MA113:025–027 Russell Brown
Review 1 September 16, 1998

1. Let $f(x) = \sqrt{x-4}$ and $g(x) = x^2 + 1$. Give the domain of f. Find $f \circ g$ and $g \circ f$.

2. Sketch the graph of $f(x) = 1/x$. Based on this graph, find graphs of $f(x+1)$, $-2f(x)$ and $f(-x+1) - 1$.

3. Suppose that a wheel of radius 1 meter rolls along the x-axis without slipping. If the bottom of the wheel is initially at the origin, find the coordinates of the point P after the wheel has rotated through an angle of $\pi/4$. Hint: How far has the wheel travelled after it has rotated through an angle of $pi/4$.

4. Consider the parametric curve

$$x = \sin t, \qquad y = \cos t.$$

   (a) Make a graph of the curve and give an arrow to indicate the direction we move as t increases.

   (b) Given an equation in x and y that every point on the curve satisfies.

   (c) Find a value of t where the y coordinate is as large as possible.

5. A population doubles every 10 days and after 20 days, the population is 400.

   (a) What is the population initially?

   (b) Give the size of the population after 23 days.

   (c) When does the population reach 20,000?

6. (a) Solve $2^{x^2} = 7$.

   (b) Find the exact value of $\log_3 1/9$.

7. Given the table of values fit a model of the form $N(t) = Ae^{kt}$. First, make a plot of t versus $\ln N$. What is the relationship between the line these points lie near and the values of A and k. Be careful, one of the values is wrong. Which value is wrong?

t	0	1	2	3	4	5
N	3	6	12	15	48	56