DAT – 204
Homework #1
Due 2/3/2020
Please submit all R code
You may put your answers after the code as a comment
Remember to include useful comments. They will be graded

1. Solve the following expressions using R:
   a.

$$\frac{4^2 + 9}{13 * 2}$$

   b.

$$\frac{18 + \sqrt{4 + 9^3} - 9}{\sqrt[3]{9}}$$

   c.

$$\frac{5/_4 + 37 - 8^3}{\sqrt{5}/_{(37+9)}}$$

2. Create a function that simulates rolling two special dice and returns the sum. The two special dice have the following properties:

Die 1:

- Six-sided with the following values: (1,2,3,4,6,6)
- Not weighted

Die 2:

- Eight-sided with the following values: (1,2,3,4,5,6,7,8)
- The values 1-6 are equally likely to be rolled
- The value 7 is twice as likely to be rolled as 1, 2, 3, 4, 5, or 6
- The value 8 is twice as likely to be rolled as 7 and four times as likely to be rolled as 1, 2, 3, 4, 5, or 6

3. Use simulation to calculate the probability of rolling a 13 or greater at least once in the first three rolls using the dice from problem 2.

4. The quadratic equation can be used to find the "roots" (x-intercepts) of a quadratic formula where the quadratic formula is expressed as $ax^2 + bx + c$. The quadratic equation is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Write a formula in R that receives three values: a, b, and c and returns the two roots. Test your function on the following curve:

$$x^2 - 2x - 4$$

HINT In this curve, a = 1, b = -2, and c = -4

The two roots of this curve are equivalent to:

$(1 - \sqrt{5},\ 1 + \sqrt{5})$