1 Problems

Exercise 1. Let $f(x) = 5log_2(x+3)$. What is $f^{-1}(x)$?

Exercise 2. Solve $e^{2x} - e^x - 42$.

Exercise 3. What are the horizontal and vertical asymptotes of $\frac{x^2+1}{x-3}$?

Exercise 4. Solve $2^{x+2} = 4^{x+3}$ for x.

Exercise 5. Compute $cos(tan^{-1}(4/3))$.

2 Answer key

Exercise 1. $f^{-1}(x) = 2^{\frac{x}{5}} - 3$.

Exercise 2. $x = ln7$

Exercise 3. Horizontal asymptote: none, vertical asymptote: 3.

Exercise 4. $x = -4$

Exercise 5. $\frac{3}{5}$

3 Solutions

Exercise 1. Proceed as in finding any inverse function.

Exercise 2. Let $u = e^x$ then the equation is $u^2 - u - 42$ which factors into $(u+6)(u-7) = 0$. So $x = ln7$ since there are no solutions to $e^x = -6$.

Exercise 3. The highest degree term is x^2 in the numerator which is greater than x in the denominator so there is no horizontal asymptote. Vertical asymptote is $x = 3$ since the denominator is 0 when $x = 3$.

Exercise 4. The right hand side can be rewritten as $2^{2(x+3)}$ so we have to solve $x + 2 = 2x + 6$. Then $x = -4$.

Exercise 5. By Pythagoras the missing side is 5 so cosine of the angle is $\frac{3}{5}$.