MATH 111i WORKSHEET 9

Name:_____

Work in groups to answer as many problems as you can. Ask questions if you get stuck. The numbers used on this worksheet may require a calculator. Keep in mind that numbers you will have on exams will be nice enough to do without a calculator.

1. Solve the following exponential equations. Simplify your answers, leaving them in terms of suitable logarithms and/or numbers.

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

   Answer:_____

   (b) $9^{x^2} = 9^{12-4x}$

   Answer:_____

   (c) $6^{x^2-3x} = 6^{20+5x}$

   Answer:_____

   (d) $9^x = 27^{2+x}$

   Answer:_____

   (e) $3 = 14^{9-2x}$

   Answer:_____

   (f) $8^{4x+1} = 1$

   Answer:_____

   (g) $10^{7x} = 3$

   Answer:_____

   (h) $6^{2+x} = 8^{8+2x}$

   Answer:_____

2. Given $f(x)$ and $g(x)$, find both $f(g(x))$ and $g(f(x))$.

(a) $f(x) = 2x + 9$, $g(x) = 2x - 1$

Answer:_____

Answer:_____

(b) $f(x) = x^2 + 1$, $g(x) = 6 - 4x$

Answer:_____

Answer:_____

(c) $f(x) = 2x^2 + 9$, $g(x) = 1 - 2x - x^2$

Answer:_____

Answer:_____

(d) $f(x) = 9x^2 + 10x + 12$, $g(x) = 2$

Answer:_____

Answer:_____

(e) $f(x) = x + 1$, $g(x) = \frac{2}{x-3}$

Answer:_____

Answer:_____

(f) $f(x) = \frac{1}{2}x - 3$, $g(x) = 2x + 6$

Answer:_____

Answer:_____

Cont.

3. Given $f(x)$ and $g(x)$, find both $f(g(x))$ and $g(f(x))$.

(a) $f(x) = 10 \cdot 4^x$, $g(x) = \log_4\left(\frac{x}{10}\right)$

Answer:_____

Answer:_____

(b) $f(x) = 2x - 4$, $g(x) = 10^x$

Answer:_____

Answer:_____

(c) $f(x) = e^x$, $g(x) = x + 3$

Answer:_____

Answer:_____

(d) $f(x) = 3x + 5$, $g(x) = \ln(x)$

Answer:_____

Answer:_____

(e) $f(x) = \log_2(x)$, $g(x) = x^4 + 1$

Answer:_____

Answer:_____

(f) $f(x) = \ln(x^2 - 1)$, $g(x) = e^{2x}$

Answer:_____

Answer:_____

Cont.

4. Given $f(x)$ and $g(x)$, determine if they are inverse of each other.

(a) $f(x) = \frac{3-x}{4}$, $g(x) = 3 - 4x$

Answer:_____

(b) $f(x) = \frac{1}{x-4}$, $g(x) = x - 4$

Answer:_____

(c) $f(x) = x^3 + 1$, $g(x) = \sqrt[3]{x-1}$

Answer:_____

(d) $f(x) = \frac{1}{x-1}$, $g(x) = \frac{1}{x} + 1$

Answer:_____

(e) $f(x) = \frac{1+x}{x}$, $g(x) = \frac{x}{1+x}$

Answer:_____

(f) $f(x) = \log_5(x^2)$, $g(x) = 5^{x/2}$

Answer:_____

(g) $f(x) = \ln(x-3)$, $g(x) = e^x + 3$

Answer:_____

(h) $f(x) = \frac{1}{3}\ln(2x)$, $g(x) = 3e^x$

Answer:_____

Cont.

5. Given $f(x)$, find $f^{-1}(x)$.

(a) $f(x) = 4x + 7$

Answer:_____

(b) $f(x) = 3 - 5x$

Answer:_____

(c) $f(x) = \frac{x}{2}$

Answer:_____

(d) $f(x) = x^3 - 4$

Answer:_____

(e) $f(x) = \sqrt[3]{x+2}$

Answer:_____

(f) $f(x) = 12x - 2$

Answer:_____

(g) $f(x) = \frac{1+x}{3-x}$

Answer:_____

(h) $f(x) = \frac{x-2}{x+2}$

Answer:_____

Cont.

6. Given $f(x)$, find $f^{-1}(x)$.

(a) $f(x) = \log_2(x+1)$

Answer:_____

(b) $f(x) = 10^{3x}$

Answer:_____

(c) $f(x) = e^{0.5x}$

Answer:_____

(d) $f(x) = \log_3(2x)$

Answer:_____

(e) $f(x) = \ln(x-3)$

Answer:_____

(f) $f(x) = 2^{x^3}$

Answer:_____

(g) $f(x) = \log_4(x^3-1)$

Answer:_____

(h) $f(x) = e^{1+\sqrt[3]{3x+4}}$

Answer:_____

The End.