4% interest compounded quarterly, how much will be in the account in 6 years?

Identify given information

- $P = 5,000$
- $r = 4\% = 0.04$
- $n = 4$ (quarterly)
- $t = 6$

Substitute known values into the compound interest formula and solve for the unknown value.

$$A = P \times (1 + \frac{r}{n})^{nt}$$
$$A = 5000 \times (1 + 0.04/4)^{4(6)}$$
$$A = 5000 \times (1 + 0.01)^{24}$$
$$A = 5000(1.01)^{24}$$
$$A = 6348.67324$$

In 6 years there would be $6,348.67 in the account.