Question of the Day

Why do we call them functions? What *are* functions?

On the Docket

Concept Review: Function Composition
Concept Review: Inectivity and Inverses
Concept Review: Exponents and Logarithms
Quiz

Function Composition

Given two functions, f and g, we may take the composite functions

$$(f \circ g)(x) = f(g(x))$$

What does $f \circ g$ mean?

How do we read it?

Given $f(x) = x^2 - 3$ and $h(x) = \sqrt{x+1}$, evaluate

(a) $(f \circ h)(x)$

(b) $(h \circ f)(x)$

(c) $(f \circ f)(x)$

(d) $(h \circ h)(8)$

(e) $(f \circ h)(3)$

Injectivity and Inverses

Given $f(x) = 3x - 2$, find $f^{-1}(x)$.

Given $g(x) = \sqrt{x-3}$, find $g^{-1}(x)$.

Given $h(x) = \frac{x+4}{2x-5}$, find $h^{-1}(x)$.

For f, g and h, verify that $f(f^{-1}(x)) = x$, $g^{-1}(g(x)) = x$ and $(h \circ h^{-1})(x) = x$.

Exponent rules

$$a^0 = 1$$

$$a^1 = 1$$

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$a^{-m} = \frac{1}{a^m}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^m = a^m b^m$$

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

Logarithm Rules

$$\log_b(M \cdot N) = \log_b(M) + \log_b(N)$$

$$\log_b\left(\frac{M}{N}\right) = \log_b(M) - \log_b(N)$$

$$\log_b(M^k) = k \cdot \log_b(M)$$

$$\log_b(1) = 0$$

$$\log_b(b) = 1$$

$$\log_b(b^k) = k$$

$$b^{\log_b(k)} = k$$

Solve the following exponential equation

$$4^{2x^2} = 2^{8x}$$

Solve the following exponential equation

$$\frac{9^{x^2}}{27^4} = 3^{8x}$$