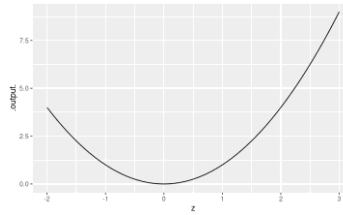Exercises in R – Math 141Z, Lesson 4

Check your memory! Can you graph the function $f(z) \equiv z^2$ over the domain $-2 \leq z \leq 3$?

Your output should look like this:

Maybe you want to define a function! You can define the function $g(x) \equiv 2 + 3x - 7x^2$ in R/Moasic by

```
g <- makeFun(2 + 3*x - 7*x^2 ~ x)
```

Task 1: Define the function above and click "run code". You should get no output and also no errors.

Task 2: Make the connection between the different ways for representing the function by drawing arrows (on this paper) between the mathematical notation and the R notation.
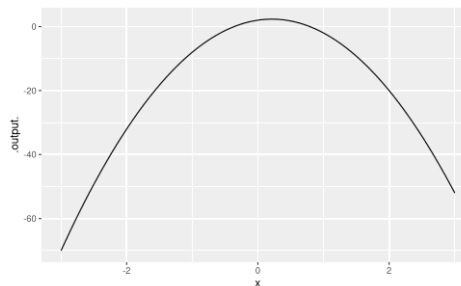
$$g(x) \equiv 2 + 3x - 7x^2$$

```
g <- makeFun(2 + 3*x - 7*x^2 ~ x)
```

Task 3: In R/Mosaic, type in `g(2)` and `g(-10)` and verify that you get the outputs of -20 and -728.

Task 4: Graph $g(x)$ on the interval $-3 \leq x \leq 3$ using the command

```
slice_plot(g(x) ~ x, domain(x=c(-3,3)))
```


Your output should look like this:

Task 5: Go back through the exercises on this page, circle things that you want to remember later, or write some notes below to help you remember these commands.
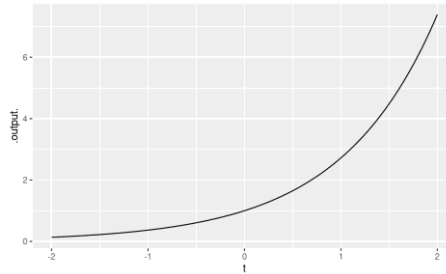
Task 6: Go to a new Sandbox (either A, B, C, or D). Create two new functions using the makeFun command, $h(t) \equiv e^t$ and $line(x) \equiv 3x + 2$.

Task 7: Check your work—for `h(2)` you should get `7.389056` and for `line(2)` you should get `8`

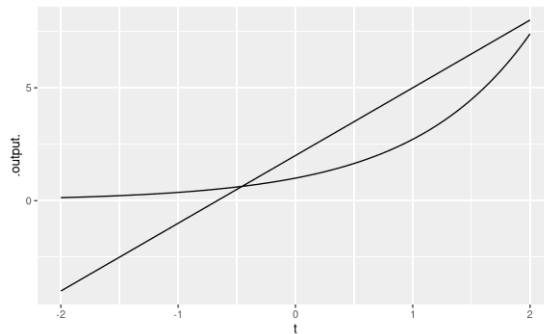Task 8: Use `slice_plot` command to graph $h(t)$ on the domain $-2 \leq t \leq 2$.

need a hint? `slice_plot(h(t) ~ t, domain(t = c(-2,2)))`

your plot should look like this:

Task 9: Now go edit your `slice_plot` command to have the pipe operator `%>%` after it, and then on the next line have the command `slice_plot(line(t) ~ t)`. Your commands should look like this

```
slice_plot(h(t) ~ t, domain(t = c(-2,2)))  %>%
slice_plot(line(t)~t)
```


and your plot should look like this

Task 10: Answer this: What is the difference between $line(x) \equiv 3x + 2$ and $line(t) \equiv 3t + 2$?

Task 11: You try it: Open a new sandbox (A, B, C, or D) and try to define the two functions $square(t) \equiv t^2$ and $root(t) \equiv t^{1/2}$, and graph both of them on the range of $0 \leq t \leq 2$. If done correctly, your graph should look like what is below: