1 Problems

Exercise 1. There are initially 2 penguins in a colony. Four hours later there are 4 penguins. How many will there be in 8 hours?

Exercise 2. Solve $3^{x+3} = 9^{x-1}$ for x.

Exercise 3. Solve $2^{x+1} = 8^{x+3}$ for x.

Exercise 4. If $f(x) = 2^x$, find $f^{-1}(x)$.

Exercise 5. If $f(x) = 2^{x+1}$, find $f^{-1}(x)$.

2 Answer key

Exercise 1. 8

Exercise 2. $x = 5$.

Exercise 3. $x = -4$.

Exercise 4. $f^{-1}(x) = log_2(x)$.

Exercise 5. $f^{-1}(x) = log_2(x) - 1$.

3 Solutions

Exercise 1. We have $4 = 2b^4$ where b is our exponential base. Then $b = 2^{\frac{1}{4}}$. To solve our question we consider $y = 2*2^{\frac{x}{4}}$ and plug in $x = 8$. This gives us $y = 2*2^2 = 2*4 = 8$.

Exercise 2. Notice that the right hand side is $3^{2(x-1)}$ since $3^2 = 9$. Then it suffices to solve $x + 3 = 2x - 2$.

Exercise 3. We have $2^3 = 8$ so it suffices to solve $x + 1 = 3(x + 3)$.

Exercise 4. Logs and exponents are inverses.

Exercise 5. Solve as if you are solving for inverses and take logarithm as in exercise 4.