University of Nottingham
UK | CHINA | MALAYSIA

Foundation Algebra for Physical Science & Engineering (CELEN036)

Homework 2

Topic 1: The method of completing the square

1. Use completing the square to solve the following quadratic equations. (*Give your answers either as fractions or in the form* $p \pm \sqrt{q}$)

   (i) $x^2 + 4x - 12 = 0$

   (ii) $x^2 + 5x - 6 = 0$

   (iii) $10x^2 + 7x - 12 = 0$

   (iv) $x^2 + 4x - 8 = 0$

Topic 2: Exponential functions

2. Solve the exponential equation for the unknown x.

   (i) $25 \cdot 3^x = 7$

   (ii) $2e^{12x} = 17$

   (iii) $3^{1-4x} = 2$

   (iv) $2^{3x+1} = 34$

   (v) $5^x = 4^{x+1}$

Topic 3: Logarithmic functions

3. Solve the logarithmic equation for the unknown x.

   (i) $\log_2 8x = -2$

   (ii) $\log(x - 4) = 3$

   (iii) $\log(2x + 1) + \log 2 = 2$

   (iv) $\log_2 x - \log_2(x - 3) = 2$

   (v) $\ln 5 + \ln(x - 2) = \ln(3x)$

Topic 4: Solving logarithmic and exponential equations

4. Use logarithms with the appropriate bases to solve each equation for the indicated variable.

   (i) $I = \dfrac{E}{R}\left(1 - e^{-\frac{Rt}{2}}\right)$, for t

   (ii) $y = A + B\left(1 - e^{-Cx}\right)$, for x

   (iii) $\log A = \log B - C \log x$, for A

   (iv) $A = P\left(1 + \dfrac{r}{n}\right)^{tn}$, for t

5. Find $f^{-1}(x)$, and give the domain and range.

   (i) $f(x) = e^{x-5}$

   (ii) $f(x) = e^{x+1} - 4$

   (iii) $f(x) = 2 \ln 3x$

   (iv) $f(x) = \ln(x - 1) + 6$