

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 4.2

Math 1090

FALL 2009

SOLUTIONS

1. (a) $f(1) = 8^1 = 8$
- (b) $f(3) = 8^3 = 512$
- (c) $f(0) = 8^0 = 1$
- (d) $f(-1) = \frac{1}{8}$
- (e) $f(-2) = 8^{-2} = \frac{1}{8^2} = \frac{1}{64}$
- (f) $f\left(\frac{1}{3}\right) = 8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

2. (a) We have

$$\begin{aligned}25^x &= \frac{1}{5^{7-6x}} \\(5^2)^x &= (5^{-1})^{7-6x} \\5^{2x} &= 5^{6x-7} \\2x &= 6x - 7 \\4x &= 7 \\x &= \frac{7}{4}.\end{aligned}$$

- (b) We have

$$\begin{aligned}9^{2x-5} &= 27^{3x} \\(3^2)^{2x-5} &= (3^3)^{3x} \\3^{4x-10} &= 3^{9x} \\4x - 10 &= 9x \\-5x &= 10 \\x &= -2.\end{aligned}$$

- (c) We have

$$\begin{aligned}4^{x^2-1} &= 8^{x+1} \\(2^2)^{x^2-1} &= (2^3)^{x+1} \\2^{2x^2-2} &= 2^{3x+3} \\2x^2 - 2 &= 3x + 3 \\2x^2 - 3x - 5 &= 0 \\(2x - 5)(x + 1) &= 0\end{aligned}$$

so $x = \frac{5}{2}$ or $x = -1$.