# CSD1251/CSD1250 Week 1 Tutorial Problems

2 – 8 January 2023

It is recommended to treat the attempt of these problems seriously, even though they are not graded. You may refer to the lecture slides if you are unsure of any concepts.

After attempting each problem, think about what you have learnt from the attempt as a means of consolidating what you have learnt.

Qn 1 (Definition, domain and range of a function)

Determine if the curve in each of the following parts is the graph of a function of x. If it is, state the domain and range of the function.

(a)

(b)

(c)

(d)
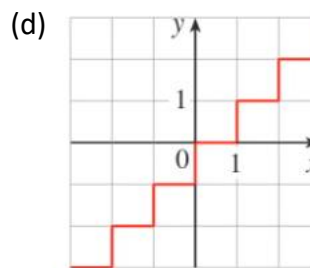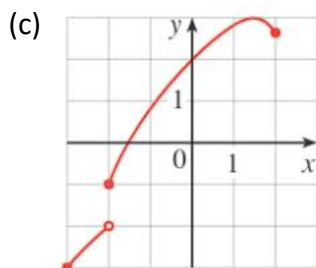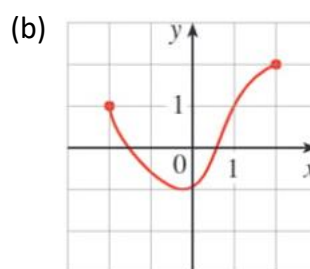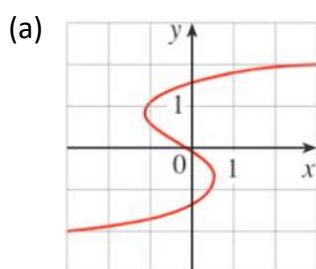
Qn 2 (Modelling using linear functions)

The monthly cost of driving a car depends on the number of kilometers (km) driven. Bob found that in May, it cost him \$380 to drive 770 km and in June it costs him \$460 to drive 1290km.

(a) Express the monthly cost C as a function of the distance d driven, using a linear function.

(b) Use part (a) to predict the cost of driving 2400 km per month. Give your answer in two decimal places.

(c) Draw the graph of the linear function. What does the C-intercept represent?

Qn 3 (Quadratic functions)

The following graphs below are graphs of quadratic functions f and g, along with some of their points. Find f and g.

(a)

(b)
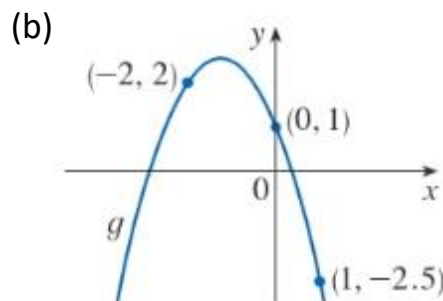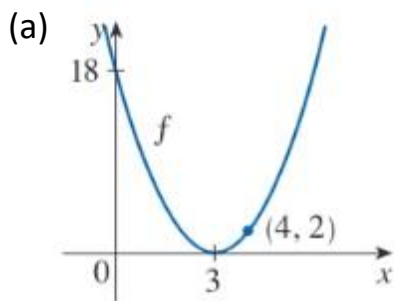
Qn 4 (Composite functions)

If you invest x dollars at 4% interest compounded annually, then the amount $R(x)$ of the investment after one year is $R(x) = 1.04x$.

(a) Find the functions $R \circ R$, $R \circ R \circ R$, and $R \circ R \circ R \circ R$.

(b) What do the compositions in part (a) represent?

(c) Find the formula for the composition of n copies of R.

Qn 5 (Inverse functions)

For the following functions and their given domains (if they are not given, recall in class to take the largest possible domain), check if each of them has an inverse. If they do, then find it.

(a) $f(x) = x^4 + 3$, $x \in \mathbb{R}$

(b) $g(x) = x^4 + 3$, $x \in (-\infty, 0]$

(c) $h(x) = 1 - \sin x$

Qn 6

The inverse for each of these functions are guaranteed to exist. Find the inverse of each of these functions.

(a) $f(x) = x^2 + 4x$, $x \geq -2$

(b) $g(x) = \dfrac{6 - 3x}{5x + 7}$

(c) $h(x) = \dfrac{1 - e^{-x}}{1 + e^{-x}}$